Leadership, Creativity, Military Innovation, and Future Warfighting

An Oral History of Admiral James R. Hogg, USN (Ret.), While Serving as Director of the CNO Strategic Studies Group from 1995 to 2013

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Interviewed by Dara Baker and Edited by William G. Glenney, IV

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Background

Admiral James R. Hogg, USN (Ret.), served as director of the Chief of Naval Operations (CNO) Strategic Studies Group (SSG) from July 1995 through September 2013 for SSGs XV through XXXII. While continuing to work directly for and reporting only to the CNO (as had SSGs I through XIV), the SSG focus during Admiral Hogg's directorship was the generation of revolutionary concepts at the operational level of warfare for the future Navy.

In addition, membership was increased from 6 to 8 CNO Fellows (U.S. Navy, U.S. Marine Corps, and U.S. Coast Guard O-6s) to 10 to 12 CNO Fellows (U.S. Navy, U.S. Marine Corps, U.S. Coast Guard, and U.S. Air Force post–major command O-6s), 10 to 12 Director Fellows (O-2 to junior O-5 from all services drawn from the student bodies at the Naval War College and Naval Postgraduate School), and 6 to 8 Technology Fellows (GS-13 to GS-15 or equivalent civilians with strong science, engineering, social sciences, and analytical backgrounds). This increase in membership was done to strengthen the quality of the SSG concepts and recommended actions.

Given the purposefully broadly defined nature of the SSG taskings from the CNO, and the diversity of the SSG membership, the SSG's success demanded a unique environment and equally unique modus-operandi—unlike any other organization within DOD. Therefore, the leadership challenges facing Admiral Hogg as the SSG director were unparalleled in the Navy.

This oral history is scoped toward capturing the leadership and mentoring approaches and techniques Admiral Hogg used to establish the SSG "Process of Innovation" as he guided 18 SSGs to successful mission accomplishment and professionally developed more than 400 military officers, of whom more than 47 attained flag- or general-officer rank, and over 100 civilians.

Admiral Hogg's leadership and professional abilities were the single most important factor in the SSG's record of sustained success in meeting the CNO's needs for 18 years and defining the U.S. Navy of the future.

—William G. Glenney, IV

A Note of Explanation

The motivation for this document was to provide a comprehensive and enduring explanation of why and how the CNO Strategic Studies Group was restructured at Admiral Boorda's direction, along with details covering the SSG Process of Innovation, the SSG's internal dynamics, and all related aspects of the SSG modus operandi. Someday, should the Navy leadership decide to return in some fashion to an SSG approach to leadership development, creative thought, and warfighting innovation, this document will provide a proven successful starting point.[1]

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1   This oral history, supplemented by "An Approach to Warfighting Concept Generation: The CNO SSG Concept of Operations for Innovation" (September 2019) by William Glenney, provides the commander's intent, mission guidance, underlying principles, and mechanics that resulted in CNO SSG mission success over its most recent 21 years. In addition, the Center for Naval Analyses (CNA) conducted a review of the entire 35-year history of the CNO SSG that was documented in an 11-volume set retained in the CNO SSG archives at the Naval History and Heritage Command (NHHC).

Chapter One
The Strategic Studies Group

The SSG: Some History | The Storyline: "SSG 101" | The SSG's "Daily Experience"

A Peek at the First Week | The SSG: The Name | A Review of SSG 1.0: 1981 to 1995

The Birth of SSG 2.0 | The SSG Coordinator Position | Associate Fellows: Junior Officers

Scientists, Engineers, and Analysts | Selection of CNO Fellows

Selection of Associate Fellows | Two Stipulations by the CNO

(Editor's note: This is an edited version of the first of five parts of Admiral Hogg's SSG oral history, originally recorded at the U.S. Naval War College on 29 September 2016.)

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Dara Baker (DB): Thank you, Admiral Hogg, for doing this SSG oral history. First, a couple of general information questions. Where and when were you born?

James Hogg (JH): Annapolis, Maryland, in November 1934. My dad was a student at the Postgraduate School, which at the time was at the Naval Academy and later, in 1949, relocated to Monterey, California.

DB: Can you tell us a little more about your father? Your mother? Do you have any siblings?

JH: My dad was a career naval officer, married in 1929 to my mother, who was from Chicago. I have two sisters and a brother—all alive. My brother is a doctor of entomology at the University of Wisconsin in Madison. One sister is an artist who lives in Ohio, the other sister is married to an IT "genius" and they live in Greenville, South Carolina.

DB: And your mom and dad?

JH: Deceased. Born in 1903 and 1910.

DB: And you were raised in Annapolis and Monterey?

JH: I left Annapolis at the tender age of 1, heading to the West Coast as a Navy Junior.

DB: When and where did you graduate from high school and where did you go to college?

JH: I went to three high schools: George Washington in Alexandria, Virginia; Granby in Norfolk, Virginia; and my senior year was at Severn School, a boy's boarding school in Severna Park, Maryland, where I completed my senior year and, concurrently, a cram course for the Naval Academy entrance exam. From high school, at the age of 17, I went straight to the Naval Academy. Full circle, back to Annapolis.

DB: After graduating from the Naval Academy, what did you do?

JH: All I wanted to do in life was to be in the Navy. It started during World War II. I remember clearly. I was very aware of what went on in the war because Dad was in command of a destroyer in the Western Pacific fighting the Japanese. In 1944, I was 10 years old and I recall deciding, right then, that I wanted to be like my dad—to join the Navy and get command of a destroyer. I never wavered, and it happened!

DB: I presume your dad was very proud of you?

JH: I'm sure he was, and it was terrific because he lived long enough to attend the change of command ceremony in Yokosuka, Japan, in 1983, when I took command of the Seventh Fleet. Dad died a year later, peacefully, age 81.

DB: So, post-graduate education?

JH: The Navy did not—over the years since World War II—value education that much. We wanted people out training the way they would fight. Maintaining warfighting competence. So, typically you got one shot at a war college. Not junior and senior schools like the other services. My shot was the Air Force Junior War College in Montgomery, Alabama, and, while there, I completed an MBA off-campus with George Washington University.

DB: Would you have liked to?

JH: Yes, I tried. I tried very hard. I was married to an English lady and I requested the Imperial Defense College (senior course) in London. The Bureau of Personnel in its wisdom told me, "No. You are coming back to the Bureau." So I said "I thought if you are screened up—which I had—that only a four-star admiral can derail you." The answer was, "the Chief of Naval Personnel is a three-star admiral, but he ranks in authority over personnel as a four-star admiral. You're coming back to the bureau." That dream was over!

DB: Today, we will focus on the general question of how the SSG was founded and how you got involved.

JH: As I started preparing for this SSG oral history, it really struck me that I'm in a unique position simply through my presence and participation with the group over the years. The SSG had two distinct lives in two phases. The first ran from 1981 through 1994 and, in hindsight, I labeled it "The Strategic Phase." The second life, from 1995 through 2016, was the "Generation of Revolutionary Warfighting Concepts Phase." I was the SSG director during the second phase from 1995 through 2013 and, as it turns out, I am the only person who was directly involved in all aspects of the group's transformation to its second life. The transformation included development of a process of innovation, which itself was unique, not only in the military, but throughout the public and private sectors.

With that introduction, I'm now going to do something unconventional. Rather than explain the transformation in increments, I'm going to give my audience here the SSG "pitch." The pitch is, in effect, the SSG's

story line, since every project to be successful needs a story line: one that is compelling [and that], over time, evolves and develops into an even more compelling and complete story. Then I'll go back to 1995 and relate the story step by step.

So, to the storyline: I call it "SSG 101" [Appendix A to this oral history], which I personally drafted in the summer of 1995. It was always the first handout received by every arriving member of the SSG: CNO Fellows, Director Fellows, Technology Fellows, and staff.

"SSG 101" goes like this: "How would you like to be in a group that is carefully designed to bring together military officers, scientists, engineers, and analysts to review naval capabilities from as many viewpoints as possible, while being encouraged to challenge all assumptions? With military officers serving in fellowships from seven to 10 months, spread across ranks from lieutenant junior grade (O-2) through captain (O-6) and other service equivalent ranks from the Army, Air Force, Marine Corps, and Coast Guard. Diverse in experiences and in technical and professional skills. Along with civilian scientists, engineers, and analysts serving in two-year fellowships providing technical support, creative thinking, technical continuity, and more diversity. All operating under the basic tenet that 'good ideas have no rank". Where a lieutenant's ideas can be as good as, and frequently better than, a crusty old Navy captain's ideas. With access nationwide across the science and technology community, all laboratories and research centers, all military organizations, all companies in the public and private sectors, and every scientist in the world. In an environment where to the extent practical all constraints are lifted. With the group's sole purpose being generation of revolutionary warfighting concepts to move the Navy into the future. All members serving a common purpose with shared enthusiasm which, over time, becomes infectious; while reporting directly and frequently—five times a year—to the top leader in the Navy, the CNO, with his full support. That group is the CNO Strategic Studies Group. Come join us!"

The title "Strategic Studies Group" no longer fits. Starting in 1981 and for 14 years, the SSG was totally involved in strategic studies in areas of national security and military strategy. In 1995, the purpose changed to the generation of revolutionary warfighting concepts, primarily at the operational level of warfare—at times moving up to the strategic level to provide an overview of concepts and, at times, moving down to the tactical level to show how concepts would be successful in the battlefield; but the going-in lane was always the operational level of warfare. So, the SSG really became, as it moved from its first life to its second life, an "operational research and concept development center." That is what each group did: research, with rigorous analysis, applied through creative thinking to generate concepts that would change the Navy. There was not time in one year for a group to develop a concept fully. It took, for example, 20 years for the Navy to develop naval aviation, a very revolutionary concept, to the point that it was ready for World War II. That was just in time, as it turned out. But there was time in one year to mature a concept to the point where first-order experimentation could commence. And, with some SSG concepts, continuity brought them forward for several years as subsets of other concepts. So, the SSG strived through its innovation process to bring concepts

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to the point where experimentation could happen; still embryonic, but framed by an operational blueprint that looked into the future, and accompanied by a roadmap that incorporated high-potential technologies.

That's the storyline, and here comes the compelling line: as with "SSG 101", I drafted "The SSG's Daily Experience" [Appendix B to this oral history]. It was the second handout received by each arriving member and it went like this: "Here at the SSG during the January through May time frame—for five months—we foster an environment that is as unconstrained as practical. You may wonder how we can possibly do that with a group of military people who are trained to live within defined boundaries, but we do. Our reasoning? How could we expect you to think innovatively or creatively, in order to have a chance of coming up with revolutionary concepts, if the environment constrained your thinking? It wouldn't work. Having said that—and it does sound great—I want you to know in advance, on this very first day, that working in an unconstrained environment will be different. For some of you, the transition will not be easy. It will be very difficult. It means you will be out of your comfort zones much of the time. It will seem just short of chaotic at times. Ideas will self-generate, collide, and then regenerate in other forms. Things will not be orderly or efficient. There will be too much overlap across concept teams.

The solution? None needed; none intended. These things happen in an unconstrained environment. They are the price one must pay in order to get to the core creative thinking we need. The approach to take? Lots of collaboration, lots of cross-concept team coordination, lots of teamwork, a "yes, and . . ." attitude, and enjoy yourselves. Have some fun while you're at it.

The scene will tighten up in June as the concept teams come together to integrate their efforts into a cohesive presentation for the CNO. That's when your exploration winds down and the arduous integration work begins; at which time, you will find your new, expanded, comfort zones and you will be much better prepared to put together your briefing for the CNO, which, if done right will change the Navy."

DB: How were the "SSG 101" and this other document generally received, especially when you started bringing up the idea of beneficial chaos?

JH: I covered these on the first day. No question members were surprised, somewhat skeptical, and, to a degree, a little overwhelmed. But they were professional people. They listened and absorbed much of what I said. I paced the content flow. Told them to review these handouts, and others to come, at least weekly for a month; by which time, they would be settled in and ready to move forward, aggressively.

Equally important, this was the beginning of a one-week orientation during which I spent 12 hours in four three-hour sessions with the group. I've just given you the tip of the iceberg. I'll go into more detail, later, about many of the other things I expressed that week, all of which I reinforced frequently during the year. Put together, they formed what I called the dynamics within the SSG process of innovation; a process which, itself, was the overarching framework for creative thinking. And, over time, those dynamics became a culture in the SSG. For example, as we wrapped up the intense first week, I would look them in the eye

and say, "If you commit yourselves unconditionally to the SSG's work, by the time you leave here, each of you will be a different person. You will think differently. You will think innovatively. I want creative thinking seared into your souls!" And at the end of each year the vast majority of members would write, or tell me directly, that the SSG had changed the way they thought about things. Some said it had changed their lives. It was rather amazing. At first, I thought they were saying it to be polite, but then I heard it from second and third parties, so I knew we were being successful. For example, a Navy captain in one of the SSGs—a submariner who retired as a Rear Admiral—held his retirement ceremony in Dam Neck, Virginia. It was during a conference, so there were a lot of flag officers there, mostly active duty: a couple of four-stars, about eight three-stars, and a whole bunch of two-stars and one-stars. I also attended. Rear Admiral Arnie Lotring got up to make his remarks and, when he reached a certain point he turned to me and said, "There's something I want everybody here to know. I was in the SSG for a year and Admiral Hogg changed my life." A very significant moment for Arnie and the SSG, and you could feel the impact on the attendees. I didn't change his life, the SSG did.

DB: You said the name "Strategic Studies Group" may not have been as applicable during its second life. Did you contemplate giving it a different name?

JH: Initially, I thought about changing the name, but I quickly realized the SSG in its strategic format was known in the Navy and among "think tanks" in positive ways; so, I decided to keep that name. But I would spend up to an hour that first week discussing with each group what the SSG's change in focus in 1995 really meant. I would say, "If the CNO called me today and said, 'we know the SSG is no longer strategic in orientation. You're at the operational level of warfare. Revolutionary concepts. I want you to change the name to reflect what you do.," I would respond, "CNO, the SSG is your "operational research and concept generation center", as I mentioned earlier in this discussion. That truly reflected the SSG in its second life.

Now, let's return to the beginning, not 1995 but 1981, and relate the complete story. The Strategic Studies Group was established in 1981 by Admiral Tom Hayward, then the CNO, as an opportunity for flag-competitive Navy captains and Marine Corps colonels—typically post-major command—to sit back for the better part of a year—10 months—and learn how to think strategically. His second reason was to form a group of strategic-minded senior officers who could contribute directly to the Secretary of the Navy, John Lehman's, Maritime Strategy development.

The SSG did some excellent work through the 1980s. In particular, the first three groups put together employment constructs that contributed to a potential winning strategy against the Soviets in the Norwegian Sea and the Kola Peninsula during the peak of the Cold War. At the time, I commanded the Seventh Fleet and we did significant at-sea experiments to support those constructs.

By the early-1990s, during Admiral Frank Kelso's term as CNO, the SSG moved intellectually into the Pol-Mil area, primarily because the director preferred diplomatic solutions over military force. His ability to do this was aided by "Tailhook" distractions that virtually consumed the CNO, so Frank had little time to work with the SSG.

Pol-Mil for the SSG did not sit well with Admiral Kelso's relief, Admiral Mike Boorda, who took command of the Navy in April 1995. Admiral Boorda felt—and he told me this personally—that he had plenty of Pol-Mil advice readily available right in the Pentagon and he wanted the SSG to return its focus to war fighting. His concern was underscored when a task force of the CNO's Executive Panel (CEP), chartered by Admiral Kelso in 1994, briefed Admiral Boorda on the results of its study titled "The Status of Innovation in the Navy." The task force concluded that insufficient creative or revolutionary thinking was going on in the Navy, "a situation" in the words of the CEP, "that has existed since Vice Admiral [William F.]"Red" Raborn completed integration of the Polaris missile into a nuclear-powered submarine in the late 1950s under the leadership of Admiral Arleigh Burke, the CNO." So, the task force's first recommendation was for the CNO to establish an organization in the Navy dedicated to generation of revolutionary warfighting concepts. Their second and less-advertised recommendation was for the CNO to disestablish the Naval Doctrine Command in Norfolk, Virginia, and from its ashes stand up the Navy Warfare Development Command (NWDC), to be collocated with the Naval War College in Newport. Their reasoning was that NWDC would have a future warfare division that would take the SSG's revolutionary warfighting concepts onboard and conduct the detailed initial experimentation process of modeling and simulation, war-gaming, prototyping, and test-bedding with rigorous analysis of the results; then, iterate with continuous corrections and up-grades until each concept was mature to the point that it was ready to enter the research and development stage. The SSG's focus would be concept generation; NWDC's focus would be concept development. Both at the operational level of warfare.

Just two days after the CEP task force made its recommendations to the CNO, in late April 1995, I met with Admiral Boorda in his Pentagon office to discuss anti-submarine warfare in the Navy. At that time, I was the president of NSIA, the National Security Industrial Association, established by Secretary James Forrestal at the end of World War II with a charter to maintain close relationships between the military and the defense industrial base to ensure readiness for future mobilization, if ever needed. I spoke with Admiral Boorda on behalf of NSIA's ASW committee, whose research had shown that ASW was being neglected by the Navy. For example, the term ASW was "no longer on any office door" in the Pentagon. In other words, there was no dedicated ASW office in the Department of Defense. The reason was that a year or so earlier, a Navy mission area study chartered by Admiral Kelso and directed by Vice Admiral Bill Owens developed a mission area matrix that defined ASW not as a mission area, but as an enabling capability that supported several mission areas. As a result, ASW had "lost its way." That could not stand because ASW is not just a Navy mission, it is a national requirement, and the Navy is the only military service that can conduct it effectively in all of its parameters. So, when I finished my pitch to Admiral Boorda on the need for an ASW director

in OPNAV responsible for all ASW requirements, programming, priorities, and funding Navy-wide, Mike agreed and said he would make it happen.

Before I could even thank him, Mike said "Now that I'm going to do this significant thing for you, would you do one small thing for me?" I had known Mike since he was a commander and I was a rear admiral, and I responded, "Of course, Mike, whatever you'd like." He looked at me and said, "I want you to return to the Navy and become the director of the SSG." I was surprised, yet being well aware of the SSG and its current situation, I told Mike I considered it to be a "Sleepy Hollow." I added that having been retired from active duty for only four years, there were a number of other interests I had in mind to pursue. Mike quickly countered by saying, "Let me explain. I want you to totally transform the SSG from a strategy cell to a vibrant group whose sole purpose will be the generation of revolutionary warfighting concepts for the future of the Navy." Those were his words, his idea. He then added, "At the operational level of warfare to change the Navy, and you can do this transformation in any way you want. Resources and funding are not an issue. All I ask is at the end of the each year your group report out to me in person, followed by a written report for Navy-wide distribution, with concept proposals that I can pursue to change the Navy."

My naval career had been more operational than staff duty, with 10 sea tours, five of them in command, spanning 20 of my 35 years of commissioned service. Beyond that, I basically thought at the operational and strategic levels. I had commanded the Seventh Fleet. I had been the director of Naval Warfare, one of the three major directorates in the Navy Department; beyond that, my heart was still in the Navy. When I was serving, federal statute required that all officers regardless of rank retire from active duty after 35 years of commissioned service. At that point in my career—my time to retire—I was only 56 years old with an abundance of ideas and energy, and a very strong motivation to continue serving.

Mike's proposal meant that I could return to the Navy at an executive level, in a civilian position, and continue to serve in ways that would help build the Navy of the future. How could I say "no"? My response was a straightforward, "Yes." Mike—somewhat surprised—said, "Aren't you even going to discuss this with Anne first?" I explained that I had been with NSIA for four years, the longest I had been in one organization and lived in the same place in my entire life. Plus, a couple of weeks earlier, Anne and I agreed we were getting restless and both of us felt it was time to move on to something else. We were ready. So, Mike then stood up and we sealed the deal with a handshake.

My commitment was for just short of four years to coincide with Mike's term of office as the CNO. That afternoon, Mike sent a SPECAT [special category] message to all Navy flag officers telling them, and this is a quote, "Admiral Jim Hogg is returning to the Navy to direct the SSG through a major transformation. If he calls, if he asks you for anything, just give it to him." How's that for an amazing level of support!

DB: That should have made your efforts a lot easier than they could have been otherwise.

JH: Yes. My status as a retired four-star combined with what I had done in the Navy drew respect from the active duty flag community and made it easy. Mike's SPECAT message made it even easier and set the stage. The next day, I informed NSIA's board of directors that I would be leaving in two months, at the end of June. I then called the director of the CEP, Captain Robby Harris, and set up a day later in the week for the task force to give me the same presentation on revolutionary thinking that they had given to Admiral Boorda earlier. After the presentation, Robby and I sat down and wrote the charter for the soon-to-be transformed SSG, which would be SSG-15 to convene on 1 September 1995. The CNO signed the charter a few days later. Anne and I were off and running, just like our Navy days with 17 moves in 35 years. We loved it. Our house went on the market for sale and three of our four children—with the fourth in college—made plans to relocate to Newport: lock, stock, and barrel.

I arrived at the SSG in Sims Hall on the Naval War College's extended campus on 6 July. The SSG was not in session. It was during the two-months-off period in the one-year cycle. The permanent staff of four were on hand to greet me. The previous director had already departed. I suggested that we get some coffee and meet in the conference room in 10 minutes; and, I thought to myself—I actually remember this—"I wonder how flexible these civil servants will be to change because, while they don't know it yet, in just a few minutes their workplace is going to be turned upside down."

DB: Had you had a lot of previous experience working with the civil service and GS employees?

JH: Not a lot compared to civilians, but I served two tours in the Bureau of Personnel, and two tours in the Pentagon in Washington, and in all of those we had a lot of civilians around at both the secretarial and management levels. So, yes, I had enough experience. And the way Robby and I wrote the charter, the CNO directed the Naval War College to provide lots of support for the SSG. I didn't report to the president of the War College. My boss was the CNO and he was the reporting senior for the captains and colonels serving as CNO Fellows in the SSG. I was the reporting senior for the other officers and civilians. War College support focused on logistics, computing resources, budget management, and human resource management. The SSG's budget came directly from our sponsor in Washington, but the funds were channeled through the comptroller at the War College. We also had legal support from the War College; and, most of all, we received a lot of intellectual support from the War College. I personally thanked the War College faculty and staff annually for their sustained and strong support.

Now, back to that first staff meeting. We conducted in-depth introductions, then I explained the general structure I had in mind for the SSG's transformation. The deputy director, Dr. John Hanley, had been involved with the SSG in one way or another since its inception in 1981 and, as it turns out, he was both ready and anxious for change. He told me he had chaffed considerably over the Pol-Mil focus the past two years and was excited about the transformation. John, among other talents, was experienced in war gaming, which fit right into my plans. Plus, he believed in rigorous analysis and his comfort zone encompassed strategic, operational, and tactical thinking. He also had military experience as a nuclear-trained submarine

officer and was still active in the Navy Reserve. It was pretty clear to me that John and I working together would have the first-generation transformation in place and ready to implement when the SSG- XV CNO Fellows arrived two months later on 1 September.

DB: Were you involved in the selection of the SSG XV CNO Fellows or was that something that was done earlier?

JH: The CNO had already selected the CNO Fellows, but there were a number of related aspects that I will explore with you now. Since the CNO told me to set this up any way I wanted to, I did. He put a retired four-star in the position for a reason, and I didn't go back and ask Mike to approve the details. I just told him what we were doing in broad terms, and the SSG's composition evolved. As I mentioned, when I arrived, there were four members of the permanent staff and there were nine CNO Fellows selected.

When Mike sent out his message to all flag officers, I knew we would be overwhelmed and would need somebody in the SSG who could coordinate all of our activities, both internally and externally. So, soon after my arrival, I called the Chief of Naval Personnel (CNP) and asked him for a limited duty officer (LDO) lieutenant, an administrative specialist, to fill a new position as the SSG coordinator. I arrived on Wednesday, I called CNP on Thursday, and the officer arrived the next Monday. A five-day turnaround from request to arrival, without a billet! It was rather amusing because my predecessor, whom I did meet before I went to Newport, told me his biggest frustration as the SSG director was lack of support from the Bureau of Naval Personnel. I didn't have the heart to tell him that Vice Admiral "Skip" Bowman, who was the Chief of Naval Personnel at the time, had been my executive assistant when he was a captain and I was a vice admiral; so, for me, getting support from the Bureau was no problem. The lieutenant specialist expanded the staff.

Then, three years later, as information technology needs kept growing, we realized we needed an IT specialist as an additional member of the permanent staff. And, the very first year, with the CNO's approval, I added a reserve officer as a CNO Fellow. So, we went from nine to 10 CNO Fellows. The plan was for this CNO Fellow to rotate yearly between a selected reserve (SELRES) and a full-time support (FTS) reserve officer on active duty. Of interest, Bill Glenney, who became the deputy director in November 1998, was the reserve officer in SSG XV.

The idea for a significant increase in SSG manning was sparked when the CEP task force briefed me in April 1995. At the end of the briefing one member—a noted physicist, Dr. Charles Herzfeld—commented "There's one thing I'd like to explain." This is very clear in my memory because it was so impacting. He continued: "No scientist, nobody in the S&T [science and technology] community in the world has ever come up with the true kernel of a new idea beyond the age of 35." I countered, "Charles, what about Thomas Edison?" He said, "Of course, he invented things after 35 with his team of engineers and scientists. Scientists do great things after 35, but the kernel of the idea that was the catalyst for all of this came when they were younger."

I decided to stop arguing and one of the first things John Hanley and I discussed as we were setting up the new organization, was the need to bring in young officers. It took about two hours of discussion, going back and forth in brainstorming mode, and we came to the conclusion that we needed lieutenants and lieutenant commanders. We felt a lieutenant had enough experience to be able to get into this group of senior officers and not be overwhelmed. Lieutenant commanders with even more experience, but still young (under 35), would have open minds and be potentially creative in thought. We knew we could go to the Chief of Naval Personnel and ask him to canvas the entire Navy for candidates, but how would we control that? Would we have interviews? Bring officers deployed in the Western Pacific back for an interview? That would be very difficult and awkward. And what about a standard by which we could measure their academic ability? The SSG was never intended to be academic, but we knew we needed to have participants with a certain level of intelligence that we could determine roughly through academic performance. So we decided to go to the two institutions in the Navy through whose portals at least 70 percent of all the young officers we would want would pass through. Those institutions were the Naval Postgraduate School for lieutenants and the Naval War College for lieutenant commanders. Once that was decided, I called the president of each and said, "I would like to have eight lieutenants from the Postgraduate School and eight lieutenant commanders from the War College to come to the SSG for a six-month fellowship each year. Can you do that?" Of course, they responded, "Yes, we can do it." So, that added 16 more people to the group. We called them Associate Fellows.

Moving forward to 1997 in a meeting with the CNO, Jay Johnson asked me "What are the weaknesses with the SSG's program, if any?" I replied, "The one weakness is continuity of scientific thought." To fix that he agreed to add eight engineers, scientists, and analysts to the SSG. These were civilians we brought in, with one exception, from the Navy's research laboratories and warfare centers. When we did that, we cut back on the number of Associate Fellows coming from the PG School and War College to six each because of space limitations. In fact, I didn't want to have any more people. I wanted to keep the number down. It turned out, with these additions, the number ended up being 35. So, by the end of 1997, the composition of the SSG was pretty well set. The number of CNO Fellows shifted around a little bit. We dropped the reserve officer after two years because of some difficulty we had with the Chief of Naval Reserve. General Chuck Krulak, the Commandant of the Marine Corps, pulled out one of his two Marines, and then we added an Air Force officer in 2008 (for eight years). In 2014, we added an Army colonel. We always had the other services represented among the senior and junior officers, including the Coast Guard, Army, Air Force, and Marine Corps. That is how SSG manning evolved.

DB: How were SSG selections made in 1995 and moving forward?

JH: The CNO continued to select the CNO Fellows. The only difference was that before I arrived, they were screened through the director of Naval Warfare directly to the CNO, which I did when I was in that position for three years in the late 1980s. I shifted screening to the Bureau of Naval Personnel. Some people

asked, "Why? You're going to lose control." I responded, "No. I'll inject a Jim Hogg rule into the process." So, I said to the Chief of the Naval Personnel, "I'd like your detailers to screen these nominees." Here's why: The selection process started with the Chief of Naval Personnel sending out a letter to all four-star admirals (and lower-ranked flag officers in community leadership positions) asking for nominations for the SSG. Typically, approximately 35 nominations would come in. I said to the Chief, "I want the detailers to review those names for appropriateness. The rule will be that nobody in the Bureau can take a name off the list, and the whole list has to go to the CNO for his review and selection, but you and I will 'rack and stack' the nominees and we'll recommend seven naval officers to the CNO. Then, it will be up to the CNO." He could select our seven or he could select from the whole list, or he could select others not on the list. It was his SSG. He could do what he wanted to do. There was nothing statutory involved. This was all administrative screening.

Why get the detailers involved? On review a detailer might say, "This Captain So-and-So, obviously he's terrific, but if the CNO selects him he'll be ripped out of his command of a CVN after only one year in command." Now, we were not going to do that. The detailers would footnote these things, so when I met with the Chief of Naval Personnel in January to review the whole package, three times over the years there were footnotes that compelled us to delete a nominee from the list. It's the value of the detailer review that prompted me to set up the process that way, and my intuition here came from having served for seven years in the Bureau. The final package went from the Chief of Naval Personnel, with my endorsement, via the VCNO to the CNO.

I selected the Associate Fellows with the president of each institution. I would go to Monterey and interview with the superintendent (now president) of the PG School. I would do the same here at the War College. I told the two institutions, "You can screen in whatever way you wish. For the finals, I want to interview people who are true volunteers, and no more than 12 nominees in total." Typically, we would select six from the PG School and six from the War College. That meant half of those interviewed were not selected. But we would list two or three of those as alternates. The two schools would send the names to the detailers in the Bureau. As with the CNO Fellows, I wanted the detailers to let us know if there was reason why a selectee should not come to the SSG. For example, one was the flag lieutenant to the president of the PG School. The detailer came back and said, "If he goes to the SSG, he will be in zone for selection to lieutenant commander without a shipboard fitness report as a department head, and he will not be selected for promotion." The PG School president and I agreed with the detailer and he was authorized to move to the first alternate. Also, with the alternate approach, we were not "slam-dunking" the detailers, which I felt was important. The detailers needed some flexibility, which, it turns out, was not abused.

Of note, I had the leadership responsibility with all CNO and Associate Fellows to make sure their post-SSG assignments were consistent with their new qualifications and their competency.

To select the civilian scientists, engineers, and analysts, the deputy director prepared a letter for my signature that went to all research labs and warfare centers in the Navy, telling them, "We are looking for candidates with these particular skills and backgrounds." Those nominated came to Sims Hall and spent a day with us. Each candidate was interviewed by eight people during the day, and gave a lunch-time presentation on a topic chosen by the deputy director—a topic that would draw out creative thinking. After the afternoon interviews, each candidate met with me at around four o'clock for the final interview. It was a very strenuous process. During my interview, the deputy director would slip the vote sheet in to me so I would know how the eight interviewers felt about that candidate. In almost every case, I agreed with their majority vote. It was very effective and I was able to tell each candidate, at the end of my interview, the final decision.

I'll step back now for a moment and relate an engaging discussion I had with the CEP task force members following their presentation in June 1995. That's when, for example, Charles Herzfeld said, "You need people under 35." It seemed to me the members were pretty excited because they recognized I would be the catalyst to bring their proposal to fruition. They were the ones who recommended to the CNO that he set up a creative group. They didn't say, "Get Admiral Hogg." They didn't say, "Do it in Newport." They just said, "Set something up." And, I told Admiral Boorda when I accepted his offer during the handshake moment that I did have two stipulations. One was that these task force members—there were 10—rather than moving on to other task forces and purposes within the CEP, would remain as the SSG's board of advisors for the foreseeable future. Mike agreed. They actually continued for the next 21 years, with the board of advisors meeting with the group three to four times each year. It was wonderful continuity and support.

DB: So, all of the members of the initial CEP task force? Or how much turnover was in that Task Force over the 21 years?

JH: Turnover, about one person every four years. The same co-chairmen, Walt Morrow and Ben Huberman, were in place for 18 years.

The second stipulation was that no SSG member would depart the Group before completion without the express approval of the CNO.

Chapter Two
Makeup of the Strategic Studies Group

Diversity of the SSG Members | Collaboration within the SSG

Teamwork within the SSG | "Yes, and . . ." Improvisation

Interactive Teamwork | The CNO's Theme | The CNO's Commitments

The CNO's SSG! | Relationships Between the SSG and the Naval War College

Geographic Bachelors | Five Sessions with the CNO

"The Power of Collaboration": An Example

(Editor's note: This is an edited version of the second of five parts of Admiral Hogg's SSG oral history, originally recorded at the U.S. Naval War College on 10 November 2016.)

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Dara Baker (**DB**): In our first recording, we left off in 1995, when you arrived in Newport.

James Hogg (**JH**): That's right. Mid-July 1995. John Hanley, the deputy director, and I were putting together a program to enable SSG XV, which would arrive on 1 September, to step out smartly. An important aspect of our planning was to bring diversity to the group. So, I'll start this second session with my feelings at that time about the value of diversity for the SSG and how we achieved it.

DB: Are you going to talk a little bit about what diversity meant at that time?

JH: Yes. Initially, I came up with the idea that we should put the pieces in place for what I thought of as an SSG Process of Innovation. At that early stage, I was vague about what form it would take, but I did have strong belief in its importance for the SSG's success. This was to be an overarching process of innovation. I recognized, while it might take several years to evolve into a mature process, there would be several critical components in development of the process. These components were: group diversity; resource support from the Navy; the right environment that would be conducive to creative thinking; access to top Navy leadership with a commitment by the leadership that would connect directly to the group—the leadership being the Chief of Naval Operations; authority to have access across the nation, in the S&T community, to all scientists, to all engineers, all corporations public and private sector, every individual in the country, across the military, across all research centers; and, the ability to collaborate based on group teamwork. I knew that, over time, all these components would need to be codified and pursued relentlessly.

I also knew, for sure, that diversity needed to start right away. We had the first group coming in September. This was July. I needed to be prepared to explain diversity to them and to start putting the pieces in place to

ensure SSG XV would actually have diversity. So, for a few minutes, I'll cover what I did at that point about diversity.

First, it was pretty obvious to me that a group of white Anglo-Saxon middle-aged males—no matter how smart they might be—would most likely come up with traditional results simply because they were like-minded people with similar backgrounds. This was not diversity and I knew this would not lead to the breakthrough innovation needed to come up with revolutionary warfighting concepts. To underscore this, over the years I would tell each incoming SSG that with a group such as described above, I would be able to predict the outcome of the product before they even started their work!

My idea of diversity included race and gender, and then stretched way beyond those elements to include a wide-ranging mix of backgrounds, experiences, interests, and intellectual depth. I also had the idea, based mostly on my intuition, that we needed more women in the group; because I knew women think differently than men, and they frequently come up with ideas that are better than ideas by men.

DB: Did that sort of initial intuition and thinking prove correct?

JH: Absolutely. With this mindset, there were several avenues through which I could build diversity into the SSG as a group. First, among the CNO Fellows, the group of 10 captains and colonels selected by the CNO. I was involved in that selection process starting with SSG XVI. Then, we had the Associate Fellows program, the younger officers I have already discussed in some detail. And we had the technical civilians and the SSG staff. Lots of opportunities to build diversity.

In addition to diversity, I identified another critical component for the Process of Innovation that would need to start right away: the ability to collaborate based on group teamwork. "Right away" meant the very first session with SSG XV, the day they arrived. I needed to be ready to lay it out to them clearly and convincingly.

For each group, starting with SSG XV, I walked them through a teamwork narrative that itself matured over time. Each time I gave it, I had more ideas and more thoughts to include. Just imagine: I had 10 captains and colonels coming in from various assignments, all leaders in their own right, all hand-selected for this position, one-third of whom would make flag; and, I would tell them, "Teamwork in the SSG is different from any form of teamwork I have ever seen in my military and civilian experiences, and from anything any of you have ever experienced. That's because teamwork in the SSG requires a total openness, dropping all baggage, holding nothing back. The walls must come down. Holding back would be the biggest barrier to teamwork and the biggest barrier to the SSG's success. And most of the time, it would be totally unintentional, but it can happen. Every one of you must join the group unconditionally."

I said to groups, "You will share all your thoughts whether or not you've developed them. You will be totally open and trusting. Starting right now, you will have no defensive mechanisms, therefore no egos to

protect." I paused for a moment, then continued, "Let's think about that. Egos. You're able to critique others in positive, constructive ways and accept constructive criticism in the same way without an ego. Starting right now, you're going to start building relationships with everybody in the SSG. You'll be able to suppress any personality dislikes. There are always little personality differences. You'll find something good about each person, build on it in positive ways, and let the other little differences slip away. As the program gets moving, you're going to be able to set your ideas aside when it becomes clear that the SSG as a team will be best served by pursuing other ideas, and you'll support those other ideas. And, during the final four to six weeks, your concepts will lose their individual identity. They will become SSG concepts. They'll be briefed to the CNO and others as SSG concepts with all of you in agreement. In fact, nothing will be briefed to the CNO that you don't all agree to. That is SSG teamwork!

"It's one thing for me to say all of this. It's another for you to be able to do it. It'll be easier for some, much more difficult for others, but it's worth the effort since this group's ability to come up with innovative ideas— concepts that will truly change the Navy—will depend directly on your ability to work together as a closely knit, intellectually aligned team. Complete collaboration. That's the SSG way and the only way."

DB: So, as you were coming up with this teamwork model, what in your experience made it clear to you that this was the way the SSG had to work?

JH: My main experience is, of course, with the Navy. I didn't think about it much as I was "growing up", but I've been told by people after the fact that "Hey, I like the way you held that meeting," or "I like this," or "I like that," or "you did it differently than anybody else I've ever seen do it". I opened up. I let people open up. I let young people say what they wanted to say. So, I had an open-minded attitude. And now, coming to the SSG, Mike Boorda gave me a blank check and an open mandate to do whatever I wanted to do as long as each group produced. To accomplish that, I knew I had to "open minds." I relied on my past experience to do this.

I also knew that I had to get a mix of people who were diverse in talent, experience, and background in order to accomplish this; and I had to get them prepared, then let them go do it.

DB: As part of this sort of opening discussion, did you talk about what kind of preconceived notions they might have about each other or this was all sort of something that you expected them to do internally?

JH: Only to the extent that there would be personality likes and dislikes that must be overcome. I stayed away from the design side of it. That would have taken us off my desired path and I did not have the formal education for it. But I did give them ways to think about it, which I'll get into in a minute.

I then would tell them, "Each of you is a big deal in your own right in the Navy. I know that. I also know that each of you is an individual who, operating in this selfless manner that I have described, will as a team do some great things.

"There are ways to go about developing teamwork. First, teamwork depends on relationships. You can start building relationships by understanding the other person's perspective—his point of view. Taking this to another level, you can strengthen budding relationships through empathy—not sympathy, but hands-on empathy. The ability to empathize is the most genuine way to build relationships, professional relationships as well as personal. You just need to have had some similar experience in life, which all of you have, and you can empathize. Taken to another level, in a much broader sense, relationships are what life is all about. Relationships at all levels. Let's start with your spouse, then your children, your extended family, your friends, and those in your profession. I think it's fair to say that the world turns on relationships and—no surprise—relationships open the opportunity for coordination, cooperation, and beyond that, collaboration.

"I can't stress collaboration strongly enough. Collaboration defines the highest level of teamwork. It's a fact that the ability to collaborate increases as the closeness of the team increases. Pretty obvious. No teamwork, no collaboration. How important is collaboration to the SSG's work? Dynamic collaboration can take a team to places you've never dreamed of. You have no idea what you can accomplish with collaboration. John Cotter said, 'Good innovation is the product of great innovators, while great innovation is the product of good innovators sharing their ideas and collaborating.' Once again, true collaboration."

DB: So, the effort that is put in and that every SSG participant puts into a full—almost a team think rather than an individual thinking process—is what you're going for?

JH: Not at all. It is individuals thinking and coming together to share that thinking as a team. That is definitely not group-think. It is group collaboration based on individual thinking and research. Cotter's quote is very prophetic because it's all about the powerful process of individual creativity, group sharing, and collaboration.

So, back with the group: "Let's get into a little more depth on teamwork. In true teamwork, there's never a 'no' or a 'maybe' in response to a new idea or a new thought because these responses will immediately kill it off. They will kill off any cooperation or collaboration. That's human nature with defense mechanisms kicking in. But you, with no defensive mechanisms, can make this work. So, how do you make it work? What is the response to a new idea or a new thought in a true team environment? You have 'yes' and you have 'yes, and . . .'. You have 'yes, I agree' and 'yes, and have you thought of this other aspect,' or 'yes, and let's consider adding another dimension, such as…'. Here, you're participating in building the strength or substance of the other person's idea or thought. And, when two or three people get together like this and start to do the 'yes'/'yes, and . . .' positive thought process in building on an idea, they come up with dimensions to that idea that are very innovative. And, there is also 'yes, I understand.' Here, you don't necessarily agree, but you do understand it. You give credit for that. This at least keeps the discussion going with the potential through cooperation and collaboration to build substance into the idea or thought, or to decide to drop it."

The SSG discovered the 'yes, and ...' approach at an improvisation theater in Manhattan in 1998. We actually went down to Manhattan for an off-site for a couple of days, spending one afternoon at an improv theater during their off-show time. The improv actors taught us the 'yes, and ...' approach.

DB: Was the improv event something that you arranged for the SSG or you attended an improv and someone picked up on the 'yes, and ...'?

JH: We arranged it for the SSG. Bill Glenney set it up. We wanted to inculcate creative spontaneity into the group's psyche. This was during phase one in the area we called "teambuilding and mind stretching for creative thinking."

DB: I think for some of them it must have been quite a mind stretch to think about how an improv team could help them move forward as a team?

JH: The mind stretch came when they were put up on the stage to do it themselves, to do it in front of their peers. It wasn't just two instructors talking. They talked first and then we got up. We spent three hours interacting. Everybody got up and did it at least twice, me included. A couple of people didn't want to do it. They were afraid. But, when they did it, the fear lifted and the defenses came down. They learned that the rest of the group would not let them fail. It was a great experience for all of them. In fact, I told groups after that experience, "This isn't something that you could just use in the SSG. 'Yes, and ...' is something you can use in life." I've used it with my wife. I didn't surprise her with it. I explained it to her first. And then one day, we were having a discussion that started to get off-key—off-kilter—and before you know it we were heading into an argument. So I said, "Yes, and," agreeing as a lead-in to my next comment, and the whole thing—the whole argument—dissolved into a discussion.

It really works in real life. That's probably one of the reasons why so many SSG members, when they departed the SSG and for years later would say to me, "The SSG changed the way I think about things and the way I express myself, and it changed my professional life." One Army major actually said to me, "I'm a better person and I'm a better father and husband because of the SSG experience." You can't imagine how good that made me feel!

DB: It's interesting because— as you know—most of us are taught or experience the argue component, but not the build-upon. There's almost always some adversarial component to it. So, I think it's very important for people to know the SSG model is positive reinforcement and building of ideas. A collaborative discussion or debate, rather than having someone stop the discussion.

JH: Yes. Then I would tell them to take this to a level I called interactive teamwork. I would say, "This takes thoughtfulness and hard work on a continuing basis. It is not a one-time event. You have to work on it throughout your time here. And, if you really commit yourself as I said earlier, and you combine this with it, then there are no limits to the creativity that your group could apply to come up with new ideas."

I then would go on to say, "In summary, to wrap up this teamwork session, here are three important elements of teamwork." (I did this to help them understand how to go about it a little better.) I would say, "The first is that to be a real team participant one must join the team unconditionally. There's no other way. Can you imagine a team participant thinking, 'I won't talk about this idea I have until I'm certain I have it right? I just need to read a couple more books, talk to a few more people, and then I will lay this out.' That approach is called "internalism", which is not helpful to team performance. You're holding back. What teams need is "externalism" at every level of participation. It doesn't matter that you haven't developed your thinking on a topic enough to make it ready for prime time. Lay it out now so that prime time will come much quicker and be much better because you'll generate collaborative support for your idea. That is total openness and that is an important key to creative thinking."

DB: How did you deal with people who may have been internal processors rather than external processors?

JH: It was pretty easy to identify them. Typically, about one out of five. It's not a bad thing.

DB: Not at all.

JH: In other words, they didn't knee-jerk and make quick decisions. They liked to think about something overnight. And that's fine, but don't think about it for three weeks. Get it out. I would talk with them privately. My job as the leader was to get conditions set so everybody could contribute to the best of their ability. So, I would get individuals aside and talk about things with them, whether they were good or bad. I might get to a young lieutenant and say, "You know that idea you threw out yesterday? You didn't get much response from it. You keep on it. That's a great idea. It has super potential. And get a couple more guys working on it with you." Or, I'd pull a captain aside and say, "You know, you really had an opportunity yesterday to project some of your thoughts. You could have participated in a much more positive way in that session. Don't hold back. You have a lot of good thoughts and your participation is important for the success of the group." I loved doing those things, and it helped build the team.

Next I would say, "The second important element of teamwork is relationships. I've already talked about this, but I can't emphasize it enough.

"The third is collaboration, remembering that 'yes, and ...' builds relationships and stimulates collaboration."

Finally, I would say, "There is one more thing I want to say about teamwork because I talked about the need for you to like everybody and the need for you to agree in areas that are beyond self. That might generate a misconception. You might think I'm saying that liking everybody rules out feelings of passion or rules out heated interactions when you're pressing your beliefs. That is absolutely not the case. Not only is passionate behavior expected, it is a very important part of the innovation process. You must debate up to a point at which everybody can disengage still as friends because the interaction has been professional and positive, as

contrasted to negative. And, up to a point at which all thoughts have been argued through and exhausted. Such that it is clear the time has come to start building on an agreed foundation with minority and diverse thoughts dropped for the sake of needed progress toward a stated SSG objective.; And, keeping in mind what I said earlier that nothing—nothing—will be briefed to the CNO that is not agreed by all the CNO Fellows. So, if you can't break through the argument, then we're going to drop that topic. It is not going to see the light of day. That's how important teamwork and collaboration are to the SSG."

DB: So, you've talked quite a bit about the approach and the SSG attitude. How did the SSG Fellows come up with the project that they were working on? Did you start with a discussion of what had been done in a previous SSG? Was it a general open question about the CNO's needs for a new idea? How did that process evolve?

JH: That's a good area to get into now. The original SSG charter I wrote with Robby Harris—who was N00K at the time, working directly for the CNO—simply said, "The SSG will generate revolutionary warfighting concepts." So, I told SSG XV, the first group, and SSG XVI as well, to go for their passion. John Hanley and I set up a program during the first three months that included teambuilding, mind stretching, and visits by a lot of subject-matter experts. We also did some significant international travel in October before the Associate Fellows arrived. Two weeks in Europe and two weeks in the Orient. The 10 CNO Fellows fit nicely into a Gulfstream Mark IV, which I arranged through the Navy [and] that stayed with us the whole time.

DB: Not a bad way to travel.

JH: For sure! We would visit six to eight locations in Europe and the same in the Orient. The idea was that during this travel, the Group would look out to 30 years and beyond at the challenges to the Navy in terms of national security. Based on what they learned, they would generate warfighting concepts designed to deal with those challenges. It looked great on paper. It was my idea, so I thought it was super! At the conclusion of SSG XV, I sat down with the group to critique the year. Just the group and me, nobody else. Not even the deputy director, who I debriefed later. One of the major critique comments was, "Foreign travel was really great, but, honestly, it didn't help us in our work and it didn't leave enough time to mature the group's concepts." So, we cut the foreign travel for SSG XVI in half. But, at the end of the next year, SSG XVI made the same critique.

It's amazing how helpful these critiques were because over the first three years we changed the SSG's Process of Innovation at least 75 percent, or 25 percent each year, until SSG XVIII, when we settled on a process which pretty much stayed the same with minor adjustments for the remaining 14 years. Changes to the process and other SSG initiatives were almost always based on these critiques and ideas from within the group. I called it "self-generating, the very best way." I didn't need management experts from the outside to tell me how to run a group whose success depended upon leadership and collaboration.

After the second year and that same critique, I thought, why don't we just get the CNO to tell us what he wants? Then we could devote the full first three months to preparation for the research and concept generation work ahead. So, I talked to the CNO and he agreed to a CNO Theme for each year. The first CNO Theme was for SSG XVII. Short and perfect! Basically, it said, "You are a maritime task force in the 21st century operating forward in the littorals. How would you accomplish your mission?" That was it. SSG XVII's work generated a lot of good ideas that were the catalyst for much of the work in SSGs XVIII through XXI.

The CNO Theme for SSG XVIII, built upon SSG XVII, was, "You are a maritime task force in the 21st century operating forward in the littorals. Engage the most difficult land targets from the sea—concealed, buried, mobile, moving—and develop, conceptually, a C4ISRT (command, control, communications, computers, intelligence, surveillance reconnaissance, and targeting) capability to engage these targets." That generated a concept called Sea Strike which greatly influenced the Navy, and was the catalyst for FORCEnet.

Another significant CNO Theme was "Develop a blueprint for the Navy's future in cyberspace." It spanned SSGs XXVI and XXVII, with concepts that changed the Navy. Foremost was stand-up of the TenthFleet (the Navy's cyber fleet) and the cyber warrior community. Another significant CNO Theme was "Take the Navy to the age of hypersonic and directed energy weapons," reinforcing the railgun, which the SSG had already introduced. And, it brought a prototype high-powered tactical laser to the Persian Gulf soon thereafter. I could go on. It would take a three-day workshop to cover all of this, which will be documented in the broader SSG history that is underway.[2] That is how the CNO's Theme came about.

There were a number of other aspects that had to come together for the Process of Innovation to hit full stride. An important one was the need for a strong commitment from the CNO. I was the director with six CNOs and, in most cases, each incoming CNO really didn't know much about the SSG other than the war-fighting concepts it produced. They had little idea how we went about it: the internal dynamics, the Process of Innovation, and—beyond products—additional SSG value for the CNO directly.

DB: Did you hope or anticipate that any of the SSG fellows would eventually become CNO?

JH: I hoped that they would become flag officers. One third of the CNO Fellows, in the 18 years I was there, made flag and 10 of them became three-star admirals. Several of the Director Fellows have made flag from the early years, which will continue as they become more senior. We have had two Director Fellows become the CO of the Blue Angels. These were hand-picked, very competent people.

Back to the CNO's commitment. I covered some of this earlier. I met with each incoming CNO before he was even announced and spent a couple of hours with him discussing all aspects of the SSG. This was

2   In November 2018, under supervision of, and in partnership with, the Naval War College Institute for Future Warfare Studies, CNA completed a review of the entire 35-year history of the CNO SSG, producing an 11-volume set of documents retained in the CNO SSG archives at NHHC.

important because the SSG wasn't very popular with some sections of the Navy. For example, in budget and program management areas. These people worked endless hours to develop the program of record (POR) for the Navy. We came along and sort of trashed it by saying, "Well, that's OK for now, but here is where you need to go and where you need to allocate your priorities for funding for the future." Programmers definitely did not like to be told that, and the budgeteers hated it. Plus, the warfare sponsors didn't like the idea of having some of their best post-major command captains go to the SSG. They had other places to put them. So, that is why one of the commitments I would ask from each CNO was that he would personally select the CNO Fellows and that no CNO Fellow could leave the SSG early without his personal agreement.

When meeting with the CNO I would say, "You have to buy into the SSG to make it successful. It's not my SSG. I am your on-scene director. It's your group. You need to agree that you will be the reporting senior for the CNO fellows—their ISIC; that you will meet with them at least four times a year to review their work progressively; your agreement that they may be authorized access to any individual or organization in the public or private sector to pursue their research; your agreement that the chain of command is directly to you." These were very important points. Combined with my rank as a retired four-star, these commitments made it very easy for me to lead the SSG and get everything from the Navy we needed for the group's success.

DB: So, the design of that with the CNO being the ISIC meant that you really could be in a team-building advisory capacity rather than a supervisory capacity?

JH: Not at all. I was the SSG's supervisor, team builder, and on-scene leader; but, I made sure the ideas they generated were their ideas, not mine. I would tell them, "It's up to you to come up with the ideas." They would then say to me, "But what do you want us to do?" My response: "That's not the right question because I don't know what you should do beyond the CNO Theme. The Theme is overarching for your work, to the extent that current understanding provides. But the Theme does not limit your creative thinking. Conduct your brainstorming and research, then ideas will come. Some of them will be beyond the scope of the Theme. That's even better.

 "When you open up to the CNO, they will be your ideas. They can't be my ideas. Why? If Navy leadership got the feeling that I was pushing the SSG in a direction, and that I had my own agenda, it would not be acceptable. They would say, 'What is going on?' When I was a flag officer in the Pentagon, if I saw the director of the SSG having the SSG research his ideas to take to the CNO to change the Navy, without my participating, I would not have liked that at all. This has to be the CNO's SSG. The themes have to be his themes. The concepts generated have to come from the group, and the CNO has to approve them before they are implemented in the Navy; otherwise it will not work. The SSG would be marginalized over time."

DB: Two other things I'd like to follow up on are the recruiting diversity and how you went about doing it—getting as much diversity as possible in terms of race, gender, experience. Also, if we can talk a little bit today about the relationship between the SSG and the Naval War College.

JH: First, the Naval War College: I recognized the need to keep the SSG outside of the Beltway. I did not want to get down there. Too many professional distractions being so close to the Pentagon. And some people said, "Why don't you go to Norfolk to be on the waterfront?" I said, "I want the SSG to be with the intellectual center of the Navy." I really recognize the War College as the center of strategic thinking and the center of intellectual activity in the Navy. Both. I believe that, and I say it every time I talk in public, including a speaking tour in Florida in 2016 as an outreach initiative for the War College.

So, there was no question that we should be in Newport. There were some local perturbations since the Navy's plan was to tear down Sims Hall. In fact, the Navy threatened to tear down Sims Hall three times during the 18 years I was the director and each time the "gallant old lady" survived. When McCarty-Little Hall was being built, the SSG was offered the penthouse floor. Concurrently, the Naval Doctrine Command in Norfolk was disestablished and out of the ashes was created the Navy Warfare Development Command, which was relocated in Sims Hall. Well, the whole idea behind the SSG's generation of warfighting concepts was intended to align with the Navy Warfare Development Command. That's what the CEP task force had in mind. In 1995, they made two recommendations to the CNO on how to get the Navy back into the generation of revolutionary ideas, as I have mentioned earlier in a different context. The first was the SSG. The second was to disestablish the Naval Doctrine Command (NDC), which was not working well in Norfolk, and establish a new Navy Warfare Development Command (NWDC) under the president of the Naval War College. It had a division designed to take the SSG's revolutionary concepts and start the iterative process of concept development. Keep in mind, the SSG didn't develop concepts, we generated them. We didn't cut any metal. We didn't prototype. We didn't do test-bedding or live experimentation. When I saw that NWDC was coming up to Sims Hall in 1998, I decided the SSG would stay in Sims Hall, as well, to be close to them.

With respect to the Naval War College, specifically, I was very careful in drafting the SSG's charter to write in the relationship between the SSG and the War College. It also covered the Naval Postgraduate School and every other Navy command with which the SSG would interact for support and information exchange. But, it specifically said the War College would provide both material support and intellectual support. Material support being the computing systems and infrastructure needed in Sims Hall. It stated the comptroller at the War College would be our comptroller. That didn't mean he could take money away. We had our own resource sponsor for funding. But, he would make sure the money allocated to us was spent properly since, as a research group, 90 percent of our money was in the research and development line that had complex and different spending procedures.

There were also "one-of-a kind" needs. We had a problem early on with one of the lieutenants from the PG School and an admiral's mast was needed. So, I arranged for the president of the War College to do

that. And, we were very close in other areas. I met, and still do, every month with the president of the War College. Three times a year, the War College president (once a year with the PG School president) and I interviewed together to decide on which students would come to the SSG as Associate Fellows. That relates to the other side of your question on diversity, since that is one of the ways we focused on building diversity in the group. That's where we could select women and minorities. We would, in advance, tell the PG School, for example, "We need a Coast Guard officer," or, "We need this," or "We need that." And we made sure they were available to interview. That didn't mean they would be selected, but I would have opportunity to evaluate them. In 1997, the CNO agreed to add another component to the SSG—what we eventually called Technology Fellows—which provided another opportunity to reach out for diversity. So, I think that covers your question pretty well.

DB: I think it does. One quick question: I know that here at the Naval War College it's usually an expectation that when someone is here as a student, their family will most likely also come to Newport. Is that also something that was part of the SSG Fellow model?

JH: In our modern Navy homesteading is prevalent, and there is always a tug between families staying put and relocating with their husbands or wives. Many wives, for example, have professional careers of their own. It's just not like it was when I was growing up. When I married Anne, there was no way that I expected her to work. And, we were together everywhere with our four children: in the U.S., in Japan, and in Brussels. But, now it's different, so I did make accommodations for geo-bachelors. One year, we had two geo-bachelors in the group from San Diego, all the way across the country. We started a spring break approach over Easter for the SSG. A three-day-long weekend. And, I said to those two guys, "Hey. Go home for a week. Get away from here for a while and when you come back, you will be ready for the final push."

Each year several families stayed in DC or Norfolk, so the Fellows would fly down for weekends. But, I did tell them in the first week that, while we were very sensitive to their humanitarian needs, we were not as accommodating for geo-bachelors in that we did not permit geo-bachelors to leave at noon on Friday and return at noon on Monday. That approach was taken at some shore commands, but would not work out here; especially after I had just given them the long talk about teamwork and the need for unconditional commitment. So, we had an extended Christmas–New Year's break plus a Thanksgiving break and the spring break I mentioned. Other than that, it would be immersive participation which they seemed to understand. Typically, I'd say four of the 10 CNO Fellows would be geo-bachelors. Related to this, after I set up the Associate Fellows program with officers from the PG School in Monterey, California, I explained to the CNO, Admiral Boorda, what I had done. He said, "Wow. What about their wives?" He picked on that aspect right away. I replied, "Some of the wives stay out there because they're working, but most of them come to Newport and settle in. They find a place for six months just like you and I did when we were junior officers." It worked well.

We have already talked about group diversity and about the ability to collaborate based on group teamwork. I have also talked about the SSG's relationship with the CNO, which I will expand upon for a moment. Over time, we increased the number of CNO events to five. So, the CNO Fellows would spend a week in DC in the October time frame. They'd get briefings by various people and get a lot of exposure: visit DARPA [Defense Advanced Research Projects Agency], NAVSEA [Naval Sea Systems Command], ONR [Office of Naval Reaearch], and other installations and commands, and have their first session with the CNO. I was very careful to tell each CNO, "The first time you meet, the CNO Fellows will know nothing. They will just be trying to figure things out. When you meet with them next in January, they will tell you what they've been doing and how they plan to conduct their research—'The way ahead'—but they will still not be prepared to talk about war-fighting concepts. That's because we will have spent the first three months mind-stretching together for the research phase that starts in January." And, it is amusing because after a couple of years with Vern Clark as CNO—he really liked the SSG and its products—he said to me, "These are not just professional ideas. The way you are developing these people as leaders is really interesting. Including their ability to think creatively. So, why don't we do a short course, say four or six weeks? You can turn out many more people who will be better leaders and who will think creatively." I responded, "Vern, it doesn't work that way. It takes three months to get their minds stretched to the point where they can even start thinking creatively."

There would be two more sessions with the CNO in April and June that led to each group's final session in July, in which the CNO Fellows presented their final report. So, through this process of five sessions with the CNO, timed to coincide with major milestones in the Process of Innovation, each CNO would progressively see the group's thinking expand and mature as they progressed through the year. Thus, by the time they briefed the CNO in July, with revolutionary concepts, he was ready for them. Others who heard the briefing for the first time were surprised. "Where did you come up with that idea?" was a frequent comment. And, some of these ideas were amazing. How was that possible? Through persistent application of the most critical component of the process of innovation—collaboration!

Here is a classic example of the power of SSG collaboration: Synthetic fuel for combatant ships, aircraft, and land vehicles. It came out of nowhere. One of the concept teams was working on something that had nothing to do with synthetic fuel. They were looking ahead to see what the challenges would be to our ability to operate in the future. They brainstormed, came up with about 75 challenges and thought, "This is too many to deal with." So, we pulled together the whole group for three days in a workshop to have them present all their ideas, and then, through group debate and discussions, they knocked the number down to about 15. The concept team then started researching, and every time they looked in-depth at an idea, they realized somebody else was already working on it or its implementation would have marginal value; so, after further debate, the breakthrough came. They said "One of the difficulties we could have in the future is energy availability. Fuel. What if our tankers are sunk and we can't get fuel to the fleet? Or what if the cost of fuel goes up to the point it inhibits our ability to operate?" So, they concluded, "Why don't we generate

fuel synthetically from carbon-based materials?" They jumped all over it, did a great job, through rigorous and in-depth research and analysis. In fact, when they discussed it with the CNO, Admiral Mike Mullen, in June, he said, "This idea of synthetic fuel is not just a concept, it is a program ready to be briefed to Navy leadership for approval. So, after you've done your full presentation in July, I want you to stay in DC. The next day you are going to brief a CEB [CNO Executive Board for decision making] to present your synthetic fuel proposal." So, here it was, something that nobody in the SSG had even thought about until February, just four months earlier. Nothing from October through February, then all of a sudden it took hold because collaboration kicked in and the concept team reached a high level of creative thinking. Amen!

Chapter Three
Strategic Studies Group Internal Culture

Self-Generation: The General Cartwright Story | Planning for SSG XV

Analytical Capability and the Center for Naval Analyses

Meeting with Admiral Jay Johnson: Strategic Thinking? Approval for Technology Fellows.

New Title for Associate Fellows: Director Fellows | Technology Fellows Explained

Director Fellows: Primary Participants—Embrace Them!

Director Fellow Interviews at Naval Postgraduate School

Informality with Respect to Rank | Evolving into the Concept of Operations for Innovation

Internal Dynamics: Growing an SSG Culture | The SSG's Crest, Credo, and Tattoo

The SSG Calling Card | Red Team–Blue Team | Changes in the SSG Charter by Admiral Clark

SSG Day One and Introductions | SSG Day Two | "Being Bold" | Critical Thinking

Comments by President, Naval War College

"A Lieutenant's SSG Experience" | Description of the SSG

(Editor's note: This is an edited version of the third of five parts of Admiral Hogg's SSG oral history, originally recorded at the U.S. Naval War College on 15 November 2016.)

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Dara Baker (**DB**): Thank you for joining us for part three of the SSG oral history.

James Hogg (**JH**): I'd like to start with a story about General Cartwright which reflects the self-generating approach by the SSG: the group at large, as concept teams, and as individuals across all ranks. The topic was cyber warfare and one of the concept teams wanted to meet with the military's leading cyber warfare command, at that time a double hat for the U.S. Strategic Command (STRATCOM) headed by General Cartwright, a Marine Corps four-star general.

One of the lieutenants on the concept team took the initiative to call the chief of staff at STRATCOM, who happened to be a Navy captain, to request this session. It was all set up for a full day at STRATCOM'S headquarters in Colorado Springs. Five of our people were to participate.

Two days before the event, the chief of staff called the lieutenant and said, "I'm really sorry to say that General Cartwright, who was going to spend the first hour with you, is now going be out of town. But everything else is on track for the full day." So, the lieutenant—without checking with anybody in the SSG,

which I like very much—said, "We'll come, of course, and do you think we could come another time as well to meet with General Cartwright?" The chief of staff said, "Just a minute." About a minute later "he" came back. But the person on the phone wasn't the chief of staff, it was General Cartwright, who said, "Young man, not only can you see me again, but I'm coming to Newport to see you and I'm going to be there in a couple of weeks." That is how the meeting in Sims Hall was set up.

When I was told about this, I smiled and thought, "If the SSG were a normal military command and some young lieutenant had arranged for a four-star general to come meet with people in my command without my even knowing about it, would I be upset?" Of course. Was I upset about this? Of course not.

This is what I wanted our people to do. This was taking initiative, and self-generation at its best. This was thinking not out of the box, but in many boxes. My next thought was, "We've arrived at a point with this group where they are going to do great things."

DB: And not only because it wasn't setting up with the meeting with General Cartwright for the lieutenant, but for the entire SSG?

JH: He was setting it up for his concept team and everybody else in the SSG who was not traveling, about 25 people total, on a voluntary basis.

Now, let's go back again to the summer of 1995, planning for SSG XV, because there are a few things I need to pick up on. After deciding on the Associate Fellows program, John Hanley and I talked about how to set up an analytic capability for the group in order to perform rigorous analysis. Without it, you are nowhere. You can't come up with a new idea, just throw it over the transom and expect people to pick up on it. You have to have rigorous analysis. And, you have to have a compelling story. You start with a storyline. Then you develop the story. Stories in this case aren't fairy tales. Every project of significance in the world has been supported by a compelling story. People had to buy into it. So, we went to Bob Murray, president of the Center for Naval Analyses [can] and asked for a full-time analyst, which he provided.

After the first year, we realized we needed more analytical support, so we brought in three analysts from CNA, but not full time. We brought them in for the last four months of the program because that's when most of the analytic work was done. In critiques, from the analysts and the SSG members, we found that approach did not work out well since the analysts weren't with us from the beginning and could not provide sustaining support. Relationships among fellows and analysts took time to develop, which needed to happen before the bulk of the analytic effort commenced.

So we looked for another approach. It came in 1997, when I met with the CNO, Jay Johnson and the Vice Chief or VCNO, Admiral Don Pilling. The reason they asked me to visit the Pentagon and talk was to determine, with the SSG no longer in strategic studies, if that was a problem for the Navy? Was there now a black hole for strategic thinking? I reviewed with them the Navy organizations responsible for strategic thinking.

OPNAV N5, who basically did "slicks," not rigorous analysis; N00K, chartered to administer the CEP and to do long-range planning for the Navy, but was neither funded nor manned for long-range planning. I then said, "Yes, there is a hole," and told the CNO about a strategic group that had been at the Naval War College shortly after World War II which I knew about because my father had been a participant. Basically, the president of the War College took six captains who had completed the one-year course and had them stay on for six more months as a strategic cell. It seemed to work well, but only existed for a few years.

Jay Johnson liked the idea and said he would tell the president of the War College to start it up, which Vice Admiral Art Cebrowski did. Art, bless his soul because I admired the guy greatly, decided to use those people not for strategic thinking, but as a way to implement his ideas on net-centric warfare which, while important, prevented the strategic cell from making strategic contributions.

Next the CNO asked, "Is there any area of weakness in the SSG that you want to strengthen?" I said, "Yes, there is: the need for a stronger analytic capability, and the need to maintain scientific thought from one SSG to another." The CNO then approved positions for eight civilian scientists, engineers, and analysts, and it was up to me to decide the mix. We eventually gave them the title "Technology Fellows." I then reduced the number of Director Fellows at the PG School and the War College. Instead of eight and eight, we went to six and six because we needed space for these Technology Fellows and I didn't want to build too large an organization.

DB: And the civilians that came onboard, were they permanent positions and people that would stay with the SSG?

JH: They came onboard for one year and those who did well would be asked to stay a second year. Those who did extremely well would be asked to stay a third year. So, of the eight, typically six to seven would stay a second year and two to three might stay a third year. That gave us continuity and provided a cadre that had experience in the SSG. It worked very well. We drew these people primarily from the Navy's warfare centers and research laboratories.

Let's move now to computing and the SSG's maturation in the IT world. In 1995, when emails were just starting to gain traction, I was still using faxes for sending quick notes to people outside the SSG. But, we provided computers for all SSG members right away. And we realized the War College, which provided our server support, was behind the power curve with respect to IT. Way behind. I had a couple of our IT-savvy young officers conduct a quick study of four institutions that taught at the graduate level: the PG School, the Naval War College, Harvard, and MIT. The idea was to see what we could learn from where they stood in terms of the IT capability they provided their students. As you would expect, MIT was way up there with Harvard close behind. The PG School was doing pretty well, and the Naval War College was in need of help.

I provided the results to Rear Admiral Jim Stark, president of the War College, who kick-started some important IT initiatives. The SSG had some work to do as well. During the first three SSG years, our

intelligence specialist, provided by the Navy's intelligence community full-time for, typically, a three-year tour, was double-hatted as our IT specialist—Commander Dan Gallagher, and he was excellent. When Dan retired, we decided it was time to bring a dedicated IT specialist to our staff, who would link closely with the IT people at the War College. The purpose was to ensure our IT systems, their displays, and connectivity were as close to state of the art as practical.

DB: I want to chime in with a little of my personal context. When I was an undergrad at Cornell, 1996 was the year that they required all students to get a net ID to use email and that was the first year that it was required. It was a massive sea change for young people, the faculty, and the staff. If you had taken a look at the Navy along with the Postgraduate School, and the War College, Harvard, and MIT, where do you think they would have fallen at the time with IT and email?

JH: The military was in pretty good shape because, you may recall, the Internet was developed at DARPA in the 1970s to give scientists around the world the ability to link up in an unclassified manner without encumbrances. Instantaneous connectivity around the world for scientists. Moving forward, I recall in 1985 as director of Naval Warfare in the Pentagon I authorized MAC work stations for my entire directorate—about 150 action officers. So, the military in 1995 was probably on the power curve.

Another aspect of the SSG I want to explain is the title for our junior officers. At first, in 1995, I called them Associate Fellows. I liked the term "fellow" that I inherited from the pre-1995 SSGs for CNO Fellows. So, the title "Associate Fellow" seemed to fit. When I did it, I didn't even think about the fact that the word "associate" connotes somebody doing something for somebody else. You're an associate to somebody. You do research for somebody. And that's the last impression I wanted to make. I finally figured this out years later, around 2006, and said to the group one day, "The title I use—we use—for our young officers is totally inconsistent with my commitment to you that everybody here does research and that good ideas have no rank. Then, I turn around and call the younger officers associates. Well, they are not associates. So, I want you as a group—the whole SSG—to come up with ideas for a new title."

Of course, they jumped right on that and, within a week, we had a lot of proposed titles. We necked it down to three, and of those three the one that had the most support was "Director Fellow." The group explained it this way: "The CNO selects the CNO Fellows. You select the younger officers, so they are Director Fellows."

We then went the final step with SSG titles by naming our scientists, engineers, and analysts "Technology Fellows." At that point, with respect to nomenclature, it all came together. Plus, SSG manning was set with modest modifications and very few increases.

Now I'll provide more detail about the Director Fellows. I told each group of CNO Fellows in the first week of orientation, "The Director Fellows will be primary participants in the SSG's work alongside you CNO Fellows and the Technology Fellows. They are not an adjunct capability. They are not associates. The success of the group depends on their full participation and there are several things you must do to ensure their full

participation. The first is to bring them into the group completely. I mean embrace them! Plan this out in advance. They will arrive the first week in December, so you have two months to work on it."

DB: Did you consider having the Director Fellows come in before the CNO Fellows to maybe avoid some of the sort of senior-junior issues?

JH: The arrival date of 1 December was pretty much set by the semester breaks at the Postgraduate School and the War College. So, what we did—and this developed, again, over time—was to spend a lot of time working with the younger officers in advance of their arrival. Bill Glenney, for example, conducted a workshop for three days at the PG School and then the same at the War College, getting them mentally prepped.

When I interviewed at the PG School, it was a one-day deal. I arrived the evening before, giving me the opportunity to review each candidate's application. The president and I started the interviews at eight o'clock in the morning. I said, "No more than 12 interviews. You can have a process that considers as many as volunteer; then you pick no more than 12 for the finals. And 6 of those 12 will be selected. Three more will be alternates. We will complete interviews by 11:30."

We gave each candidate 15 minutes. And, at two o'clock, I met with the selectees and alternates for about two hours. I started to get them pumped up, gave them a lot of literature, a lot of handouts, all the kinds of things I'm talking about here; and then, Bill's follow-up started.

DB: Only a 15-minute interview?

JH: It turned out, having done this so many times, I could tell in five minutes if I really wanted the candidate; and, the interviews would go for another five to ten minutes either because I was really interested in hearing more about the person or out of courtesy.

DB: And since you already knew a lot about them by the time you walked into the room, it was, I guess, a little bit more like an academic interview, where it's making sure that it is someone you can work with and someone who had that spark?

JH: Getting close. The interviews were designed to "draw the person out," so I could sense the "spark of creativity" I was looking for.

Here is how the entire Monterey/NPS trip would lay out. I loved this. I would ask our secretary/office manager to get me a flight into San Francisco. I would say, "I want to arrive in San Francisco at about mid-afternoon. I'll rent a car, drive down I-5 across to Half Moon Bay, and then drive down the Pacific Coast Highway to Monterey. Dinner at about 6 PM at the Whole Enchilada, a fabulous Mexican restaurant at Moss Landing, which is about 20 minutes north of Monterey, arriving at the PG School around 8 PM.

There would be a briefing book for me at the registration desk, so I could read up on the candidates in advance. So, yes, I had some familiarity, as much as I needed. I did read carefully through all their backgrounds, so I knew what questions I wanted to ask them early on based on what I had read, and I knew what questions to ask next based on their initial answers.

Flash back now to my orientation with the CNO Fellows. In addition to what I have already covered, I would tell them, "Use the better part of the first week of December to orient the Director Fellows. Review with them what you've been doing the last two months, all of your experiences, and how you feel about things." By that time, the CNO Fellows had developed their preliminary operational premise for the year's work and they needed buy-in from the younger officers; otherwise, it would not work. And frequently, the preliminary operational premise would transition from preliminary to final draft in December based on a lot of changes suggested by the younger officers. That was typical. In fact, a frequent reaction from the Director Fellows, once the CNO Fellows had briefed them, was "We don't think this is revolutionary enough!" And because I had the CNO Fellows (these captains and colonels) so positively oriented, they usually accepted that critique (no egos!). Plus, this made the Director Fellows truly believe they were full-fledged members of the Group.

Next was the question of informality with respect to rank. I did not push it. Early on, a couple of the Director Fellows proposed all members be on a first-name basis. They pointed out it worked in the seminars at the War College. I met with the CNO Fellows and asked, "How many of you would like that?" Maybe two or three out of the 10 put their hand up. Clearly not a majority. I then said, "For me, it would be a personal thing. If you want to have one of the lieutenants call you by your first name in a social environment that's fine, but not in Sims Hall and definitely not in the SSG's Innovation Center [conference room]." That ended the discussion and, other than rank difference, there were no barriers to the relationships.

DB: It sounds like a pretty significant barrier, though.

JH: Not in the military. I'll explain why through an example. Circa 2008, a couple of the younger officers came to me midway through the program and again surfaced the question. They said, "We really think we should call the captains and colonels by their first names when conducting business in Sims Hall."

So, I had a long session with the CNO Fellows and then a long session with the younger officers. I said, "If we go informal with rank, then we will also integrate all officers in office spaces by concept teams. It turned out that 9 of the 10 CNO Fellows said it's not a good idea and 12 of the 14 Director Fellows said it's not a good idea. The younger officers basically said, "Admiral, we're lieutenants. We've been in the Navy for six to eight years. These guys have been in for 24 to 28 years. There's a level of respect. We don't need to call them by their first names, or be in the same office spaces, in order to do things with them. In fact, it's sort of a terrifying thought, the idea that we would be with these 'gorillas' all day long? We need a place to go and hide. We need our own little space as well as they need their space."

So, then, with less than 20 percent of both groups agreeing it was a good idea, the issue was put to rest. Apparently, it was successful at the War College. That's fine. That is purely an academic environment. The SSG was not an academic environment. The SSG was not a full-up military environment, but it still was a military organization, and that was what drove the end result. The relationship was not "equality without rank." The relationship was that a good idea from a Director Fellow held equal value to a good idea from a scientist or a CNO Fellow. So, good ideas really did have no rank. In fact, frequently, the younger officers had better ideas than the more senior ones, and with this openness, their ideas were debated and accepted. The orientation's declaration that every member of the SSG was a primary participant worked. And I kept saying it throughout the year, just to make sure!

You asked about what I was looking for during the interviews. When Vice Admiral Rod Rempt became president of the Naval War College, he asked me that question. The question was easy because I did the interview four times a year with a variety of presidents and, in their absence, at times, their provosts. I would always set the stage for them. I jotted down some things for Rod in advance because he had asked. I said, "These are a starting point. We can discuss the flow of the interviews just before we convene." I usually had the president start with a softball question like, "What do you think of the War College? How are things going for you?" And then we would ratchet things up. I told Rod, "We will be looking for obvious talent. Smart, but being intellectual is not needed. We want people who are both smart and savvy, and who can influence others to join their team. Technical background and interests help. Those who have at least some innovative thoughts, enough to show they have the capacity to think deeply and innovatively. Add forthright and confident to the traits. Along with the expectation that they will be able to take a position, describe it, defend it to a point of exasperation within the SSG among more senior people, and with groups outside of the SSG who might be the Secretary of Defense, or the CNO, or the Secretary of the Navy. We want people who will stand up for what they believe. And, as a group, in terms of diversity, we are looking for unrestricted line [URL], restricted line [RL], and staff corps [SC] officers across all specialties."

When I came to the SSG, all the CNO Fellows were URL officers. I got the CNO to back off on that. I said, "We need a mix. We need the majority to be URL." So, if we were going to have 10 CNO Fellows, and we had Coast Guard, Marine Corps, and later Air Force officers, that means for the Navy's seven, I would want four URLs: typically, a submariner, a surface warfare officer, and two aviators, or one aviator and one SEAL or EOD officer. That left room for three RL and staff corps officers. Their community leaders competed fiercely for SSG spots. And we loved the EODs, the cyber warriors, and supply corps officers. Combining the CNO Fellow and Director Fellow openings, there were all kinds of RL [restricted line] and staff corps officers that we brought in.

And, there are some humorous examples about Director Fellows. At one point, I brought in a doctor from the War College. I'll explain. Bill Glenney showed me the rack-up the day before I was going to interview and I said, "What's this doctor doing on the list?" He was a pediatrician. Bill didn't know and, in all fairness,

he was just the messenger. These nominees came from the dean of students, who did all of the screening. Then I said, "Has this guy already been told that he's in the finals?" And Bill said, "Yes, he has." So, I said, "OK. I'll go through the interview, but he's not going to make it." Within 30 seconds after the start of the interview, I knew we had to have him. This guy was so well-rounded, and his thoughts were so far beyond medicine that it was amazing.

Then I remember another guy, who the provost of the War College and I interviewed because the president was on a trip. This was a Navy lieutenant commander. He came in and I could tell he had a chip on his shoulder. I thought, "We have to get that knocked off." As it turned out, the provost, a rear admiral, had an even bigger chip on his shoulder! He was like a bulldog. He had the first question and he said to the guy, "I see here that you only got an 88 in this particular course? That doesn't cut the mustard." The lieutenant commander looked right at him and said, "Quite frankly, Admiral, that professor was so bad and that course was so boring that I decided I could get a B without doing any studying at all, so I took the time I would have done studying and built a computer at home." When he left the room the rear admiral looked at me and said, "Well, we can't have him." I quickly responded, "Creativity is written all over this guy. He is absolutely assured a spot with the SSG."

DB: What would have been your response if he had said that it was a terrible course? Had said it was really boring, and didn't say what he was doing in his spare time?

JH: I would have questioned him intensely, going into his motive deeper. Lacking a strong and positive response, I would not have accepted him.

Here is a very positive story. A lieutenant from the PG School: During the interview in Monterey, I asked him what he did in his free time. He said, "Over the Christmas holiday, I worked for the U.S. Post Office as a part-time employee." Then, I said, "And what was your job?" He responded, "I developed and proposed a computer network for the postal system." I said, "Really?" He said, "Yes, sir. I noticed that the individual stations in my post office were not digitally connected and, beyond that, there was no digital connection between my post office and the regional post office, nor between the regional post offices and the Postmaster General in Washington. So, how would they know how to resource efficiently for the next day or week?" I said, "And what happened to your proposal?" He said, "They implemented it." The postal system actually implemented this guy's proposal that digitally netted the entire U. S. postal system! That was in August.

Three months later, in December when the Director Fellows arrived at the SSG, we had a full SSG session. The entire morning for introductions. We had done this in October for the CNO and Technology Fellows. As I mentioned earlier, each member told the group about his professional career, highlights of his private life, his family, his interests, activities, and passions. As an aside, early on, somebody said, "Do you really want to spend so much time doing this?" I said, "Absolutely. This is the most important event of the year for each individual and for the group. It is step one toward full collaboration." Back to the lieutenant. In

his comments to the full group on 1 December, he mentioned nothing about the post office and his digital netting proposal. I would frequently ask questions and pull more information out of people, otherwise the session would not have lasted half a day. So, I said, "What about what you told me about the post office when I interviewed you?" So, he told the story and it was amazing. People could hardly believe it. And, ironically, that year the group's theme from the CNO was to net the operational Navy! As you would expect, our lieutenant was very effective with the SSG. A great SSG asset!

There is another interesting Director Fellow story. At the PG School, we interviewed and selected an Army major, but the Army's Deputy Chief of Staff for Personnel said he could not participate because he had orders to be a math professor at West Point. Of course, I understood that and we moved to an alternate to fill the position. Several months later, I called the academic dean at West Point and asked, "Would you consider—after the major's first year of teaching—letting him come up here for a six-month Director Fellowship and then return directly to West Point?" He said, "Yes, of course we'll do that." The major was a superb SSG member. The day he departed—I had already signed his FITREP, he had said goodbye to everybody including me—he came back to see me again and he said, "Admiral, I just want you to know that when I was at the PG School and heard things about the SSG, they all sounded so good that I didn't believe them. So, when I came, I was always on the lookout to find where the weaknesses were. I mean, you said all these things to us in Monterey, but would you follow through? Would you actually run this organization so that good ideas truly have no rank, for example?" He went on, "Once here, everything I had questioned, I found right. This place really does reflect what you said. So, I committed myself. I just want you to know that it has changed my life. I'm a better Army officer, and I am a better father. It has changed the way I think, it has changed the way I look at the world, and I am a better person." He came across as very genuine. He had no reason to say it other than that he believed it. So, I started collecting comments such as this. I probably have hundreds. With 25 Fellows a year, for 18 years, a lot of feedback was generated.

That probably takes care of the Director Fellows for now. I'll get back into something that goes to the very heart of the SSG: the Process of Innovation.

Earlier I went through what I called the six critical components of the process. That's how we looked at it in 1995, but it was only the beginning of this evolving process. What happened is that what we then called the Process of Innovation evolved, through critiques and reviews, into what became the SSG's "Concept of Operations for Innovation" in the form of a document. Here is that document for SSG XXV as an example [Appendix C]. It was revised for each SSG. We called it a "concept" because nothing had to stay the same in the SSG. You will see, in the document, that any group could change it. But, change would have to make sense and I would have to agree to it. If a proposed change was worth it, we would make it.

DB: And would any change still operate under the unanimity rule? So, everyone in that SSG had to agree to the change?

JH: There would have to be general agreement, with any objections satisfied. The next aspect, you will note, is that the Concept of Operations for Innovation does not place emphasis on the CNO Theme early on. That is because for the first couple of months we wanted each group to focus more on mind stretching and a variety of other skills. Otherwise, our "Type A" Fellows would work hard to solve their CNO Theme right away. Each group was in session for 10 months and if members moved too quickly to the theme they would short-change mind stretching, thus limit their overall success. For example, in the Concept of Operations for Innovation, phase one ran from October through December with nine purposes. These included broad exposure to the Process of Innovation, mind stretching, operational art and war gaming, the work of prior SSGs, analytical methods, future warfighting concepts and threats, red teaming, critical thinking, human system integration and organizational concepts, and emerging science and technology. All of these were important in preparing the group for the innovation phase to come. Subject-matter experts from around the country came and talked about these things, which we then reinforced. It got pretty powerful.

My final point here is that the Concept of Operations for Innovation was an overarching architecture for the SSG; and what I called the Process of Innovation, with its six critical components, was embedded into it. So in practical terms, the Concept of Operations for Innovation was the full framework within which each group operated. It became a comprehensive and evolving, "hands-on," "living" document that set the stage for each SSG's success by establishing an environment conducive to creative thinking. Impacting at the very core of the SSG as an institution.

Let's move now to the SSG's internal dynamics, important because they provided the substance within the SSG's framework. These internal dynamics, over time, developed into an SSG culture. This culture was manifested by the SSG's logo; amazingly so, as it turned out. I'll explain: Early on, I challenged the SSG by saying, "We need a logo with a crest and a credo." SSG XVI worked on it, but nothing exciting jumped out. They came up with a lot of ideas, but not enough to say, "Yes, we will commit to this." No consensus. SSG XVII was next. Led by Lieutenant Commander Jeff Cares, a Navy analyst, they came up with something that everybody liked. Here it is, displayed on this paper [Appendix D]. I'll explain what all these symbols mean. Obviously, the blue and gold are traditional Navy colors. The eight points represent the original eight CNO Fellows in 1981. The trident signifies teamwork among the group. The four stars relate, not to me, but to the CNO. It was his SSG. The Latin term generare futurum translates "To Generate the Future."

Six years later, in SSG XXIII, one of the CNO Fellows (Captain Laura Marlowe) came up with the idea of making the logo a tattoo because I frequently talked about it in that context. I would say, "You all know this is not an academic environment, it is a research center. And when you leave here you are not going to receive an academic diploma. You are going to earn the SSG tattoo which symbolizes the fact that you will never leave the SSG. Now, I know you're going to leave physically in July, but intellectually you are with the SSG for life. With the tattoo comes our commitment that we will be in your corner forever. Whatever you need in the future—whether you're in the military or a civilian at that point—a recommendation, a

reference or whatever it might be—we will support you. In return, we ask only that you keep us posted as you change addresses so we can maintain contact. That's all we ask of you."

DB: So, a certain indelible nature to the SSG experience?

JH: Yes, Laura framed the tattoo in a one-inch square, easy to paste onto one's arm. Biodegradable in three days. And so, not only did every member who completed the SSG program get the tattoo, it is the way I referred to them in the future. I don't say, "Lieutanant Jones served in the SSG". Instead I say, "Lieutenant Jones is a 'Tattoo Holder.'"

On to the SSG's "calling card." We needed some kind of introductory paper or brochure for the SSG research ventures that started each January. Here is an example from SSG XXVI [Appendix E]. A five-by-seven brochure that contains an SSG history summary, the CNO Theme for that year, areas of research for each concept team, and the SSG's full roster with contact information for each member. It was surprising how many people from industry responded to those brochures sent out in advance, saying, "We can help in this area. We can help in that. We've got this expertise. Come see us or we'll come see you."

DB: It's an interesting setup so that every member of the SSG is listed. There may be a certain order in here. It looks mostly alphabetical, but possibly there's a concept team leader that develops out of it?

JH: You see, each of these is the composition of a concept team. If it looks alphabetical, that's a coincidence. And to your question about cConcept tTeam leadership. It all began when the CNO Fellows arrived. I told them the captain/colonel O-6 with the earliest date of rank would be designated the senior CNO Fellow, responsible for "managing the herd"; but was specifically not responsible for deciding whose ideas were best or what concepts should be developed. That was all self-generated from within each group and for that there was no rank. No seniority. A lieutenant's idea could become one of the major paths the SSG pursed. Plus, the concept teams were self-forming from within the group. The full group decided, through a lot of interactive discussions in December, upon the areas they would pursue to tackle the CNO Theme. Then, the CNO Fellows would "recruit" among the Technology and Director Fellows to form the "concept teams." The draft for this came to me for approval. The only reason I might change it would be for balance of talent and expertise. That happened a couple of times and I served as the "referee." No complaints!

I'll focus now on specific internal dynamics. Boldness was the first. Then, "good ideas have no rank," followed by the SSG's approach to teamwork, the logo (crest, credo), the calling card, all of which I have covered. Add self-generation. Almost everything the SSG did was through self-generation. "Self" doesn't mean just the individual. Self can mean an individual, or a concept team, or the group at-large since each of those actually "generated." I kept them generally moving in the right direction. If I heard an idea coming out of somebody, thought it was good, and saw it was not gaining traction, I would link up with that person or that concept team, talk through it showing them how they could explain it better—build the story line— along with additional areas of research to explore. I met with each concept team about once a month during

the concept generation phase to have them discuss with me all their ideas; and the full group would meet in plenary twice a month throughout the year.

 "Read, talk, write" was another discipline I instilled in the research process. And, the "red team–blue team" approach is worthy of covering now. It was suggested several times in the early years by outsiders that we have one of the concept teams serve as a red Team--blue team for the entire year. It didn't make sense for us because the teams were not ready for red teaming until six to seven months into the 10-month program. So, we took a flexible approach. When concept teams formed up, they knew it didn't need to be forever. Teams morphed. One SSG morphed and realigned concept teams three times during the year as their research took them in unexpected directions. And, we would set it up so that we would pull members during the last couple of months from each team to form a red team as a part-time assignment. They would do that in addition to their designated concept team work. The result: we did plenty of red teaming, but we didn't formalize it structurally.

Next, coordination and collaboration, which I have covered. That's where teamwork and coordination generate collaboration. Hold nothing back. You're in this unconditionally. You'll like everybody in the team. No great things without collaboration.

"Yes, and ...," which I have also covered.

Equality of thought: How to ensure it? That was my biggest job, as the leader of the group, since it was up to me to make sure somebody in the group was not placing boundaries on another person's thinking, or restricting mental movement. An example: A PhD scientist grabbed one of the lieutenants early on and said, "You're going be my assistant and support me in my research work." No! I found out about that, through Bill Glenney, in about two hours and quickly put it to rest. Having said that, a concept team might put together an overall research plan and say, "These are the areas we have, who would like to research in what areas?" Then research areas would be divided up and assignments agreed.

DB: But as long as that's self-generating rather than coming from someone else?

JH: Right. Self-generating at the concept team level.

The final "internal dynamic" to cover: an environment conducive to innovative thinking. A very important and big deal that I took very seriously. It had to be! It involved more action than talk. One of our actions was establishment of the "Imaginarium," located adjacent to the SSGIC [SSG Innovation Center]. It started as a workshop for building robots. Our Technology Fellows took the lead and started adding all kinds of "tech toys". We even installed a 3D printer long before it became the "rage," to demonstrate its important shipboard value.

DB: For those who didn't have experience with coding or computers, is that something that you encouraged them to learn?

JH: It's interesting. That never became a sticky point because the younger officers were very computer-literate and the senior officers just knew they had to catch up. Their first challenge was to submit travel claims online, since they were used to having a yeoman do that for them. But most caught up quickly. The Imaginarium was mainly for reading, thinking, and tinkering. I would tell the group, "There's nothing wrong with your going into the Imaginarium to spend a day reading a book, if it is a book that has to do with the research area you're involved in. Don't feel guilty about taking time to do that kind of thing. It is an important aspect of your research."

More on books: we would frequently bring in speakers who were authors. Malcolm Gladwell, for example. His book, [The] Tipping Point, had just come out and had influenced a particular group. So we went down to Manhattan and met with him for a couple of hours. I remember that group used the term "tipping point" in their final briefing on a particular topic. One of the members of the audience smirked and challenged them by saying, "I see you're quoting Malcolm Gladwell. What's the big deal there? I mean, you've never met him." So, one of the Fellows responded, "As a matter of fact, we did spend two hours with Malcolm down in Manhattan discussing his work. We wanted to see him because we had read his book, we thought The Tipping Point fit with our research, and we wanted to make absolutely sure we understood how he came up with it before we used it. We think it is very appropriate."

Another point: At the completion of each year's work, the group briefed the CNO, who then gave permission to brief commands and organizations that included the Secretary of Navy, the Commandant of the Marine Corps, fleet commanders, Office of Naval Research, systems commands, and others. During these briefings there were always a lot of questions; and, through all those years there was never a question that wasn't answered appropriately, both technically and in a warfighting context. Maybe the audience didn't like the answer, but they had to agree it was an appropriate answer because the Fellows had done the research thoroughly and, over time, had internalized it. These were their ideas, not my ideas. I might have thrown out some seeds that they picked up, but once those seeds started to germinate they were their ideas. And they were not an individual's ideas anymore. As the briefing for the CNO was prepared, they became SSG ideas. So, if the audience asked a question, one Fellow would start the answer, then two or three more might chime in with additional points until the person asking the question would say in effect, "I surrender." That was terrific, and very dynamic.

I want to emphasize an aspect of the SSG charter: Every incoming CNO would re-sign the charter as a visible display of commitment to the group and their work. Very few changes were made and I do remember every one of them. For example, we had some difficulty with the follow-on assignment for one of the CNO Fellows who made flag while he was with us since, unbeknownst to the Chief of Naval Personnel, the CNO wanted to make him the deputy for his Revolution in Training Initiative. The Chairman of the Joint Chiefs had already approved him to be the deputy J5 at CINCEUR headquarters in Frankfurt. The CNO, at the time Vern Clark, said "No, no. I want him." I said, "I'm sorry, but to change it you are going to have to

see the Chairman JCS. Do you really want to do that, Vern?" Vern backed off. But then he said, "OK. I want to change the SSG charter. I want the charter to say that I will personally approve all post-SSG assignments for CNO Fellows." That change gave me even more latitude as the mentor for all CNO Fellows. "Jim Hogg rules" were now officially CNO rules! I was their military mentor and would say to them, "Look, you all need to move from the SSG to jobs that are worthwhile jobs—both for you and for the Navy—which will take advantage of what you have learned here. So I want you to let me know, as you're working with your detailer, how things are going because at some point I might just have to get involved with the Chief of Naval Personnel. One detailer told a CNO Fellow, "We have different rules for you guys than we do for the rest." That was because, based on the charter change, nobody could be assigned out of the SSG until it had been approved by the CNO. Even the Chief of Naval Personnel had to wait.

DB: And that applied for the CNO Fellows, but not for the Director Fellows?

JH: I applied it to all, so, over time, I got involved in follow-on orders for several Director Fellows.

The charter was re-signed, as I said earlier, by each incoming CNO. One thing that never changed, in the very first paragraph, was "The mission of the SSG is the generation of revolutionary warfighting concepts for the future of the Navy."

DB: And that was the statement that was active when you came in in 1995?

JH: No. That was the new commitment in the first SSG charter [1995] based on Mike Boorda's comment, "That is what I want the SSG to do." It wasn't worded quite that strongly in the first charter that he signed, but in the next charter that Jay Johnson signed in 1997, it was there. I said to Jay, "We've evolved to the point where I see it very clearly. The sole purpose of the SSG is to generate revolutionary warfighting concepts. That is what we are doing." Jay said, "OK, put it in"

Now, I would like to take us back to a typical SSG "Day One". The SSG has arrived. It is 1 September 1995. We shifted it back to 1 October in 1997 to narrow the amount of time before arrival of the Director Fellows. We didn't need three months. Just two months. We were careful not disturb the semester breaks for the Director Fellows.

DB: I'm happy to be a pseudo-SSG participant.

JH: We are all gathered in the SSG's Innovation Center at 8:30 am. My opening comment: "The purpose today is to get to know each other. That's it. We'll start with staff, then the Technology Fellows, then the CNO Fellows. Please open up totally. Your background and experience—both personal and professional— your career development, special interests, your passions, your hobbies, your family, your education. Just lay it all out. This is the beginning of your team building, which is one of the key elements in the SSG's Process of Innovation. Team building. And just relax. This is going be a three-hour session. We'll end at 11:30."

DB: And the military were in uniform?

JH: The first day, and after that civilian clothes with a few exceptions, such as the first day of December when we did this again with the Director Fellows, and when the CNO and certain other four-star military officers visited.

Before we actually started introductions, I did say a few things, such as "I want to welcome you and right from the beginning I want you to work on being bold, reaching out, opening up, seeking relationships to share your ideas, collaborating and —most important—believing in yourselves, believing in the group, and believing in the CNO's commitment to the SSG." Then, introductions would start. For the next four days, I was with them each morning 8:30 am to 11:30 am for comprehensive orientation. We always had two hours off for lunch, 11:30 am to 1:30 pm. Then, in session from 1:30 pm to 4:30 pm. My thinking about the long lunch break was that I expected the group to be totally engaged in the SSG starting at eight o'clock in the morning, arrival time. So, they needed some time for their own purposes: run errands, work out, eat lunch, and personal computer time. We rarely varied from that two-hour lunch break.

It is now Tuesday morning, the day after "Day One." "We've got a lot to cover, but time is on our side. I have four three-hour sessions with you this week, plus there will be reinforcement of what I say throughout the year. I do this twice a year, for you now and for the Director Fellows when they arrive in early December." By 2012, my last year, it was "Having been with the SSG since 1995, you are my 18th group and this is my 35th orientation week. And I enjoy it more each time."

The day before each new group, I looked at this stack of notes in front of me, and I promised myself before the next time I would put them into a cohesive presentation. Then I never did it. The reason I never did it is not that I ran out of interest, but I guess there was a subconscious intuitive sense that told me and the group, "If I do, it will constrain my thinking; or, even worse, it will come across to you as a "slick," and appear that I have the final answer. I don't want any of that. The combination of a "slick" and knowing the answer is the worst perception I would want because that would definitely constrain your thinking. I don't know the answers. You are going to come up with the answers. It is hard for you to believe that next July you will be briefing your concepts to the CNO. Concepts that you researched, that you generated, that you believe in, and that you understand better than anyone else in the world. You will brief your concepts directly to the CNO and you will excel because all the work you do will be internalized by then. In fact, you will meet with the CNO five times between now and then for discussions. No briefings, but discussions about everything you're doing and all your ideas. All SSGs since 1995—all 17—have reached a level of excellence and have contributed concepts that have changed the Navy. You will, too." At this point the Fellows were probably wondering, "How are we going to do this?"

DB: And I just want to interject that Admiral Hogg is giving us the introduction and the setup for the concept of innovation and the innovation process for the SSG under his directorship, so people in the future can understand what someone who walked into SSG on that first day would experience. .

JH: Right. Continuing on Tuesday morning: "No question, the SSG is a unique organization in the Navy—in fact, throughout DOD and across the country—simply because it is so different from anything you and others have ever experienced or ever will again. For starters, the SSG is very diverse and is very open. Companies listen closely. For example, Chrysler sent a team of people to spend several days with us to learn our process.

"There is no other group within DOD like the SSG. I know that for a fact. We've reached out and established relationships with the other services, which I'll cover later. But the SSG's unique hallmarks are its revolutionary focus at the operational level of warfare and its innovation process. I didn't start out to make it complicated, yet the way we are organized and the innovation process we follow are so different from what military officers are used to that, in the beginning, things will seem complicated to you.

"You won't disbelieve the things I tell you this week, but you will have a difficult time taking some of them onboard. That's not unusual. It's not something to be concerned about. I will purposely cover important areas more than once from different angles, as will Bill Glenney and the staff, and we will reinforce these with you throughout the year.

The important thing for you to do right now is just sit back, get relaxed, and listen real hard. Take some notes if you wish. There will be some handouts. Spend some time each evening reflecting and reading. For example, read all the SSG fFinal reports from past years. That's essential. If there's not time now, then scan them now in order to know what territory has been covered in past years. Go back later and read them to see how ideas built in each group. You will see how dots were connected, how story techniques were applied, and how audiovisual was injected. By the end of the month, you will be on solid ground.

"How should you think in the SSG? Be bold—aggressively bold, constantly bold no matter the topic. Always ask yourself, how can we take this beyond the next horizon—way beyond. Forget the next horizon. You're going to leap past it. Reach way out. It's much easier in creative thinking to reach out and then come back than it is to move forward in incremental steps. Take the incremental approach and you'll never get to where you want to be. Think boldly about everything you do, everything you're exposed to, everything. Do this until boldness—not arrogance— but boldness becomes natural to your way of thinking. Until it is hardwired into your brain. Think in non-linear ways that will stretch your mind, open your mind to new areas of thought or different ways to address a current thought. When traveling mentally on a linear path from point A to point B, forget about point B. Leap ahead to point C, or, even better, to point D. A linear path most likely generates a single-point solution. That's not what you want. Anybody can get on a linear path to a single-point solution, which, by the laws of nature, is all that will come out of it. No matter how

hard you try, a single-point solution is what you're going to get. Nothing more. You want to travel down multiple paths and several dimensions from various non-linear angles and aspects. That's like thinking in many boxes, not just thinking out of "the" box. This approach could take you to solutions that nobody has ever thought of and, with a high level of collaboration, will become so powerful that you will change the Navy. I love that phrase. Always remember, you are here to generate concepts to change the Navy. That's what the CNO wants and that's what he expects. That's your job, and it is all up to you.

"After all this talk about boldness you need to realize that your success will require critical thinking. Boldness and critical thinking are intertwined. If you get too bold, it can cloud the need for critical thinking. So, you need to be aware that boldness based on mistaken hypotheses or flawed assumptions will drive you to failure; whereas boldness given a solid foundation of understanding, with good assumptions and rigorous analysis, will drive you to success. The point being: Come up with a bold objective, then challenge all assumptions through critical thinking before committing.

"Here are a couple of additional thoughts to keep in mind. Don't mistake enthusiasm with reality. Here's a comment made by General Shoemaker, the Army Chief of Staff. 'If you accept something to be true without rigorous research and analysis, it's no more than assumption.' So, your approach? Be objective, be rigorous in your analysis, and ensure that boldness drives you forward."

DB: Did you find there would be points in this introduction where you would get questions, or you would see the puzzled look, or have to take a minute to let them sort of absorb?

JH: Sometimes I would take a minute. And if I saw an expression of question or wonder I would stop and open up for discussion. But most of these people in that first week were in a listening mode, trying to figure things out. At that point, the SSG was pretty well known around town, and they were told by others before arriving this would be an awesome experience. I had them in the "palm of my hand" and I could sense it. So, I just wanted to try to get all of these ideas pushed to them early, some accompanied with handouts, which we reinforced to them a lot during the year. And we exposed them to the SSG's body of work, which basically was the final work of all past SSGs in aggregate form.

DB: Is there is a distinction here between SSG I through XIV and then SSG XV going forward?

JH: Yes. A total distinction. The body of work started with SSG XV. I also told them, "You are not bound by past SSG work. You are breaking new ground. You're also definitely not bound by the Program of Record in the Navy. You will be thinking far ahead of the Program of Record. But you need to show the path to get there. You can't just bash it and then expect somebody else to come up and sweep up the debris. You've got to bash and then rebuild with your ideas. So, the bottom line with respect to past SSG work is that you need to understand it and build on it if you think it's appropriate, but only if it will contribute to your work."

Then I relate comments from a president of the War College, Rear Admiral Jake Shuford, who had a lot of good ideas. He shocked a lot of the faculty and staff members at the college, but with good ideas. One day, we were out cruising the Narragansett on his barge. Probably 10 or 12 people. Scientists, people from the Center for Naval Analyses, and faculty civilians. All of a sudden Jake, in his characteristic way, jumped up and said, "I've got something I want to tell all you people…." I returned to Sims Hall and I wrote down his comments as verbatim as I could remember. He said, "I have just read the 'Quick Rep' for the SSG's final report that came out last month. The progress the group made this year and the value of their work to the Navy are really impressive, and their proposal on synthetic fuel production is incredible." Then he said, "If you take the time to read the SSG's final reports going back to 1995, you'll realize they form a compendium of warfighting concepts that covers virtually every aspect of maritime combat and combat support, every Navy task and mission. No matter what the topic is, you can find a detailed discussion in these reports along with proposed concepts for improvement. It's all there for the Navy's use. In some areas, it might take five or even 10 years for these concepts to get the Navy's attention, but over time they all will." The SSG thanks you, Jake Shuford!

Now, I'll explain Jake's Quick Rep reference. It typically would take about six months after the group reported out to the CNO for the SSG to turn a PowerPoint presentation into a written final report. This time delay was due to the difficulty in making a written report as compelling as PowerPoint. At the same time, I wanted to make sure that flag officers in the Navy, who did not have the benefit of hearing the briefing to the CNO, would know quickly what the CNO heard and agreed to. So as soon as we reported out, within a week, we distributed to approximately 100 flag officers what we called a Quick Rep, which was the actual verbatim briefing to the CNO. Later, the final written report went out to a long distribution list.

Jay Johnson was the first CNO to review and agree with the distribution list for the SSG's final report. Two columns, a full page, across military and national organizations and institutions. The final line said, "A copy to each person, organization, or institution that contributed to this work." I defined "contributed" as anybody who worked with the SSG, those who came to Sims Hall and those who members of the group visited. Adding all that up, the final report went to about 1,700 individuals and organizations throughout the country. It was marked "For Official Use Only." I did that purposefully knowing—even though it would be unclassified—that some of the material would be sensitive. And, if a foreign power like China looked at two or three SSGs in a row, they could start connecting dots to see where our Navy was headed. I wanted to ensure I could look a judge in the eye, if he was reviewing a Freedom of Information Act [FOIA] request and say "Your Honor, the SSG final report is a controlled document. I know exactly who receives each one of these and each one is numbered. It is not classified, so we do not go out each year and request an inventory. But, the only two people in the world who are authorized to add or take somebody off this distribution list are the CNO and, by his delegation of authority, me. Nobody else." A few years later, there was a FOIA request from a news channel which the Navy denied.

Then I met with the Navy JAG—the rear admiral who was head of the JAG Corps—and the captain who was the CNO's lawyer for two hours and discussed all aspects of the SSG. I showed them the language we had at that time in the cover letter to the final report, which explained why it was a "For Official Use Only" document, and asked for their legal review. They came back with a modestly modified cover letter and said, "With these changes, it is our legal opinion that challenges for access under the Freedom of Information Act will be consistently denied."

As an aside, in 2006, a Navy lieutenant, on completion of his SSG work, went back to the PG School and one of his professors asked him to relate his SSG experience. He chose to write a paper, eight pages in length and very descriptive of the SSG. He sent it to me as a final draft and I suggested no changes. I just told him I was very impressed, that I could not have written this paper from a lieutenant's perspective, and that the experiences he related would be of significant value when shared with others. I then said "when you finalize and submit this paper, with your permission, I'm going to use it as a handout for every arriving SSG member in the future." So, I titled it "A Lieutenant's SSG Experience [Appendix F]. It really explains SSG dynamics in ways that are very powerful. In fact, he takes everything I've said and highlights it into an eight-page document that describes the SSG experience in a very special way.

On to what the SSG really was. Frequently people would ask, "What is this place." That's because, starting in 1995, it was no longer a Strategic Studies Group. So, how might I characterize the SSG in just a few words? First, it was not an academic environment in any way. SSG members learned a lot, but not through a school-house experience. In fact, one scientist who spent a day with us said to me, "The first three months of the program you have here are like a compressed master's degree in the broad field of science."

It was not a think tank per se, and it was not a schoolhouse experience. In many ways, it was not a military environment. Of course, we were in the military, and we observed a few military protocols as I have covered. But, after the first highly structured three months it was an unstructured, unconstrained environment, and protocol with respect to my presence was dispensed with.

So, what was the SSG? The SSG was an amalgamation of research center and think tank. If the CNO had called me and said, "I know the term SSG is a misnomer now, so I want you to change the name to something that actually describes what you do today," I would say, "CNO, this is your Operational Research and Concept Generation Center." That's what the group did. It conducted rigorous research at the operational level of warfare and generated warfighting concepts through a process of unconstrained thinking and collaboration. That describes exactly what we did. The group operated at the operational level of warfare. That was their lane. They, at times, would go up to the strategic level to frame their work. At times, they would drop down to the tactical level to show the warfighting impact of their work. But their going-in lane was the operational level of warfare.

What did the Navy get out of it? A comprehensive warfighting blueprint for the future across every warfighting and warfighting support area, with roadmaps to support individual concepts; and, a cadre of innovative officers and civilians who returned to Navy assignments as creative, non-linear thinkers.

-I should also point out that the SSG's organizational development was a "one-ofa-kind original." I didn't read business books to decide how to put together the Process of Innovation. It came from within the group. I envisioned where I wanted to take the group and then participation and self-generation by the group itself took over. But, I have read a lot of business books since 1995 and have found they are management-oriented. They say they are about leadership, but they're really more about management. Throughout the SSG years, as mentioned earlier, I spent a fair amount of time reaching out around the country to determine if there were ways we could improve our process. Basically, this effort confirmed our process was solid, and unique.

On the subject of psychologists, we always liked to have a psychologist in the group. Dr. Yvonne Masakowski, for example, was our science adviser. And, we also always liked to have a neuroscientist in the group as a Technology Fellow. A friend in town once said, "Why do you need a neuroscientist in the SSG? What does that have to do with warfighting?" I decided on a short and uncomplicated answer by saying, "One of the Holy Grails of the military is how to make better decisions faster and neuroscience has a lot to say about that." That points to the wonderful diversity for the group!

DB: Even in my short time working with the Navy I think it's a general societal trend now to look at business and motivational models for leadership and organizational structure.

JH: We had a few "experts" discuss those topics with us in the early years, but our basic model for motivation, leadership, and organizational structure came from within the SSG. Internal to the group. At the same time, we reached out to deal with emergent needs. For example, if we wanted to figure out how to make decisions faster, one of the things we would do is send a team to Wall Street and get on the floor with the traders who make lots of decisions. They know if they've made a good decision or not before they leave the floor. They make them fast, and they're connecting dots all the time.

Chapter Four
Strategic Studies Group Dynamics

SSG XV Day ONE (Continued) | SSG Travel

Disparate Ideas and "Think in Multiple Boxes"

Futurists—No; Science Fiction Authors—Yes | Enders Game as a Mind Opener

Experience Virtual Reality in Second Life | Human Factors Engineering

The SSG Dynamics: Results | [H2]A New Approach to Computing: Hand-held

The Relationship with the CNO (Continued) | Week ONE (Continued)

"Full Body–Movement Pattern Analysis" and Professor Brenda Connors

"How Far Can You Go?" | SSG Alumni Day | Value of the SSG in Professional Development

"Quotes and Thoughts" | "Persistence!" | "Rhetoric, the Killer" and Literary Perfection

(Editor's note: This is an edited version of the fourth of five parts of Admiral Hogg's SSG oral history, originally recorded at the U.S. Naval War College on 7 December 2016.)

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Dara Baker (**DB**):   Good morning, Admiral Hogg. We are here for part four of our oral history on the SSG.

James Hogg (**JH**):   We'll return to SSG XV on Day ONE. First, for the benefit of those "Tattoo Holders" who might read this, my comments are based on notes I compiled over the years. So, SSG XV was the first to get the exposure, but they did not get the full exposure I'm giving you today.

Continuing on, I'm telling the group, "The SSG doesn't make up all of its ideas on its own. It comes up with a lot of ideas through its research and collaboration among the group. It picks up others through discussions with a variety of organizations and individuals outside the SSG."

I have already mentioned the travel program. We funded each group for travel approximately 40 percent of the time January through May with 30-plus people involved. That's a lot of people doing a lot of travel and research. In fact, typically, a concept team would travel no more than 35 percent of the time because they felt they just had to spend time in Sims Hall, come back together with their concept team, and with the full group to participate in plenary sessions and discuss the way ahead in the broadest sense.

One of the strengths of the SSG was its ability to take disparate ideas picked up outside of the group, during this research and travel, and put them together in ways that became much more persuasive than any single idea. Then, the group integrated these external ideas with ideas of its own in ways that generated powerful

revolutionary warfighting concepts. Of course, it took aggressiveness and innovative thought—lots of both—to reach that point.

Members of the group would ask how to proceed. My answer, "Try to come up with different ways to address your ideas. Some say you should do this by thinking out of the box. That sounds nice, but it doesn't get me anywhere. Instead, try thinking in multiple boxes—in many boxes. Give them names. Give them titles or functions that reflect the disparate ideas you have collected. Then, close your eyes and mentally start moving the boxes around and connecting them up in various ways. Sort of a virtual reality approach, but you're not online. Seek alignments that make sense. Try to develop a story about them. Move them around until you think you have a pretty good story outline. Something that holds together. In other words, develop relationships among them through storytelling. Now you're onto something. Keep iterating. Keep thinking boldly. Do that and innovative ideas will come. When that happens, you will be on a path to success."

In the early SSGs, we were enamored by what you would call futurists. They looked to the future and would "predict." But, we soon realized that, with in-depth questions our smart people would ask, after the second question on a particular topic the futurist was stymied. In other words, futurists were about a mile wide in ideas and about a quarter of an inch deep in specific knowledge. So, by 2000, we migrated to science fiction authors. We had a Technology Fellow from CNA who was a historian and he was also a very futuristic kind of person, born and raised in Manhattan. It turns out there is a large group of science fiction authors who hang around together in lower Manhattan. We started inviting them to Sims Hall, one or two a year. We found that science fiction authors not only thought in future terms, they were very smart, they did a lot of research, they answered all questions, and their ideas in many cases sparked the way we looked at the world in the lens of technological advancement.

DB: And you had mentioned a few authors that you had brought in and a few books that made an impact, one of which was Ender's Game.

JH: Ender's Game is an example of the value of science fiction for mind stretching. I read it in 1996 and then read the five sequels. All were fascinating. I would ask everybody on the first day of arrival, "How many of you have read Ender's Game?" One third to one half had read it and the others read it very soon. It offered a different way to think about the world, not only in how we trained people, but how we thought and operated in the virtual world and, ultimately, in the real world.

Virtual reality became a very big part of the SSG's thinking. In fact, we "discovered" Second Life, during a visit to New York City when we had a guest speaker for a half-day session who was the chief technology officer for the Second Life online website. That really opened our eyes. Several of us quickly visited Second Life headquarters in San Francisco and learned a whole lot about it. As a group, we became members of Second Life. We actually demonstrated to the CNO how Second Life could facilitate collaboration and decision making. We placed half of our members in other parts of the country the day of a CNO visit. Then,

the full SSG conducted a one-hour session with full SSG presence, through the virtual world, with the CNO directly. I still remember in 2003, when the realization hit me very hard that through Second Life's virtual world we could hold a conference with anybody in the world, anywhere in the world, in real time with language synthesis. So, I could be talking to a Chinese scientist at a research center in Wuhan, China, in real time. He heard me in Chinese, I heard him in English. Remarkable!

DB: Were there other avenues of interest and support?

JH: Much of our humanities exposure came through voracious interest by the groups. As I commented earlier, we made a point of having neuroscientists, clinical psychiatrists, and behavioral psychologists in the group. We always had a science adviser, in addition to the Technology Fellows. The science adviser, a multi-disciplined scientist or engineer, looked across all disciplines and helped bring the Technology Fellows into a broad pattern of thinking.

One year, the group took on human factors engineering. It popped up in a discussion with the CNO during his April visit. One of the Fellows told the CNO, as his concept team was researching the SSG's [CNO] Theme for that year ("Integration of the Warfighter into FORCEnet"), "As we look across all aspects of the fully netted force to integrate the warrior, we find the lowest decision level for all aspects of human factors engineering in the Navy is at the CNO level. At your level." The CNO, Vern Clark said, "that's not good. I want to totally change it. Let's push authority down the chain of command. When you brief me in July, as part of your briefing, I want a plan for restructuring all elements of the Navy's human factors engineering program. And that happened. The Navy implemented the SSG's plan. Another small, yet important, example of the SSG's value to the Navy.

DB: The very idea of the ergonomics of design being part of the warfighter concept for FORCEnet is fascinating.

JH: It was then and it will be more so in the future.

DB: And it's associated, I presume, with everything from body armor design to ship chairs, to everything you can think of.

JH: Especially in command and control and, for example, the integrated operations of manned and unmanned systems.

DB: And the cognitive component about how much information the human brain can take in from screens.

JH: That's a great point because we frequently talked about cognition, for us meaning the cognitive level of warfare. We called it "cognitive warfare," which is right in the middle of a neuroscientist's lane, type of thinking, and research.

It is still Day ONE, SSG-15, and I'm telling the group "If you haven't figured it out yet, you soon will realize the SSG is a very dynamic organization and that is by design. Our sole purpose is the generation of revolutionary warfighting concepts for the future. You have to be dynamic to be successful.

"The primary lane is the operational level of warfare. Not strategic. Not tactical.

"Think of the SSG as a warfighting research center that looks out from today to 30 years ahead. That might sound a little esoteric. Who can predict out to tomorrow, let alone out to 30 years? The answer, no one can predict, but we can forecast based on trends, our military experiences, and first-order analysis. Plus, it is important to realize that the SSG does not deal with a concept unless there are actions needed to be taken right now to enable its implementation in the longer term."

DB: Can you unpack that a little bit more, the actions needed to be taken right now?

JH: Let's take [the] railgun. SSG XVI told the CNO that, if the Navy did its research and development properly, the Navy would have [the] railgun in its surface combatant ships in 25 to 30 years. If we had stopped right there, it would have sounded great, but nothing would have happened. So we proceeded to discuss all the steps that needed to be taken to get the Navy from here [1996] to 25 to 30 years from now for railgun development, many of which started right then. As an example: "Right now, CNO, you need to fund electric-drive IPS [integrated power system] for surface combatant ships because that will provide the power source for high-energy weapons in the future, including railgun[s] and lasers. And we can't do it in series. We have to do it in parallel." That the SSG did not deal with a concept unless there were immediate actions that needed to be taken was a basic reality check built into the Process of Innovation.

Another aspect of the SSG dynamic was its straightforward chain of command. Dotted lines and parallel paths? We did not have them in the SSG. The SSG reported directly to the Chief of Naval Operations, who was the senior military officer in the Navy. And, by charter, the CNO was the only person who could task the group.

An OPNAV staff officer might call a friend in the SSG and ask for an overnight point paper on a particular topic, because he knew the group had a lot of expertise in that area, but we did not do that. It distracted the group from its purpose. I would tell the group, "You are here to generate warfighting concepts for the CNO based on the Theme that he has provided you. Nothing else."

The good news is that the Navy has implemented or is pursuing many concepts that the SSG generated over the years. These include: [the] railgun; the warrior of the 21st century, which came out of that human factors discussion; sea strike against the most difficult land targets—those mobile, moving, concealed, and buried; in-stride sustainment from a sea base; directed-energy weapons; hypersonic weapons; a fully netted operating force called FORCEnet; all types of unmanned vehicles—families of unmanned vehicles—air,

surface, and subsurface, integrated with manned systems to complement them in ways that greatly increase warfighting capability; electro-magnetic maneuver warfare; and cyber warfare.

For two years the SSG dove deeply into the cyber world. SSG XXVI and XXVII, 2006 to 2008. I was amused, recently in 2016, when the President's special cyber commission [President's Commission on Enhancing National Cybersecurity] reported out. Basically, everything they said one could find in one of those two SSG reports 10 years earlier. For the Navy, our work in cyberspace generated the standup of the Tenth Fleet, the Navy's cyber fleet. It influenced formation of the cyber warfare community—the cyber warrior. The most important aspect was that our work kept pushing the Navy to bring the cyber capability from the national level down to the ship level so that the commanding officer of a ship would have a –cyber package, prepared by NSA, for use in a tactical warfighting environment.

DB: Were there any discussions on the cyber issue about the fact that so much of the IT for the federal government and the Navy is contracted out?

JH: That subject came up frequently in the SSG, which always recommended that all digital capabilities, the software and the chips, be made in America. Just too risky to have them made elsewhere. And, that any combat systems we provided to other nations have a chip inserted so they could not be used against us.

Another area of SSG work that influenced the Navy was a totally new computing approach for operators. That started with Admiral Roughead, the CNO. I walked into his office to discuss the Theme for the next year. I had three ideas to go through with him, but was hoping he had one since the very best CNO Themes were the ones the CNO himself came up with, which meant immediate buy-in and his total commitment. So, as I walked in, Gary said, "I have the idea." I thought, "Terrific." He then picked up a handheld device and said, "By 2020, I want fleet commanders to be able to command their fleets in warfare with one of these." That became the CNO Theme, which, in a phrase, was "Take the Navy's computing capability to the next level in the operational environment." One concept from that group was that every Sailor's sea bag, on original issue, include an IT device. So every sailor would become cyber-capable, quickly.

Shortly before I left the SSG, the CNO Theme was "Electromagnetic Maneuver Warfare (EMW)," meaning how to maneuver in the electromagnetic spectrum. This was Admiral Greenert's idea. A short version of his Theme was "make the electromagnetic spectrum a primary means of warfighting by 2020." That was SSG XXXI, in 2011 to 2012. EMW gained traction so fast that in a few years it was Navy doctrine.

Most of the time, the group did not get recognition beyond the CNO, which is fine, because I found over the years the more public recognition the SSG got, the more difficult it was for us to do our job, and the more people would "circle the wagons" because there were Navy directorates that had their own programs and they did not want the competition. So, the SSG's thinking was a catalyst for the CNO, but not always welcome by others in the chain of command.

DB: So, do you think that the lack of recognition had an impact on the fact that the current CNO [Admiral John M. Richardson, CNO 18 September 2015–22 August 2019] has told the SSG to stand down now?

JH: No. I worked with six successive CNOs and made sure that each knew a fair amount about the SSG by the time he became the CNO. They all knew about the SSG's products, but had little idea how those products were developed. No idea of the innovative process and internal dynamics that I am discussing in these oral history sessions. That is, until I briefed each of them in detail.

This orientation for incoming CNOs was very important if I was going to maintain the SSG's forward momentum because it wasn't unusual for somebody to recommend to the CNO that he disestablish the SSG, or place it in OPNAV in the Pentagon. In fact, Vice Admiral John Morgan, who was N3/N5 for three years during the Admiral Clark and Admiral Mullen tenures as CNO, strongly recommended during the CNO transition team's work that the SSG be placed under him, so he could "get control of it and integrate it into the OPNAV way of thinking." That's the last thing the CNO should have wanted to do. He wanted new thinking, and you don't get new thinking from your mainline organization. You get it from a group that can do what we did located away from headquarters to reduce interference.

I would get with the incoming CNO before his appointment was even announced, and spend two to three hours with each. Then I would follow up with an email and say, "Thanks. That was a great session. Just as a reminder, these are the commitments you need to make in order for the SSG to be successful, because you are the face of the SSG. Without you, there would be no SSG." Then, I would list all the important aspects in which he needed to be involved, such as, "You will be the reporting senior for the CNO Fellows; you will select the CNO Fellows; you will ensure they go to meaningful follow-on assignments that can take advantage of what they learned in the SSG; you will meet with the SSG five times a year." It was easier for me to do that than it was for Vice Admiral Wisecup, who relieved me, simply because of my rank. The CNO and I discussed this when the CNO said that Phil was his choice to relieve me. He asked me if I thought the rank difference would be a problem. I told him, "It could be. But, as long as you support Admiral Wisecup, it won't be."

Within a month after Phil relieved me, another vice admiral tried to take advantage of the situation and get control of what the next CNO Theme was going to be before it even got to the CNO. The CNO intervened and that situation was worked out. For sure, Phil tried to do what I did with incoming CNOs. I explained all this to him and I know he understood the importance.

I have an active professional relationship with the current CNO, Admiral John Richardson, and he is aware of this initiative to write the SSG's history. It would be helpful if he provided his reason for disestablishing the group. For now, the importance of this oral history is to make sure we document properly the Process of Innovation; because, if the CNO at some point in time decides he wants to bring back the SSG or an

equivalent group, then he needs to have all aspects of this Process of Innovation at his fingertips. They must not be lost.

DB: And the oral history provides your perspective on the most important parts of that Process of Innovation.

JH: Right. My oral history work with you is all about the Process of Innovation. You will not get it in such detail from other sources simply because nobody else knows it the way I do.

Now we get to the emotional part of Week ONE. I'm reaching the end of my 12 hours of discussion with the group. They're half exhausted, but I'm going to pep them up because I tell them the SSG is their challenge: "In fact, it is your crusade to influence how the Navy will operate and succeed in the future from today out 20 to 30 years, and beyond.

"Your influence is not on the margin, but in big ways. Big, warfighting ways. You will be successful. The harder you work, commit, and focus, the more successful you will be. There will be no losers among you.

The SSG is product-oriented without question, and professional development will be a strong byproduct for all of you—in both military and civilian endeavors." And I did spend a lot of time every year working with the group in professional development. It included leadership workshops for the young officers, moral compass workshops for the senior officers, along with numerous discussions and papers in the category of "how to lead and to live one's life[examples in Appendix G]."

Now to the wrap-up of Week ONE. I said: "The SSG's success is directly related to the levels of dialogue and mutual trust that you generate among our operators (the military) and our technologists (the civilians) and more is always better. A common purpose with shared enthusiasm. Said another way, the SSG's innovation process doesn't just kick automatically into gear and stay there. It needs close and constant interaction and nurturing among the operators and technologists. Teambuilding is both continuing and essential.

"A relatively unconstrained environment is essential. The mix of operators across ranks and specialties, along with technologists in their diverse areas of discipline, generates multiple and sometimes-unique ways to think about ideas. Not just new ideas, but old ideas as well, because in many cases you do not come up with the idea; instead, it comes from a new way to look at an old idea.

"You should review the CNO Executive Panel charter, the CEP task force charter on innovation, and the task force's relationship with the SSG as the group's board of advisers. The board of advisers will meet with you three times a year.

"The SSG has several byproducts that spin off of its singular purpose to generate warfighting concepts. The first, I've mentioned already, is professional development for each individual. I am your military leader. The CNO is your big boss. I'm his on-scene 'Boss Hogg' and I am your military mentor.

"Next, we develop a core of innovative thinkers for the Navy. And, finally, we make a broad audience aware of warfighting concepts and their interrelationships, so it's not just the Navy. It is DARPA, the Defense Science Board, OSD, and many others. All are aware of our work. For example, our work on electro-magnetic maneuver warfare in 2011 to 2012 preceded by six months the Defense Science Board's Summer Study Workshop on the EM spectrum. Although the SSG's final report on EMW wasn't published yet, I sent the final draft to the director of the Defense Science Board. He took it to the workshop, put it on the table and, I am told, said 'Looks like our work's already done. Here it is, guys.'"

DB: Did you do personality and leadership tests? The Myers-Briggs kinds of things? Were those a part of initial group building or was that part of the way that you put together the innovation program?

JH: We thought a lot about this, and used Myers-Briggs for the first four years. It showed the profiles you would expect for the military. The clear majority were Type A's. So it didn't help that much, to be honest. I knew by the time the concept teams were formed up in late December who the Type A's were, and I knew those who liked to think things over a lot more before they made a decision. There were some groupings that were based on that knowledge; but, it was not a big influence in group teaming.

We also had the benefit of bringing Brenda Connors over to the SSG. She lost her home at the War College. Was told there was no longer an office for her, so we provided an office in the SSG spaces. She didn't work for the SSG. While at the War College and at the SSG, she was sponsored and funded by the Secretary of Defense. But the SSG provided an office and facilities. Her expertise is in full-body movement analysis. Many people think that means facial expressions, but this goes way, way beyond that. The only reason there is not a PhD level of education in this discipline is because nobody knows how to put the curriculum together. Brenda is one of about 300 full-body movement experts in the world. She provided insights for CNO Fellows through their leadership assessments, so that helped as well.

Back again to my Week ONE comments: "You need to stay linked up all the time. By linked up, I don't mean just in person. I mean both in person and digitally. That's why each of you has a full work station in Sims Hall, a BlackBerry (at the time I said this, we all had BlackBerries), and a laptop or tablet (tablet computers were a big deal then, now it is iPads). There will be frequent updates to IT systems and software applications because we want you always linked up. Don't go on a trip for a week and wait until you get back to Sims Hall to share your information. Send back copies of everything you have received. Reports, documents, data. Start the discussion online. Then, when we get into a meeting in the SSG, you will all be ready to start making decisions. This information exchange has to be interactive 24 hours a day from January through May, until we wrap up the travel and then start to integrate the work.

"Most important is your openness to innovative thinking and your team spirit."

"Keep in mind when you talk with people outside the SSG, your thoughts and your concepts are not official Navy thinking or positions. That's very important because you are going to talk to a lot of people across

industry and with intellectual groups, and you are not speaking for the CNO. You are not a Navy spokesperson. The SSG's forays are informal information-seeking efforts. Period. Any questions by the media? Just refer them to me."

My final thoughts as Week ONE wrapped up: "How far can you go with this year's work? Once you come together as a solid, highly motivated team, you will only be limited by your ability to think innovatively and your energy levels. Take up the credo 'Teamwork to Collaborate.' Always keep in mind that you have an opportunity—in fact, an obligation—to move the Navy forward. Be physically and mentally prepared for a full-court press from mid-May through the final report out to the CNO in late July. Do all that as a team, do it with unconditional commitment, and I guarantee your success. Plus, you will have the satisfaction of knowing you have gone as far as you could possibly go given the time constraints, and you will have the reward of observing the Navy over the next several years actually implementing your ideas and concepts."

DB: The term "crusade": Where did that came from? Was it something you started when you came to the SSG? Or did it develop as you moved forward?

JH: I love that term. For me, it started in Coronado, California, in 1956, when I was a brand new ensign on the waterfront. We would have a "crusade" about once a month on a Saturday. One person would pick a bar somewhere up north of San Diego on Old Route 1 for noon "roll call," then we would "crusade" south through about 10 bars, ending up in Tijuana for the finale. About 30 of us. We would all walk into each bar at the same time, overwhelm them, but everybody got a drink. Just one drink per bar. It took about half an hour to 45 minutes of dwell time in each bar. Now that's a crusade! And, that's where the term came from in my mind. Of course, I also like the term "crusade" for what happened as Western civilization came out of the Dark Ages. Anne and I were in a church in northeast Belgium in 1990 and there was a commemorative monument that said, in effect, "This is the church from which Charlemagne departed with his Christian army for the Great Crusade." I'll never forget it. So, those are my two relationships with the term "crusade."

There is one thing I didn't talk about earlier when discussing SSG dynamics. In 1996, we decided to have an Alumni Day. As I discussed earlier, in late October, each group would spend a week in Washington to meet with all kinds of people and organizations. DARPA, ONR, NRL, ONI, NSA, the Navy systems commands, the CNO, the Secretary of the Navy, OPNAV flag officers, the CEP task force, and others. We would designate one of the days "Alumni Day." It was a full, professional day. We didn't include members of SSG-1 through 14 because, while they did some excellent work, theirs was a totally different process, a totally different approach, a totally different purpose. So, we did it the first time with SSG XVI. SSG XV's "new" alumni joined us. Typically, half to two thirds of recent groups would attend and attendance would drop off for earlier groups. So, if one were held in 2013, there might be 3 or 4 people from SSG XV [1995–96] in attendance. As we proceeded through the years, we routinely had about 75 to100 total alumni in attendance. We would kick things off with introductions around the room. That helped build their contact base. Then, I would talk for about 20 minutes about what was going on in the SSG, such as changes in the Process of

Innovation and in group compositions, implementation of SSG concepts, and ideas for the future. Then, we would have the most recent group that just finished up brief their actual presentation to the CNO. That brought everybody up to speed, and gave the new group a real "feel" about the final product for the CNO. Next, we formed into small teams, rotating the alumni so current members had full exposure to their reflections and ideas. Basically, the "old-timers" would tell the incoming group what it was "really like." "Well, Boss Hogg will tell you all this stuff and that's all good. He knows what he's talking about. We will tell you some other things you need to be aware of." All good. At around 4 pm, we returned to plenary session for a 45- minute wrap-up that I would facilitate. Then we would break for Happy Hour at five.

DB: At the officers club or some place in town?

JH: We held Alumni Day in a conference area at the hotel where we were staying, so Happy Hour was at the hotel bar/lounge or at a pub close by. That was our standard approach. It worked out very well.

I'll talk now about the value of the SSG to the Fellows. Professional development and mentoring were central to the work of the SSG [see Appendix H].

We have hundreds of written comments, emails, and notes from past members about the value they gained from the experience. Here is one example: It was in 2003, so SSG XXII. An email from a departing Director Fellow. He was a major in the Army, artillery, and started by saying, "I personally want to thank each and every one of you who took the time to discuss what I deemed important during the various work days." That's an important comment because it shows the CNO Fellows really did look upon the Director Fellows as primary participants in the process. Then he said, "My time with the SSG was exactly what Admiral Hogg and Bill Glenney expressed to us during orientation, a very worthwhile endeavor that changes you forever. Throughout, I had the privilege of working, socializing, and learning from the very best in the Navy, Air Force, Marine Corps, and Coast Guard, as well as the very technical and analytical civilians. These shared experiences, as I become indoctrinated back into the Army, will influence me more than I can express. My decision to be part of this experience was the best decision I've made in my Army career. Thank you all for making this such an outstanding opportunity."

That note was not unique. Many of them said the SSG was a life-changing experience. When I said I wanted the ability to think innovatively seared into their souls, they confirmed that it happened. How satisfying can that be? That is the primary reason I stayed for 18 years. When I first started getting this feedback, I thought, "There may be a little smoke and mirrors here." Then comments increased. For example, the Army major at West Point, covered earlier, who told me, "You changed my life. I'm a better person; not only in the military, but I'm a better father. I'm a better family member at home." That really gripped me. Then, I realized there was more to it.

In no way can I say it was all me. Yes, I'm the one who put the process together, but, fortunately, I had a fabulous deputy director, Bill Glenney, who was my alter ego for 15 years. I always made sure we were in

lockstep. Anything I knew, he knew; anything I did, he understood why I did it; and I listened closely to his advice. He also had much more to do with the Technology Fellows than I did. He saw them on a daily basis and—while I was with the whole group on a daily basis—with the exception of the science adviser, I did not do as much hands-on work with the Technology Fellows.

DB: This feedback process is important because it reinforced that the Process of Innovation was a fundamental change rather than a superficial one for these individuals across the military and these civilians who interacted with the military. So that, despite the SSG stand-down, the legacy of the SSG and those people will keep growing.

JH: That's right. It is still growing and that will continue as long as there is a Fellow on active duty.

One of the things I did routinely every year was to share with the SSG what I called "Quotes and Thoughts." I would start it in January, when the concept teams were formed up and generating their concepts. The first quote included a note explaining the purpose, i.e., another way to relate among the groups. I would say, "Let's start sharing quotes and thoughts based on our experiences and our readings. These might relate to professional or personal development and any challenges you might see. So, mine will primarily be along motivational lines. I'll provide no more than one a month on a small card for handy reference. My suggestion for those interested in participating is that you normally use the 'SSG all' net and that your individual contributions are spaced so that as a group we generate no more than one a week. That's only a ballpark comment since the only control will be provided by group dynamics and a self-organizing group environment." That was another way of reminding them that the SSG environment was truly self-generating. The first quote was on a two-by-three-inch card (wallet size), titled "Persistence!" Many people are familiar with it:

> *Nothing in the world can take the place of persistence. Talent will not. Nothing is more common than unsuccessful people with talent. Genius will not. Unrewarded genius is almost a proverb. Education will not. The world is full of educated derelicts. Persistence alone is omnipotent.*

That quote, the best I can tell, goes back to President Taft, and I have been aware of it most of my adult life. I always gave it a lot of thought and found out that persistence really helped in my career. So, I would try to encourage others to be persistent. In doing so, at times they would become a pain in the ass by always bugging people. Then I would explain, "That's not the kind of persistence I'm talking about. I'm talking about being persistent in meeting your objectives in life, so that you are always prepared to take advantage of the next opportunity." An action officer, for example, if he's good at what he does, can have 10 to 15 professional "balls" in the air at any given time. He should frequently review each ball to make sure he is ready for the next step when a staffing breakthrough comes, so he can quickly move in and take advantage. That's the kind of persistence I'm talking about. That prompted me to add two lines to the quote. My lines, based on my personal experiences, were:

Because persistence will take over when your natural ability is exceeded and carry you through to success.

Another quote every SSG received was my "Philosophy of Life" card. I put it together in my thirties, based on discussions I had with Vice Admiral [Howard A.] Yeager in my mid-twenties20s while serving as his flag lieutenant. It went like this:

Every day, at the end of the day, you are a better person or you are worse, and it's all up to you." I tell people, "It's simple, it's straightforward, it's very hard to implement, but very easy to remember.

I don't suggest that people accept it as their philosophy, but I do suggest they put together their own and do their best to live by it.

DB: So, no verbosity allowed?

JH: Absolutely not. Which reminds me of my annual effort with each SSG, as it started preparing the final report for the CNO, to keep the verbiage down. I drafted a "sample letter" along with a note to the group. The note said: "Rhetoric is a killer. You need to be precise and specific. Every word has to count. Get all the verbiage out [see Appendix I] I then gave them the "sample letter," many words written in the typical Joint Staff manner. Then, I reduced it to a few words, saying exactly the same thing in a much more powerful way. The lesson: fewer words is better, until the author reduces the verbiage to the point where one less word will change the intent of the message. At that point, the author may congratulate himself on reaching one key element of literary perfection!

Chapter Five
An Evolving Nature

SSG Character | The SSG's Evolving Nature | The SSG Director's Tenure and Relief

"This is the CNO's SSG" | The SSG's Influence | Realign the SSG?

Support for Deep Blue | Strategic Thinking: The Triad | More on Strategic Thinking

The Human Side: NCIS and DIS Stories | Political Correctness Gone Astray

Admiral Hogg's Best Move: Says I | Admiral Hogg's Best Move: Says Bill Glenney

The SSG's "Long-Range View" | Conceptual Development of the Railgun

Research Travel | The "Way Ahead Plan" | Unleashed and Immersed

Final Comments

(Editor's note: This is an edited version of the fifth of five parts of Admiral Hogg's SSG oral history, originally recorded at the U.S. Naval War College on 13 December 2016.)

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Dara Baker (**DB**):   Good morning, Admiral Hogg. We are here to wrap up the SSG oral history.

James Hogg (**JH**):   Do you have many questions in mind based on what we have already been through?

DB: You may want to speak about whether individual SSGs you worked with had individual characters; and a little more about the changes from the first SSG that you made throughout the years.

JH: First, character. Every SSG developed its own character. Its character was defined by the personalities, the experiences and the backgrounds of all the individuals. My job as the leader was to make sure we took advantage of those attributes by recognizing the diversity they brought to the group, then using them to bring the group together. It wasn't always easy. The coaching I gave was more for the senior officers because they had been in the Navy for anywhere from 22 to 26 years and they knew how to get things done the "Navy way." They had been very successful. They had all experienced command. Most of them had commanded at sea; several commanded ashore. They all understood people. They felt they knew the answers to personnel situations. They knew how to work the system. So, a difficult thing for some to internalize was that we, the SSG, were not working within the system. We would set the system aside. Some people said we "trashed" the system, but that is somewhat of an overstatement. Yet, we purposely set the system aside so we could take off all of the shackles, drop all the baggage, and look freshly with new and innovative thinking to come up with revolutionary ideas. Otherwise there would be few, if any, revolutionary ideas; or, they would be accidental. All SSGs generated revolutionary ideas purposely, and that was their job.

Next, changes made over the years. The evolving nature of my understanding of innovation was significant. I came to the SSG as a Mark 1 Mod 0 Navy guy, 35 years of active duty. So the SSG actually opened my mind. A lot! I had some defense mechanisms built into my system when I came to the SSG. I never let them show, but they became obvious to me. I knew I had to eliminate them, for the good of the SSG and for my own personality as well. And what helped the most was "Yes, and ..." Another was the increasing realization that we needed more women in the SSG. More gender diversity. I already had a lot of experience with women in the Navy. I was considered by Navy women in the 1970s and 1980s to be their "champion." It was my job to establish policies for women in the Navy as OP-13 [director of Navy Personnel Policy, 1979–82]. I served on the President's Commission on Women in the Armed Forces in 1992 and was a strong proponent of eliminating Article 2017 of Title 10, U.S. Code, so women could serve in combat ships and aircraft. I did not agree with women serving in infantry and Special Forces, but that's another story.

So, SSG XV got "everything I had" at the time in terms of positive leadership and the ways to come up with innovative thinking. It coalesced, by SSG XVII, with the CNO's Theme that I have covered. That helped. I mentioned earlier that I visited Buffalo State University in upper New York State in 2005 because I was told Buffalo State was the only university in the country that offered a master's degree in creativity. We invited the head of that department down to work with the SSG for a day; then, she invited me up to Buffalo State. I spent three days. They actually asked me to teach a course—a three-hour class on innovation. I learned a lot about what they were doing. I was hoping I would find things I could use to build upon the SSG's innovation process. That didn't happen, but the visit affirmed that our process was on track; which, in itself, made me feel pretty good.

Over the years, I also found different ways to discuss things with the groups: how to stretch minds in order to think innovatively. By 2000, I pretty well had it together. At that point, it was just a matter of how I presented the material. And, doing it every year for 18 years, it became part of my "DNA." To the point that I barely needed notes. The notes just kept me on track. Most valuable were the spontaneous group discussions in our conference center, where we had the group sessions, and periodically with individual concept teams. I would meet with the teams, as I mentioned, typically once a month to see how they were doing; to give them an idea or two, ask and answer questions, coach them, and I frequently threw in leadership thoughts and ideas. So, for me, these were fabulous clinics on creative thinking, innovation, and leadership—with a captive, yet very friendly and receptive audience.

DB: You were there for 18 years. Did you revisit, periodically, your decision to stay in charge of the SSG? Was that something you discussed with every new CNO, or was it an unwritten statement that you were the head of the SSG until you decided otherwise?

JH: After my fifth SSG, rumors started to build on the War College side of the campus. "Well, Admiral Hogg is going to retire this year." And they were always wrong. I don't know where they got the rumors.

It wasn't a "given" that I would be there for the 18 years, and I never took it for granted. The longest tenure of anyone before that was three: but nobody else had my background, my interest, and my intense love for the Navy.

When Mike Boorda asked me to come, I committed for four years. I really planned to leave after four years and get back into the mix in the private sector; but, the SSG Innovation Process, the energy level of the groups, integrating young officers into the program, and the actual ideas that the group came up with were all so enjoyable that, for me, it became a compelling environment. There was no way that I could leave. My wife, Anne, would ask me about it. I would respond, "I'm very happy doing what I want to do and helping young people develop." I soon realized that I wanted to stay with the SSG for the duration as my second career. So, I defined it that way. That doesn't mean the Navy defined it as my second career. It just worked out that way.

In more detail: Mike Boorda committed suicide before SSG XV reported out at the end of the year. We were heading to the Pentagon the next day to brief him, in May of 1996. We got a call from N00K, Captain Robby Harris, who said, "The CNO is gone." Jay Johnson became the CNO and we postponed the briefing until September. I never had a discussion with Jay about whether I would stay because I had a contract, for four years, and didn't even think about it. When I was coming up to the end of my four years, Jay was still CNO and I brought it up by saying, "How would you like to deal with this? My time is coming up." He asked, "Don't you want to stay?" I responded, "Sure." He said, "OK. Fine." So we renewed the contract for four years. Two years into that contract, my status changed. When I started with the SSG, I had been hired by CNA—the Center for Naval Analyses—as a member of CNA. They in turn, under the Interagency Personnel Act, turned me over to the Navy as the director of the SSG, reporting directly to the CNO, yet CNA continued to pay my salary.

DB: That means your salary was paid by CNA through the IPA Program, but your end-of-year evaluations were written by the CNO?

JH: There were no written evaluations. And by the way, when you become a three-star flag officer, there are no more fitness reports.

DB: That's interesting—I didn't know that.

JH: Or for four stars. It ends. The senior statutory rank is two stars. You serve at three and four at the pleasure of the Secretary of the Navy and the President, and every assignment has to be confirmed by the Senate.

Getting back to the IPA, it was a four-year deal and you could get one two-year extension, which I did. After that, in order to have another extension, you had to have an uninterrupted two-month sabbatical during which you were not allowed to talk to anyone in the Navy about anything. So I was scratching my head

because July and August—when the SSG was not in session—were the two months when Bill Glenney and I and the technologists set up the whole program for the next year. And, it was when I negotiated the next group's CNO Theme with the CNO. I thought, "That's not possible." Then Art Cebrowski, who was the president of the War College, said, "Why don't you come over here?" I agreed. We arranged it so that I would be hired by the president of the War College as a professor. Then, he would sign a letter directing me to report to the CNO as director of the CNO's SSG, with the CNO as my reporting senior.

Vern Clark relieved Jay and my contract expired after his second year. He said, "I want you to stay on. I hope you will." And I said, "Fine." Then I said, "Let's do it for two years so when you leave, we'll give the next CNO some flexibility," not knowing Vern would have a five-year term because no one had done that before. We then extended that one year, so when Mike Mullen relieved Vern he could decide whether he wanted me to continue. Mike said "yes," Gary Roughead said "yes," and Jon Greenert said "yes." I gave them all the opportunity, and that's the way it worked out.

DB: Can you talk a little bit about the choice for who replaced you and how that came about.

JH: Yes. It was April 2013 and the CNO, Jon Greenert, was with the SSG in Newport. He and I were sitting in my office, just the two of us, before we went down to the session in the conference room. Jon said, "What would you like to do?" I said, "I think it's time. I'd like to retire when I'm 80." Intellectually and mentally I was on top of things, but I needed another back surgery, I needed a left knee replacement, and I really couldn't keep up physically with the group. I could keep up in meetings, but I had to get from point A to point B, maneuver through the Pentagon, all the travel we did—I traveled three times a month on average. It was getting difficult to keep up with the younger people. I didn't like that. I'm sure that it didn't bother them, but, to me, it felt like "if you can't swing with the group, you really should pass the baton."

Jon said, "Let's think about who might relieve you. This is very important. I want to make sure the SSG's positive momentum continues, the way you set it up. If we're going to turn it over, I want to do it before I leave, if that's all right with you." I said, "That's fine." So, we agreed that the next SSG would have a new director and that would happen on 1 October 2013, SSG XXXIII. We agreed to think about who might be the right relief and discuss it again in June.

Jon came back in June. Same deal. I'm in the office with him. We were talking through it and he said, "I have a list here of all three- and four-star flags who I expect will retire in the next year or two." I sort of smiled because they didn't necessarily know they were on the list, but he did. Jon said, "The only person on the list who I would like to have is Phil Wisecup. I have worked with him as the Inspector General. I like the way he goes about things. I know I could work well with him as the director of the SSG and that is very important because, as I said earlier, I want to make sure the SSG maintains this continuing upward momentum that you have established over the years."

I personally believed Phil was a solid candidate, so I didn't even throw out a name. I also felt it was the CNO's SSG and, if he really wanted Phil, it was his decision. But, I did bring up the four-star aspect. By that I mean, would a retired vice admiral be as effective in the position as an admiral (O-10). Jon brought it up, too. And even Phil did. The general agreement was that the CNO's full support of Phil in the position would overcome any potential difficulties. For me, the best aspect was that Phil had served in the SSG as a CNO Fellow. He didn't know what all the other SSGs had done like I did, but he knew the process. He had been through the whole thing. We had an extensive turnover for one full week, eight hours a day, constant, covering all the materials and all the processes. Of course, it would be up to him to decide his own approach, so I didn't try to lecture him. I just made sure he knew everything I had done, and why, plus a lot of the history of the SSG. That was the way it happened.

DB: So then—

JH: The only people I told were my wife and Bill Glenney. At the War College, again, as in most other years, people were saying, "This is the year he's going to retire." As the rumor started to build, I said to Bill, "There's no way we can discuss this with anyone until the last day of the group's year. I don't want this group to know I am retiring until after they have briefed the CNO." I told the CNO this and he played along—said nothing. Then rumors increased because an SSG staff member discussed transition planning with a War College human resources counterpart. But Bill and I stayed above the fray. No comment!

DB: Considering that the rumors of your retirement had been premature for 13 years!

JH: Had they been betting, they didn't win any money until that last year. More background: each outgoing SSG, as our last official event on the last day of July since I started this program, went to McCarty-Little Hall at 8:30 am to brief the greater War College, meaning the War College itself—students, faculty, and staff—the Naval Station staff, the Surface Warfare Officer School, the Naval Undersea Warfare Center, and all the captains in command positions on the base. All were invited. Typically 75 to100 people attended. Exactly the same brief we gave the CNO. No ad libs, no adds, no changes; saying, "This is what the CNO got, and these were his responses." That wrapped up at about 11:30. Then, the SSG had its farewell lunch. The CNO Fellows, the Technology Fellows, and the staff (the last of the Director Fellows had departed in June). At the end of the luncheon for SSG XXXII in 2013, I told them, "You are my last and my very best SSG." What I didn't tell them was that I put enormous energy into SSG XXXII's program, making sure they got everything I had ever said or done with any of the previous groups. They got the total package that included my most recent mentoring approaches in areas of professional development and leadership.

Four of them made flag during that year, with the list for promotion from captain to rear admiral already announced. That's four of the seven Navy.[3] And, it was a very successful group. You would think with that many very capable CNO Fellows —one third of whom, on average over the years, made flag—that there

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3   Two of the four Navy flag-selectees would go on to be promoted to vice admiral.

would be some "prima-donnas." There were none. It was my job to make sure they all came together as a team. Relating, cooperating, and collaborating with unconditional commitment. SSG XXXII did this very effectively.

DB: And one last, maybe difficult question.

JH: There are no difficult questions.

DB: The historian in me always wants to know, is there anything you would have done differently? Anything that you regret? Anything about the legacy of the SSG that you think may be misinterpreted?

JH: I'll start with the last one. Not everybody in the Navy was keen on the SSG. Before I took over, for the first 14 years, the SSG did some very good things. But, after they reported out to the CNO, access to the material was limited. Basically, there were only five written reports over those years. They were very short, and they were not distributed. They just went to the CNO. So, up until 1995, the SSG was not a visible threat to any organization in the Navy. Not a threat to the budget people or the warfare sponsors, or to anybody who put together the warfighting program for the future. Of course, that all changed with SSG XV. All of a sudden, the SSG became a threat. The program executive officers [PEOs] feared losing money that might be redirected to the development of SSG concepts. The warfare sponsors [surface warfare, aviation, and submarine] knew where they wanted to put their post–major command captains. They didn't have enough post–major command captains to fill all the needs of the Navy, especially those who were flag competitive which was the selection criteria. And they were told, "You are going to provide seven post–major command, flag-competitive captains for the SSG. They were probably thinking, what are we doing here? We are going to send these seven captains up to the SSG so they can come up with revolutionary warfighting concepts, present them directly to the CNO, who is going to agree and then tell us to develop them. In effect these captains are telling us what to do. Warfare sponsors did not like that. So, I was very careful as the director to make sure nobody ever thought I felt this was my SSG.

If I said it once, I said it a thousand times: "This is the CNO's SSG. I am his on-scene director. The CNO selects the CNO Fellows. The CNO decides where these senior officers go when they leave the SSG. The CNO decides the Theme. The CNO decides what concepts proposed each year will actually be pursued by the Navy. Not me." And, I believe it worked. I know when I was a vice admiral on the OPNAV staff in the Pentagon, if I had thought there was a retired four-star up in Newport feeding his ideas to the CNO that became Navy policy or program, I would not have liked that at all. And, it wasn't just the final report out that each group gave. CNOs typically—while they were meeting the SSG for those four times before the final report—were taking notes. One time, Vern Clark—on a Monday morning—called a meeting of all the OPNAV senior flag officers. He had a list of items he was interested in. He went down the list—ten items— saying, "Have we ever done this?" Or, "Why don't we?" "What do you think about it?" and, "Let's get on with it." The flag officers were wondering, "Where did he get that list?" So they went to his schedule and saw the

previous Friday he had been with the SSG. That was it! I was sitting right next to him that Friday and saw him writing them down. That was not unusual for a CNO.

Another example of SSG influence: A retired flag officer who attended an annual retired flag officer's symposium hosted by the CNO told me that, twice during the symposium, OPNAV vice admirals told the audience the CNO, Jon Greenert, got most of his strategic- and operational-level thinking from the SSG. Finally, as I said earlier, each group's written final report was sent to about 1,700 people and organizations throughout DOD and the private sector across the country. When companies read it, year after year, they saw both warfighting concepts and continuity of thought. They easily could think, "We should put some R&D money into this," or, "This is the direction the Navy is likely to go. After all, these have been presented to the CNO."

Also, as I said earlier, some people wanted to realign the SSG. John Morgan for example, the vice admiral who was N3/N5, director of Operations and Plans for the Navy—a very significant position—and one of the top three-stars in OPNAV told the incoming CNO [Admiral Gary Roughead] during his transition, "The SSG is not doing what it should. You need to put it under me and I will make sure it does the right things." Gary, as he related it later to me, smiled and said, "It's OK. Jim Hogg knows what he's doing. He and I have already discussed this. We'll just keep it going like it is right now." That was the value in my briefing each new CNO in advance of his even being announced. And again, while the incoming CNO's knew the products of the SSG, they had no idea how they were put together, all the dynamics and the innovation process involved, or the CNO's responsibilities which I have covered in some detail.

With that background, yes, there were some critics of the SSG. Apparently, Jim Stavridis didn't really understand it. I noticed his comment when the CNO, John Richardson, disestablished it. Jim said, "We should go back to Deep Blue." That would be a good idea on its own merit, but Deep Blue and the SSG were never in competition. Jim was the first director of Deep Blue, which was established by Vern Clark during the Middle East conflicts to come up with things the Navy could do "right now" to aid the warfighting efforts in Iran and Iraq. It was at the tactical level, not the operational level, and it was very good. When SSG members went around the country doing research for five months, and came across something that looked like it might be a candidate for Deep Blue, we made sure they got linked up. So, we were complementing and supporting Deep Blue.

DB: Was it the competition for personnel and resources or what you try to avoid, which is that it wasn't your program and that you weren't protecting it?

JH: You mean the disestablishment?

DB: Yes. I guess the concept was in competition with others?

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JH: Not really. The competition for resources, people, and money did not rise to the level of disestablishment in my mind; especially, given the value of SSG products. The only high-level competition was based on competing high-end interests, with John Morgan's as a good example. John felt that he could do a better job of running the SSG because he would align it with the OPNAV agenda, which is the last thing the CNO would want. John wanted to align it with the Program of Record, which meant more of the same. The Program of Record is very important to the Navy. It moves the Navy forward incrementally year by year, but it is not an organization that leaps over 10, 20 years, looks ahead, and then comes back and says, "These are the things you need to start doing now, to be in a good position in 20 years." So, I'm not critical of John Morgan in general. But, I am critical of the way he talked about the SSG; although he never did it in front of me, probably because of respect for rank. Nobody ever said things like that directly to me. I always got them second hand.

In one isolated case, it got so bad with an OPNAV flag officer that, when one of our CNO Fellows served on the officer's staff after he left the SSG, the flag officer totally marginalized him. I finally told the Chief of Naval Personnel what was happening. I said, "If it doesn't stop, I'm going to have to go to the CNO. Or you will. One of the two of us." So, we tamped it down. But, that was vindictive. Just plain wrong.

I do think that once I settled in as the director and people understood our approach, they realized, "We may not like the fact that he's getting top talent, and we may not like the fact that the SSG is giving the CNO a lot of ideas, but we realize we'll be a better Navy because of it. Plus, the Navy needs an organization that is dedicated to thinking innovatively." In OPNAV, they could not turn a switch and go from Program of Record thinking to innovative thinking, back and forth. It could not work that way. So, in the main, they came to accept the fact the SSG was an institution in the Navy, worth keeping, and the SSG was doing a good job.

DB: Do you think there is too much of a distinction in the Navy between strategic thinking, operational-level thinking, and tactical thinking?

JH: No, there is not enough strategic thinking at all and there hasn't been for a number of years. Strategic thinking basically comes out of N5 and it is things like "Forward… From the Sea," which was really a brochure for force building. If the Navy did some serious strategic level thinking, it would totally reorder the force posture. It would take on the nuclear triad. For example, the nuclear triad is not broken, but parts of it are becoming much less relevant. Land based silos—every year that goes by—become more vulnerable because every year, the Russians improve the accuracy of their ICBMs against fixed land-based targets. It is a fact that two thirds of the DOD strategic budget for the triad goes to the Air Force for their silos and land-based bombers, while only one third goes to the Navy for SSBNs. While the SSBNs provide more than 50 percent of the strategic deterrence capability. Now, why is that? It is because SECDEF/OSD/JCS have not broken out of 1980s thinking. Result, the triad needs a top-down strategic review. They can't quite deal with that. But, the SSG would in a heartbeat. Yet, the Navy also has a blind side. For years, officers in the unrestricted line [community] have been tacticians. The very best. Their blind side has been at the operational

and the strategic levels of operating and thinking. Recently, this was acknowledged by Navy leadership with corrective action now in place.

When I was coming up, things were different. For example, I remember four days after becoming commander of the Seventh Fleet in 1983, I sortied the entire Seventh Fleet to find a Soviet submarine that was in our expansive 52 million–[square] mile area of responsibility and not yet detected. We only knew it was out there because photographs taken of the dock showed it alongside the pier one day and not there the next day. It had been at sea for 11 days before I relieved, and nobody was doing anything about it. I didn't ask permission. I'm sure my staff informed CINCPACFLT that we were sortieing the fleet so they wouldn't be surprised, but I was thinking at levels above tactical, with the authority to act—at the peak of the Cold War. Three days after the sortie, our forces detected the submarine and forced it to surface.

DB: I think it's really important because when you are talking Navy, here at the War College, and the way the Navy thinks: the tactical, the operational, and the strategic are the language that everyone uses.

JH: It emphasizes my point. Naval officers operate in the environment where we expect to fight. That means we are tactically oriented. So, let's take the COs of CVNs. By the time they get through all of the pipelines, they take command at their 27th to 28th year of service. Eighty percent make flag at the 29-year point. That means they have been immersed in tactical warfare for almost 30 years.

For years, we refused to join the other services in an approach to joint doctrine at the operational level of warfare. We really didn't believe in doctrine the way the Army did. To us, the Army's doctrine was rigid, while the Navy's task=oriented organizational approach—what I would call "employment of forces"—was flexible. We moved forces in and out of strike groups for whatever mission, quickly. Every day of the two years I had command of the Seventh Fleet I worked with my task force commanders on how their forces were employed to counter the Soviets in the event a war started—so, we were ready to engage immediately. That was basically operational-level doctrine. We finally realized, when the Joint Staff started writing joint doctrine about maritime forces, with no maritime input, that we had to get involved. We also realized the Navy wasn't a strong player on large joint staffs because our officers really didn't understand joint operational planning and modes of warfare as well as officers in the other services.

That is all changing now. For example, Rear Admiral Jake Shuford drove the establishment of an operational-level warfare program here at the War College. He put a big stake into the initiative and garnered a lot of support.

Strategic warfare is something else, again. I do believe the center of strategic thinking in the Navy is right here at the Naval War College. The organization chartered with overall responsibility for strategic thinking is OPNAV N3/N5. I have told a number of N3/N5 directors over the past 22 years that they should develop a relationship with the Naval War College in strategic thinking, explaining, "You could think of the War

College as being your field activity for strategic thinking. They are not competing with you. By charter, you have the responsibility. You have the deck of cards. Why don't you play that deck out a little bit and you'll gain so much from it."

The SSG was into strategic thinking up until I took over. Two years later, in 1997, I was with the CNO, Jay Johnson, and the Vice CNO, Don Pilling as I mentioned briefly earlier, they asked "What do you think about strategic thinking in the Navy now that the SSG is not doing it?" I responded, "There is a vacuum, a black hole. The Naval War College is not chartered, with its only influence through the Quarterly Bulletin. N3/N5 is doing "slicks" for force building. N00K has the charter for long-range planning, but has never done it because they are not resourced. So you really need a new approach." I then offered: "I remember when my Dad was a student here at the War College in 1950. The president selected six captains from that year's group who stayed on for six months in a new program designed for strategic-level thinking. My Dad was one of them." Jay Johnson responded: "That's a great idea. We'll do it." I didn't tell Art Cebrowski about this because I was very discreet about my relationship with the CNO. Art was told to establish this group for strategic thinking. God bless him, I always liked Art, who worked for me when he was a captain and was great; but, instead of making it a broad, strategic-thinking approach, he focused the group to push forward his program on net-centric warfare. Since then, several special groups have blossomed here, all very good. At least two of them have periodic direct access to the CNO, and interact with the fleets as well. But, none of them are strategic.

DB: Can you define what you mean by "strategic thinking"?

JH: It covers very broad, very big ideas and programs of military and national security interest and consequence. The nuclear triad, as I discussed earlier, is a good example. Another would be an overall, broad-gauged plan for "U. S. strategic and national security interests in the Arctic." That would impact the general war plan at the strategic level. And, by the way, every combatant commander has a general war plan. Beyond tactical and beyond employment of forces. An overarching strategic plan. That's strategic, and it demands serious attention.

DB: Most of the time people mistake "strategic" with one of the others and call it strategic?

JH: Yes. All of the time. Just like they misuse the word "paradigm."

DB: It is like you're asked to do a strategic plan and then someone says, "And how many computers do you need?" That's not a strategic plan.

JH: A strategic plan may have nothing to do with computers.

DB: The strategic plan is like you need to reconsider the location because of increased radar capacity to detect trees.

JH: The thinking behind the SSG's CNO Themes always started at the strategic level. For example, the big rage right now is electromagnetic maneuver warfare, or EMW. It is approved Navy doctrine. That was Jon Greenert's idea when he said to me, "Has the SSG ever done research in the electromagnetic spectrum?" I said, "Yes, One SSG did," and I showed him what it was. It was a small section, not a total report. He said, "I'd like the next group to expand that." So the CNO Theme for SSG-31 was basically, "Make the electromagnetic spectrum a primary means of warfighting by 2020." Now, that thought is at the strategic level of thinking. He didn't tell us how to do it. The CNO provided the big idea and the group engaged at the operational, sometimes tactical, level of warfare. More on EMW. I'll bet you 90 percent of the people who are involved—OPNAV, the systems commands, and the Fleet—have no idea where it came from, but there is a full SSG final report on it. In fact, that is the report I mentioned to you earlier about the Defense Science Board [DSB] doing a summer study on the same topic. It just happened the SSG completed its work a few months before the DSB was going to meet. I gave an "advance" copy of the SSG's report to the DSB's chairman. When they met, the chairman placed the SSG report on the table and said, "Our work has been done for us." They did go on to review the topic in depth, and basically affirmed the SSG's work.

DB: Were there any bad decisions that you made or anything you regret in your time at the SSG?

JH: The only things I regret have to do with the people. Two naval officers came to the SSG, in different groups, as post–major command captains. Both were on the flag list while they were with us, but never made flag because of hotline calls about something the caller claimed they did before they came to the SSG. In both cases, I felt it was trumped up. The evidence in both cases never came close to convince me that there was enough in it to take them off the flag list. This is a statutory selection board and they were administratively taken off. I voiced my dissatisfaction in both cases directly to the CNO, Vern Clark. For one, I provided the CNO a 10-page rebuttal of everything that the Naval Criminal Investigative Service [NCIS] had said in its report. In addition, I was highly critical of NCIS in areas of process, procedure, and fidelity. The CNO did not answer me directly, but I got his answer a few months later when I received a call from an investigator with the Defense Investigative Service. He said "We are investigating the Naval Criminal Investigative Service and the CNO has referred us to you for comment. When could we get together? If convenient with you, we could meet in your office." I said, "I'm going to be in DC next week. Just tell me when and where we should meet!" I spent two and a half hours with DIS scorching NCIS over the two incidents I just described.

As an aside, when I was a junior officer on the waterfront, I knew if I decided I was going to live with a woman without being married that I was putting my career in jeopardy, to put it mildly. That was the 1950s. Here we are in 2005, with this officer in command of a shore command and the officers of his staff decide they want to have a weekend skiing trip with their wives. The CO is legally separated, but not yet divorced. He is dating, so he brings his girlfriend and that takes him off the flag list. That was 12 years ago.

It is even worse now, because the Navy is way too politically correct. For example, there was an SSG member, a lieutenant commander selected for commander. Terrific person. Great operator, Surface warfare, in the pipeline to command an Arleigh Burke DDG. Down in Dam Neck for training, he and another PCO [prospective commanding officer] went to the Officers Club at Dam Neck for pizza and had a couple of beers, then drove off the base to their hotel. A 50-mile-an-hour zone dropped to 35 and he slowed down to 37. (I got this report not only from him, but from the guy who was in the car, a Navy detailer whom I met later.) A cop pulled him over and said, "You're going too fast and you've been drinking." Wrote him up for a DUI. The lieutenant commander appeared before the judge in court the next week. The judge dropped the DUI charge since the on-scene breathalyzer test results were within the legal limit. The whole case was officially dismissed.

A week later, the lieutenant commander was down at SURFLANT in Norfolk for briefings and pipeline training. The chief of staff called him in. "What's this about your drunk-driving charge? Why didn't you tell us about it?" The lieutenant commander responded, "There is no charge." Chief of staff: "I have it right here." The lieutenant commander then responded, "The judge dismissed it." Chief of staff: "That doesn't matter. It's an alcohol-related event. You're out of the pipeline for command!" So, the lieutenant commander then had to process through three boards. The first board to convince the Navy that he was even fit to stay on active duty, the second board to determine whether he was sufficiently fit to actually serve in the rank of commander—a rank for which he had already been selected by a statutory selection board—and the third board to determine whether he was fit to actually go to command. These boards concluded: he could stay on active duty, but no promotion and no command. So, this lieutenant commander, with great potential and value to the Navy, was forced to depart active duty at the 20-year point. Why? "Over-the-top" political correctness. So, what did I do with that pathetic story? I actually detailed it just like I am telling you and sent it to the CNO, ending with, "This is ridiculous."

Here is another PC example. I was in Jacksonville at a very nice reception at the Officers Club. I had never been there before. A great club. Right on the water with a pier/gazebo complex and a big outdoor deck for events. So I asked my active duty friends, "This is great, do you guys come here very often?" The answer, "No. We never come here. There is a Jacksonville City police officer in his car parked at the exit to the parking lot every night. He's watching, and if he sees an officer sort of stagger or stumble to get to his car, as soon as he turns on the engine the cop steps in with a breathalyzer test and if he's in command or an XO, he's out." My immediate reaction was that this was terrible and I thought, "Why in the world does the commanding officer of the Naval Air Station, a Navy captain aviator, allow a city police officer to be on base to do that?" I understand why they have the authority to come onto bases [U.S. government property] in "hot pursuit," but to park on the base to look for intoxicated drivers? No way. That's the CO's jurisdiction. I sent that one to the CNO as well. But, I imagine such situations have become so "politically correct" that if the CO said, "You're not going to come onto the base," there would be a hotline call to SECNAV the next day and the

commanding officer would be relieved for "not supporting SECNAV's policies on reducing alcoholism in the Navy."

DB: And, in general, the message of reducing alcoholism in the Navy and not driving drunk are very important, but setting up a trap for naval officers may not be the best interpretation.

JH: Absolutely not the best; in fact, not acceptable! And on federal land, I must add.

I do have a few more things to cover. First, I sent a note to a friend recently about the SSG. He was an Air Force guy, very interested in the SSG and how it was all set up. I also sent him a copy of the CNO's Theme for SSG-32 and then told him this is an annual theme that we started with my third SSG, SSG-17 in 1997, to ensure the SSG's work would relate specifically to the CNO's interests. The CNO would come up with the theme. It would be a direction in which he wanted to take the Navy, which was great because then the SSG would have the CNO's commitment and buy-in. The group just had to come up with some great recommendations and they would be implemented. I said to my friend, "That probably is the best move I made as the director." Bill Glenney, cc'ed on my email, came back and said, "That was a great move, but I offer your best move as director was to set up the program for junior officers as Director Fellows, because without them the CNO Fellows would not have been anywhere near as bold." Bill was right. The younger officers always pushed. I expect it was because young people just naturally think more creatively and don't have as much at stake in the Navy. The more senior officers have vested in a full retirement plan. This is their career. And the younger officers? The lieutenants—while they may decide to make the Navy a career—haven't internalized the "Navy way" as much, and are willing to reach out in creative and bold ways.

DB: Or like an investment portfolio. The closer you are to the end of retirement or the end of where you are, the more conservative you tend to be in general.

JH: That's right. Next, there are two final things I would like to include in the record. I don't want to read through them. I'll just characterize them for you and then I'll give you a copy of each.

The first is what I call the SSG's "Long Range View for Future Maritime Operations" [Appendix J]. I wrote this in 2008. It provided a broad view of the SSG's work for the previous 13 years. This might give people who read the SSG's full history a perspective they won't get otherwise.

The next and last thing is railgun conceptual development which was one of the, let's say, 10 major areas of SSG research that are seriously influencing the Navy. It started in 1995. We didn't work full time on it every year, but we worked on it in various ways through 1999 to the point where we built a reputation. It took about six more years for the Navy to actually pick up on [the] railgun, and I've already discussed how key Mike Mullen was in that. Over time, the SSG was considered by those in the technical fields the "father of the railgun for the Navy." It wasn't me. It was the SSG. But because of all that, I did receive an IEEE medal in 2014 for railgun development. Last year [2016], there was a global electromagnetic launch symposium

sponsored by an organization in the U.S. There are 12 countries in the world interested in this technology. Most of them are at the science and technology level. China is one of them. They take turns hosting the symposium, bi-annually. In 2016, the symposium was in China. I was invited as a member of the U.S. delegation and was asked to give the keynote speech, which I did. That is what I want to provide you for this record because the speech has direct SSG significance. It is an important aspect of the SSG's history. The final version is provided in Appendix K. Everything I ad-libbed is included, so it is what I actually said on the podium.

DB: Tell me something that people wouldn't expect to know about the SSG. We talked about science fiction. We talked about traveling out to meet companies. What was it like the first time you went out to a Google or a company very un-Navy-like?

JH: We did a lot of that. The group would typically visit a software boutique or IT guru in Silicon Valley as often as a Raytheon just up the road. I'd say, at least two thirds of our research travel was to private sector civilian corporations, institutions, and research centers—large and small. Or, single individuals in various scientific, academic, entrepreneurial, musical, medical, engineering, and applied-science fields. The farther from mainstream military interests the better. And, our ability to think creatively benefited greatly.

Bill Glenney and I would tell each group, "Do not go inside the Beltway initially. Go outside the Beltway for your research. Then, go inside the Beltway to see what the lay of the land is, which might help you decide how to put together the final report. But, don't be influenced in any way by current military thinking. Because typically the reaction to your ideas inside the Beltway is, 'No, no. Don't. We're already working on that or we've tried that. It doesn't work. Or, you just don't understand enough about the problems here.' So, rise above that. Don't even expose yourself to it." We only went inside the Beltway as a group during the initial orientation period to meet the top leadership people. "If you do go into the Beltway prematurely, the people who are putting together the Program of Record will tell you what you are doing is irrelevant to the Navy, and you don't need to put yourself through it. It's a waste of your time. Finally, later when you go down to discuss the Program of Record, you're not going to tell them what you plan to recommend to the CNO, but to find out how your ideas and concepts will build beyond the Program of Record. You are leapfrogging ahead."

DB: Did you visit any women-owned businesses? Anything that was not what we would anticipate?

JH: I'm sure we visited companies with women as CEOs, but it is not something we discussed in advance. It just happened naturally. When we picked a company to visit, we didn't need to know who the CEO was. The visits related to content, to ideas. We really enjoyed visiting Wall Street. We would get right down on the trading floor. I did it at the Mercantile Exchange in Chicago, to learn. A "Holy Grail" in the military is decision making. How to make better decisions faster. Traders on the floor do that routinely, and very

well. The Marine Corps started such visits, led the way. We were one of the few organizations in the Navy to do it.

Another example: I wanted to find out a lot more about drug interdiction, so the Coast Guard set me up. I went first to Norfolk for a day, where the Atlantic Area headquarters for the Coast Guard is located. Then to Miami, and on to Key West. Norfolk gave me the strategic view, Miami gave me the operational view, and Key West the tactical view. I actually went out in a Coast Guard cutter for an interdiction "take-down" event. That describes how the SSG did things. All SSG members were doing those kinds of things. Not just me. Earlier, I had mentioned authors and books. We didn't just read a book. We would invite the author to come and discuss the book. I mentioned the experience we had with Malcom Gladwell. So, each group felt very confident that, in research, it had gotten into the right level of information flow.

DB: Did you encourage SSG participants to take notes, write journals, do visualization exercises, testing the ways in which they interpreted and understood information?

JH: We did. But we didn't say, "This is the day to do a certain thing." It happened through the orientation program. As a reminder, in Phase 1 and Phase 2 in our Process of Innovation, you will see there are 9 different areas we focused on from October through December. Also, during that time, the group was working on forming up concept teams and working on an outline for how to proceed. The way ahead. So, it was not just an orientation. By the Thanksgiving break, the CNO Fellows had to present me their proposed approach for the year, then they smoothed it out in December with the Director Fellows; after which, the full group presented me with what we called the "Way Ahead Plan." It was presented to the CNO in January. Once he said, "This looks good", the group was unleashed and everybody immersed into the research phase.

A final comment. My 18 years with the SSG were as satisfying—professionally and personally—as my 35 years of active duty. That says a lot, because my active duty years, for me, were both special and stunning—every day, year after year. Putting it all together with my Naval Academy midshipman days included, it adds up to 57 years of learning and pleasure spanning seven decades from 1952 through 2013. And, I would repeat it in a heartbeat!

DB: Thank you. This completes the oral history process.

A Note of Introspection

It is mid-2019, nearly three years since this oral history was initially recorded. Looking back with the benefit of hindsight, I consider my 18 years as director of the SSG the most constructive years of my adult life.

I say this with assurance since the SSG's open environment that stimulated creative thinking, among a diverse and interactive group of smart and dedicated people, was truly a pleasure to behold. It repeated itself, successfully, year after year "right on schedule!"

And, it changed the Navy in a number of positive ways.

For me, being the director brought both personal and professional satisfaction that no other activity could achieve.

I thank Captain Bill Glenney, the deputy director during 15 of those years, for his unconditional commitment to our cause. I thank Admirals Boorda, Johnson, Clark, Mullen, Roughead, and Greenert for their total support in making it happen. Finally, I thank every CNO Fellow, Director Fellow, Technology Fellow, and staff member who served during my directorship.

Be bold!

<div align="right">

James R. Hogg
Admiral, U.S. Navy (Ret)
SSG Director 1995–2013

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Appendixes

(Editor's note: The materials in the following appendixes have been retained in their original form.)

Appendix A - SSG 101

The CNO's Strategic Studies Group (SSG): What is it all about?

The CNO's Strategic Studies Group:

- Brings together military officers who we call Fellows;

- plus scientists, engineers, and analysts who we call Technologists;

- to review Naval capabilities from as many viewpoints as possible;

- while challenging all assumptions;

- with military officers serving in Fellowships from 7-10 months,

- spread across ranks from LT to post-major command CAPT and other Service equivalent ranks;

- diverse in experiences and technical skills;

- and Technologists serving in two-year Fellowships, providing technical support and continuity for the Group's work, and equally diverse;

- all serving as primary participants in the SSG's process; and

- all operating under the basic precept that: "Good ideas have no rank";

- with access, nation-wide, across the entire S&T community, all labs and Research Centers, all military organizations, and all companies in the public and private sectors;

- in an environment where, to the extent practical, all constraints are lifted;

- with the organization's sole purpose being the generation of revolutionary war fighting concepts for the future;

- reporting directly, and frequently, to the Chief of Naval Operations, the senior officer in the Navy, with his full support;

- with a "common purpose and shared enthusiasm" that become infectious.

The title, Strategic Studies Group, no longer fits. For 15 years, until 1995, the SSG was involved in Strategic Studies in areas of National Security and Military Strategy.

Now, as you know, its commitment is to revolutionary war fighting concepts.

So the SSG is really, today, an "Operational Research and Concept Generation Center".

There is not time, in one year, for the Group to develop a concept fully. It took, for example, 20 years to develop Naval Aviation -- a very revolutionary concept -- to the point that it was ready for WWII. That was "Just in time", as it turned out!

But there is time, in one year, to mature a concept to the point where first-order experimentation can commence.
So the SSG strives, through its innovation process, to bring concepts to that point.

Still embryonic, but framed by an operational blueprint that looks into the future, and accompanied by a roadmap that incorporates high potential technologies.

The approach, then, becomes evolutionary in nature; with the Navy -- through an interactive process of modeling and simulation, war gaming, experimentation, test-bedding, prototyping and demonstrations -- moving forward in incremental steps toward achievement of revolutionary concepts.

Building war fighting capabilities along the way.

// Boss Hogg //

Appendix B – The SSG's Daily Experience

THE SSG'S DAILY EXPERIENCE

Here at the SSG, during the January through May timeframe, we foster an environment that is as unconstrained as practical.

Our reasoning: how could we expect you to think innovatively, in order to have a chance of coming up with revolutionary concepts, if the environment constrains your thinking?

Having said all that, and it sounds great, I want you to know in advance that working in an unconstrained environment will be different!

For some of you, the transition will not be easy. It means that you will be "out of your comfort zones" much of the time.

It will seem just short of chaotic at times.

Ideas will self-generate and collide.

Things will not be orderly or efficient.

There will be too much overlap among Concept Teams.

The solution: <u>none needed</u>, <u>none intended</u>. These things happen in an unconstrained environment!

The approach to take: lots of collaboration, cross-CT coordination, teamwork, and "yes, and"! And enjoy yourselves. Have some fun while you are at it!

The scene will tighten up in June as the Concept Teams come together to integrate their efforts into a cohesive presentation for the CNO. That's when your exploration winds down and the arduous integration work begins; at which time, you will find your new, expanded comfort zones and be much better prepared to put together your briefing for the CNO which, if done right, will change the Navy!

// Boss Hogg //

Appendix C – SSG XXV Concept of Operations for Innovation

11 August 2005

MEMORANDUM FOR DISTRIBUTION

Subj: CNO SSG XXV CONCEPT OF OPERATIONS FOR INNOVATION

Encl: (1) SSG Concept Development Timeline

Ref: (a) CNO letter dated 12 March 2002, Subj: SSG CHARTER

1. The sole mission of the CNO Strategic Studies Group (SSG) is generation of revolutionary naval warfare concepts as discussed in reference (a). Each year the CNO provides the SSG with a Theme around which the concept generation will occur.

2. The SSG XXV team is comprised of CNO Fellows, Associate Fellows including students from the Naval War College and Naval Postgraduate School, Scientists/Technologists, Systems Analysts, a Science Advisor, and Administrative staff. CNO Fellows have overall responsibility for the effort, including the CNO briefing and the final report. Associate Fellows work with the CNO Fellows by contributing intellectually in all areas and activities, based on the fundamental SSG tenet: "Good ideas have no rank." The Systems Analysts and Scientists/Technologists members of the Team, also serving as junior partners, collaborate in all aspects of the innovation process, with special emphasis on the assessment of operational concepts, and the identification and assessment of promising technologies, methods and processes which support those concepts.

As the innovation process proceeds, SSG XXV will transition from a plenary approach to Concept Teams (CTs). It is within the CTs that most of the concept generation and supporting research will occur. Each CT, under the leadership of one or more CNO Fellows, includes Associate Fellows, Scientists/Technologists and Systems Analysts, and focuses on a specific aspect of the overarching operational concept. The number of CTs is not delineated or constrained. As a function of group dynamics, the number of CTs, their areas of activity and their composition may change as the SSG innovation process plays out. In that regard, as the work progresses, it will be important to understand and maintain an appropriate balance between continuation of the focused work of the individual CTs and progress toward the overarching SSG concept.

3. SSG XXV begins on 3 October 2005 with arrival of the CNO Fellows and proceeds in four phases with mission completion on 31 July 2006.

a. **PHASE 1 -- Operational/Organizational Concepts and CT Formation (3 October to 22 December 2005).** This phase is structured to provide the Group with the tools, background knowledge and framework necessary to move forward. Within a process that has evolved over the past ten SSGs but is not exclusively focused on the current year's CNO Theme, the CNO Fellows are given broad exposure to such areas as:

(1) the process of innovation,
(2) imagination stretching,
(3) operational art and war gaming,
(4) the work of prior SSGs,
(5) analytical methods,
(6) future warfighting concepts and threats,
(7) Red Teaming and critical thinking,
(8) human system integration and organizational concepts, and
(9) emerging science and technologies.

The broad scope of this phase presenting a diversity of perspectives provides fertile ground for innovative thinking.

By the Thanksgiving break, the CNO Fellows will outline the overarching concept and determine the supporting concept areas that the CTs will address.

With arrival of the Associate Fellows on 1 December, the Group will focus on:

(1) continuing presentations on emerging technologies,
(2) continuing presentations on innovative methods, tools and approaches,
(3) refinement of the overarching operational concept under the CNO
    Fellows lead,
(4) formation of CTs,
(5) development of CT research plans under the Associate Fellows lead, and
(6) development of the SSG XXV "Way Ahead" Plan.

In early December, the CNO Fellows, Scientists/Technologists, and Systems Analysts will orient the Associate Fellows, to include briefing the overarching concept and proposed CT supporting concept areas. The CNO Fellows will make CT assignments taking into account the desires, experiences and capabilities of the CNO and Associate Fellows, Scientists/Technologists and Systems Analysts.

During the remainder of December, the SSG will receive briefings on topics that are potentially relevant to the Theme. Time will be allotted for the preparation of CT research plans and for further refinement of the overarching concept, in preparation for mid-December discussions with the CNO and for preparation of the "Way Ahead" Plan. Both the CNO discussions and the "Way Ahead" Plan will, in a general sense, describe how the SSG intends to address the Theme in subsequent phases.

Implicit throughout yet critical to Phase 1 is the process of building teams -- first among the CNO Fellows, then in a larger sense to include the Scientists/Technologists and Systems Analysts, and finally with the addition of the Associate Fellows. Strong, effective teams at all levels are essential foundations for collaboration and innovation within each CT and across the SSG as a whole.

<u>Key Events</u>

3 October 2005	SSG XXV convenes
13 October	CNO Fellow's introductory meeting with the CNO
18-20 October	Concept Introduction Event
23 November	CNO Fellows outline overarching concept and determine CT supporting concept areas
1 December	Associate Fellows arrive
Mid-December	CNO Fellows complete overarching concept work and make initial brief to CNO
22 December	Complete "Way Ahead" and CGT Research plans

b. **PHASE 2 -- Research and Concept Generation (4 January to 5 May 2006).** With Phase 2, the SSG will shift into a relatively unconstrained approach in order to allow the work of innovation to proceed. The center of activity will shift from the SSG as a whole to the CTs as critical components of the SSG. During this phase, two interrelated activities occur: (1) full development of the operational concepts, and (2) research, analysis, and evaluation of promising approaches and technologies that are critical to the operational concepts. The CTs will focus on the challenging and difficult task of innovation, broadening their exposure and extending their horizons into the future. This phase typically finds CT members conducting literature and Internet research, and traveling to conduct research by participating in technology briefings, discussions and site visits to academia, private industry, and government facilities. During this phase, the CTs typically meet "across CT lines" periodically to critique progress and to share directions and plans.

In early March, a wargame called a Concept Exploration Event is scheduled in order to investigate potential concepts from an operational or warfighting perspective.

During the Research and Concept Generation phase, the SSG as a body and individual CTs will interact with the CNO Executive Panel (CEP), SSG Plenary panels and other organizations in order to foster collaboration and to enhance the work of the CTs. In mid-April the CNO Fellows will meet with the CNO for a mid-term review.

A final wargame called the Concept Evaluation Event, scheduled in early May, will provide the venue to complete first-order analysis and an operational assessment of the overarching concept and supporting concepts.

31 January 2006	Plenary Session
7-9 March	Concept Exploration Event
28, 29 March	Plenary Session and CEP Assist
Mid-April	CNO Fellows mid-term discussion to the CNO
2-4 May	Concept Evaluation Event
5 May	Complete research and concept generation

    c. **PHASE 3 -- Roadmap Development (6 May to 9 June 2006).** As the CT research process and CT travel wind down, the process of developing operational, organizational and technological roadmaps to the future begins. The purpose of the roadmaps is to chart a course from the Navy of today to the revolutionary warfare capabilities of the future. Based on the results of Phase 2, the CTs will be able to identify a network of approaches that are necessary to operationalize their revolutionary concepts. Initial steps in the roadmap will provide clear actions that the CNO and Navy leadership can take now to start bringing the concepts to life.

    An important aspect of the Roadmap Development will be to build on cross-CT efforts started during Phase 2. Broader, more compelling concepts and the steps to make those concepts a reality will emerge as the work of the CTs and the SSG as a whole is brought together during Phase 3.

Key Events

| 23, 24 May | Plenary Session and CEP Assist |
| 9 June | Complete Roadmap development |

    d. **PHASE 4 -- CNO Brief and Final Written Report (10 June to 31 July 2006).**

    This period is devoted to preparing the final brief to the CNO and the formal written report. The final brief is typically a two-hour presentation given by the CNO Fellows to the CNO in early July. It will provide a summary of the overarching concept, an assessment of the capabilities provided by this concept, a description of the supporting concepts and related critical enabling technologies, roadmaps, and recommendations for CNO action. Depending on the outcome of the final brief, the CNO Fellows may be tasked to brief other military leadership later in July.

The SSG XXV Final Report will be completed by 31 July 2006 to allow transfer of the CNO Fellows to their next duty stations. The Final Report generally follows the content and organization of the CNO Brief, with greater detail, including substantial additional documentation and analysis cross-referenced to supporting volumes. The Supporting Volumes are compiled to include more detailed analyses of the concepts as well as to document additional research that was conducted during the year.

Distribution of the Final Report will be controlled by the Director and normally includes Navy, Marine Corps and Coast Guard leadership, and those organizations supportive of and involved with SSG activities.

<u>Key Events</u>

Early July	SSG XXV Final Briefing to CNO by the Fellows
31 July	Complete SSG XXV Final Report
31 July	CNO Fellows detach.

4. The overall SSG process described above is depicted in enclosure (1). While this Concept of Operations for Innovation has been put together based upon the experience of the past ten SSGs, <u>every aspect remains experimental and subject to change by SSG XXV</u>!

JAMES R. HOGG
Admiral, U.S. Navy (Ret)
Director

Distribution:
SSG XXV
CNO Executive Panel Task Force on Innovation and Technology Insertion
CNO (CNO, VCNO, DNS, N1/NT, N2, N3/5, N4, N6/N7, N8, N00K, N00X, N00Z)
Commandant, USMC
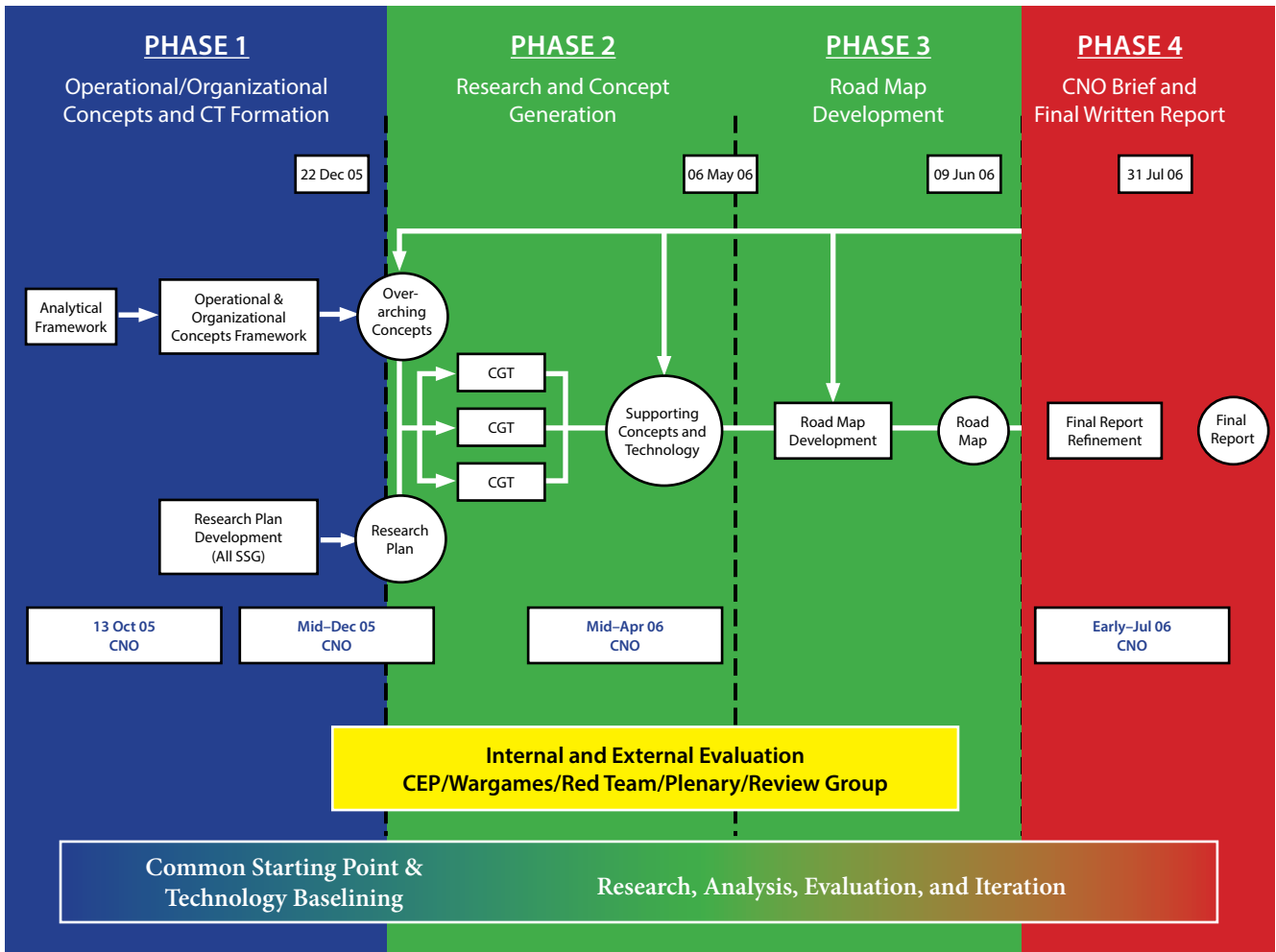Commandant, USCG
President, Naval War College
Commander, Navy Warfare Development Command
Commander, Navy Personnel Command
Commanding General, Marine Corps Combat Development Command
President, Naval Postgraduate School
Chief of Naval Research

PHASE 1
Operational/Organizational Concepts and CT Formation

PHASE 2
Research and Concept Generation

PHASE 3
Road Map Development

PHASE 4
CNO Brief and Final Written Report

22 Dec 05

06 May 06

09 Jun 06

31 Jul 06

Analytical Framework → Operational & Organizational Concepts Framework → Over-arching Concepts

CGT

CGT

CGT

Supporting Concepts and Technology

Road Map Development

Road Map

Final Report Refinement

Final Report

Research Plan Development (All SSG) → Research Plan

13 Oct 05 CNO

Mid–Dec 05 CNO

Mid–Apr 06 CNO

Early–Jul 06 CNO

**Internal and External Evaluation
CEP/Wargames/Red Team/Plenary/Review Group**

Common Starting Point & Technology Baselining

Research, Analysis, Evaluation, and Iteration

Appendix D – SSG Crest

**CHIEF OF NAVAL OPERATIONS
STRATEGIC STUDIES GROUP**

GENERARE FUTURUM

**Crest
of the
Chief of Naval Operations'
Strategic Studies Group**

Blue and Gold, traditional colors in the Navy and in heraldry, dominate the shield. The eight "points" represent the CNO Fellows while the trident signifies the teamwork among the fellows, technologists the analysts as well as the fellowship among the CNO Fellows and the Associate Fellows from the Naval War College and the Naval Postgraduate School. The four stars connote that the Strategic Studies Group takes its tasking directly from and reports directly to the Chief of Naval Operations. "GENERARE FUTURUM" translated from Latin means "to generate the future". The torch of knowledge lights the way.

Chief of Naval Operations

STRATEGIC STUDIES GROUP XXVI

CHIEF OF NAVAL OPERATIONS
STRATEGIC STUDIES GROUP

GENERARE FUTURUM

Cyberspace and Maritime Operations in 2030

The Chief of Naval Operations Strategic Studies Group

Admiral Hayward established the Chief of Naval Operations (CNO) Strategic Studies Group (SSG) in 1981. The early SSGs contributed to the conceptual underpinnings for the emerging Maritime Strategy. Over the years, work continued in the areas of national security and military strategy.

In 1995, Admiral Boorda transformed the SSG into a group whose sole mission is the generation of revolutionary naval warfare concepts. The process for this effort includes:

- Exploring innovations in naval warfighting,
- Developing warfighting concepts,
- Underpinning these concepts with technologies,
- Establishing criteria to evaluate these concepts in operational experiments, and
- Recommending actions to the CNO

While the SSG title remains, the Group is more appropriately characterized as an "Operational Research and Concept Development Center".

The SSG resides at the Naval War College in Newport, Rhode Island. Only the CNO tasks the SSG and the SSG reports directly to him. The CNO personally selects Navy Fellows and invites the Commandants of the Marine Corps and Coast Guard to nominate officers to serve as Fellows. The Fellows have ten-month assignments. The President of the Naval War College and the President of the Naval Postgraduate School work with the SSG's Director in selection of Associate Fellows who have 7- and 6- month assignments, respectively. Scientists and Analysts are nominated by the Navy's Systems Commanders and Laboratories to the SSG's Director. They serve for two years, and then return to their parent organizations. Operators, scientists, and analysts working in collaboration is a powerful approach for developing warfighting innovations.

The SSG works closely with the CNO Executive Panel; OPNAV Staff; Naval War College; Navy Warfare Development Command; Naval Postgraduate School; Chief of Naval Research, all Systems Commands and their field activities; Joint and other Service staffs; operational commanders; DOD, national, public and private sector Research Centers and Laboratories; U.S. Government entities as well as non-governmental and foreign organizations; and, the private sector in accomplishing its tasking.

For more information see the SSG website at <u>http://www.nwc.navy.mil/ssg</u>

THE OVERARCHING CONCEPT. *Cyberspace and Maritime Operations in 2030* - SSG XXVI will explore the implications, vulnerabilities and opportunities of cyberspace in order to generate revolutionary concepts that enhance Maritime forces' capabilities in the joint, combined and interagency arenas of 2030. As a point of departure for this effort, the SSG will concentrate on answering three broad questions intended to generate an expansive approach: What is cyberspace? Why is cyberspace relevant to Maritime forces? And, how can Maritime forces use cyberspace? The ultimate test of any SSG XXVI concept will be its relevance to future Maritime force missions.

CONCEPT TEAMS. SSG XXVI has broken the overall task into three supporting concept areas with each area being investigated by a dedicated concept team (CT): (1) People; (2) Process; and (3) Technology. Each of the CTs will investigate the implications of cyberspace across the full spectrum of maritime operations out to 2030. The three CTs will function in a highly collaborative process, ensuring that any concept generated in a single CT will be supported by or build upon the concepts of other CTs. This collaboration is essential to ensure concepts are thoroughly addressed from all aspects throughout SSG XXVI's efforts. A clearly defined systematic approach to integrating ideas and concepts on a periodic basis will be used along with regular rotation of some members between CTs to cross-pollinate ideas.

People CT. Global reach and speed of communications, made possible by cyberspace, are transforming human activities and culture, transcending the constraints once imposed by geographical boundaries. To maintain their relevance, U.S. Maritime forces require a dramatic, even revolutionary, expansion of its understanding and capabilities in the dynamic and compelling environment of cyberspace. As this future unfolds, U.S. Maritime forces must operate and manage risk effectively in this new dimension of information exchange and human interaction. To that end, the People Concept Team will initially pursue broad objectives that include the following:

- Explore the landscape of cyberspace examining how societies and cultures are impacted by interactions between the physical and virtual worlds.
- Consider the effects of evolving trends in cyberspace on national sovereignty and international organizations.
- Explore the expected impact of cyberspace on human cognition, especially in the areas of human/system interface considerations, artificial intelligence, biological augmentation/implants and cyber-organisms.

Process CT. The Process CT will develop a long-term view of how Maritime forces will operate in and exploit cyberspace to their maximum advantage. By exploring potential cyber-technology and trends in human-machine interface development, this CT will create operational concepts to enhance Maritime forces' ability to increase awareness, expand capacity, and exert influence in a cyber-enabled world. The Process CT effort will consider likely courses of action of potential adversaries and how they might be dissuaded from operating counter to U.S. national interests. The means by which future capabilities can leverage virtual presence in combination with physical presence to strengthen alliances and collaboration will be investigated. Areas of initial research will include:

- Implications of cyberspace on ethics and social behavior.
- Employment of cyberspace to enhance the traditional elements of national power.
- Identify and overcome vulnerabilities in a cyber-dependent world.

Technology CT. The Technology CT will identify, research, and analyze cyberspace-related technologies and evaluate opportunities. Concepts will be focused on application of, or counters to: disruptive technologies; potential adversaries' unexpected and significant advancements in cyber technology; the balanced application of "push" and "pull" technologies; and management of the vulnerabilities and risks in cyberspace. Critical technology areas to be investigated include:

- Physical (Platforms, weapons, sensors, etc.)
- Information Technology (Communications and networks which provide information services, etc.)
- Data (Information, data mining, data storage etc.)

People Concept Team

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CAPT Doug Venlet, USN		
Dr. Alan Krulisch		
Dr. Robb Wilcox		
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Appendix F – A Lieutenant's SSG Experience

The Chief of Naval Operations Strategic Studies Group Experience

Report

By LT Martin J. Holguin, USN[1]

18 July 2006

The purpose of this report is to provide informative feedback of my experience as an Associate Fellow in the Chief of Naval Operations (CNO) Strategic Studies Group (SSG) to the Naval Postgraduate Leadership.

In order to discuss the experience of serving in the SSG, I find it helpful to discuss the mission, process, SSG team composition, and approach. Every SSG is unique based on the group dynamics and is free to form in whichever way it chooses; however, the process and approach have remained consistent over the past ten years.

The mission of the CNO SSG is to generate revolutionary naval warfare concepts for the US Navy thirty years into the future.[2] Each year the CNO provides the SSG with a Theme around which concept generation occurs. As part of the process, the SSG keeps the CNO informed of the progress at two informal discussions in Newport, RI and with a final report. A first order analysis and recommendations for next steps are included in the report and out brief. SSG XXV's Theme was to *"operationalize the Free Form Force."* The concept Free Form Force was introduced by the previous year's group.[3] The gist of the concept is to rebalance the Navy by 2036. Rebalancing the Navy of the future is something that gives the CNO options to support the Global War on Terrorism while maintaining the blue water dominance the U.S. Navy enjoys today. Some of the missing elements of our current dominance are interagency cooperation, third world country self-support initiatives, and many others relating to operations that preclude combat action. As the work evolved, the term Free Form Operations replaced Free Form Force, and these operations are those that bridge the gap between the blue water dominance and the current lack of presence in the green and brown waters. This presence is not restricted to combat, and includes the building of relationships.

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[1] LT Holguin is in the 590 Curriculum and a Surface Warfare Officer. Graduation Date December 2006.

[2] Please see http://www.nwc.navy.mil/ssg/ for more background information on the CNO SSG.

[3] It is common that each CNO SSG builds upon the previous SSG work. SSG XXV is a continuation of SSG XXIV's work.

The SSG XXV team comprised nine CNO Fellows, thirteen Associate Fellows,[4] four Scientists/Technologists, four Systems Analysts, a Science Advisor, and supporting Administrative Staff. The CNO Fellows have overall responsibility for the effort, including the CNO briefing and final report. The Associate Fellows work with the Fellows by contributing intellectually in all areas and activities based on the fundamental SSG tenet: *"Good ideas have no rank."*

The approach is modeled after historical results of the dynamic interaction between the SSG groups. Over the years, successful innovations resulted from operators, technologists, and analysts interacting through an iterative process. Operators brought forth unarticulated requirements, technologists identified promising technologies, and analysts blended the two employing scientific methods and analytical techniques. In my opinion, this approach provided the framework for each individual's input, but did not preclude anyone from researching areas of interest. The approach can be summarized as follows:

- Develop an appreciation of scientific methodology, innovative processes, and future warfare challenges

- Analyze potential future naval operations to develop a detailed understanding of mission requirements, alternative operational approaches, and measures of effectiveness.

- Recommend steps to further develop these concepts

- Form Concept teams, immersing them in the history, essential characteristics, and technologies under pinning alternative operational hypotheses.

As part of the approach mentioned, Concept Teams (CT) were formed. They comprised of the following teams:

- Harnessing Knowledge
- Capabilities and Force Packaging
- Manpower
- Disruptive Technologies
- Interoperability and Relationships
- Roles and Missions.[5]

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4 Includes Officers/students from the Naval War College and Naval Postgraduate School not restricted to Navy.

5 The Way Ahead document sent out by the SSG (sent in late December 2005) contains a description of the concept teams and a list of specific questions formulated by the concept teams as a calling card to "Friends of the SSG". It also served as a history and summary of work for those not familiar to the CNO SSG.

The concept teams routinely met to discuss concepts generated.[6] The SSG maintained a healthy flow of information via email on issued hand held Blackberry devices, lap top computers, and desktop computers. Discussions often occurred online while team members were scattered across the country conducting site visits in locations conducting work of interest to the SSG. I usually caught up on the discussions while awaiting connecting flights at the airport.

I served in the Harnessing Knowledge CT (HKCT) along with one Associate, a Technologist, and a Senior Fellow. In this group, I developed an interest in Cognitive Engineering and plan on pursuing an advanced degree in Cognitive Psychology in the future. The HKCT work was related to command and control in one form or another from the start of our team meetings. Eventually, the group was changed to the C2 Group for "Free Form Operations." The questions that we implicitly asked through our research were:

- How to make better decisions faster?

- How to share knowledge?

- How to obtain expertise generated from the overall organization (over time) to a person or team in need?[7]

I submitted two concepts for SSG Concept Evaluation Events[8]. These concepts were titled: Hovering Eagle and the United Wisdom Center. Hovering Eagle was a concept in support of a small unit (a small warship) minimally manned, expertly trained, implementing sensor fusion and combat systems designed around the warfighter. The United Wisdom Center was a concept that supported modular, joint, interagency operation center that implemented intelligence analytical tools to the operational level. I also submitted a paper for discussion within the SSG combining social network development in third world countries and operational command and control efforts. To summarize this paper, the foundation of successful command and control with both the host nation and US maritime forces relies on a pre-establish trust and social networks at the deck plate level.

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[6] Often CT interests and findings were related to other CT work.

[7] The Way Ahead document contains a list of specific questions.

[8] Concept Evaluation Events were intense inspection of concepts written by member of the SSG. Decisions and input were given on these concepts over a period of a week. All travel and outside business ceased for these events.

The benefits of my participation at the SSG were many. I'll elaborate on four of them for the purpose of this report. One of the benefits was the travel to the various labs and companies. I traveled with my concept team, other concept team members, and alone. I enjoyed traveling alone and felt that it was the most efficient use of SSG resources if I wrote a supportive trip report that could be referenced for concept generation at another time (which I did to the best of my ability). I was trusted to represent the SSG and this trust is greater than words can express. At the various locations for our visits, our hosts gave their undivided attention and treated the members of the SSG as VIP's. When I traveled alone, I received the same treatment. In order to represent the SSG well, I prepared for each visit as if I were preparing for a job interview. I learned the background of the company or organization, exchanged initial interests and requests for information with a point of contact, and finally, made the most of the in person discussions by being attentive, open minded and remaining clear of any hidden agenda. I also maintained the frame of mind that the work in many places was for the near term not the future. I needed to think about the future possibilities of the work in an operational concept, and how it related to the SSG theme. Some of the places that I visited were:

../ Microsoft Corporation: Redmond, WA

../ IDEO: Palo Alto, CA

../ Naval Postgraduate School (Info Sciences and OR)

../ Pacific Northwest National Laboratories: Richland, WA

../ Cyberkinetics: Foxborough, MA

../ El Paso Intelligence Center: El Paso, TX

../ El Paso Sheriff Department: El Paso, TX

../ MIT Lincoln Laboratories: Lincoln, MA

../ Mohegan Sun Casino: Uncasville, CT

../ San Diego State University: San Diego, CA

../ SPAWAR San Diego

../ SSC, San Diego

../ National Security Agency

../ John Hopkins University – Applied Physics Laboratory: Columbia, MD

../ Acuitus: Palo Alto, CA

../ Boston University

../ Naval-Small Craft Instruction and Technical Training School: Stennis Space Center, MS

../ EDO Corporation: Morgan Hill, CA

../ Camp Roberts, CA (Tactical Network Topologies 05)

The meetings at these site visits were at all classification levels. The majority were unclassified, however there were a few briefs that were classified secret and top secret. Two meetings contributed greatly to my efforts of pushing ideas at the SSG. One was with Professors Nita Miller and Lawrence Shattuck of the Operations Research Department discussing command and control in terms of the technology and human cognition. Another great meeting was with Acuitus CEO John Newirk and Maria Machado on methods of educating and training through the innovation of computer technology for learning.

Another benefit was participating in the introduction to innovative thinking phase. This phase comprised of the Associate Indoctrination to the group and the beginning of a divergent process. There were two benefits within this phase. One was having the entire SSG in the SSG conference room together as we introduced ourselves to the visiting speakers. The group as a whole was very impressive and it provided a glimpse of the talent possessed by this unique organization, and I was honored to be a part of it. The second benefit was additionally rewarding because of the high-quality, expert speakers. It was the first time I was part of an organization in which the experts had candid discussions with their audience. For the entire month of December, a guest lecture would present new and innovative work in the areas listed below:

- Process of innovation

- Imagination stretching

- Operational art and war gaming

- Prior SSG work (Internal Presentation)

- Analytical methods

- Future warfighting

- Concepts and threats

- Red Team and critical thinking

- Human system integration
- Organizational concepts
- Emerging science and technologies

Each presentation consisted of an in depth presentation, and a couple of hours of discussion. Each speaker was outstanding, which is a rare experience for a junior officer. These lectures were atypical and ranged from mathematics and Clausewitz to Kodak and IBM. There was a common thread of innovation, change, adapting in business, technology and as military.

Another indirect benefit of this experience was the research approach. For the first time in my career, I have been introduced to research. Research includes much more than reading papers and books. It is not finding an answer that a sponsor would like to hear. To me, at least now, research is developing an idea based on a need and then, taking that idea and finding supportive documentation of how it has been developed. I see it as hands on approach to embrace the work of others, and include this work in solutions that pertain to the challenge at hand. This process has also introduced me to the fact that if I thought of an idea, the chances that it had already been thought of were very high. This is not something to be upset about, but to be encouraged to find a way to push the idea forward.

A final benefit of the SSG experience is having your work critically evaluated by Senior Military Officers and Senior Civilians such as members of the CNO's Executive Panel. Once I spent the time and effort putting together a concept, I appreciated the thoughts of others as they critically evaluated. It is fruitful to be evaluated critically by others interested in the project goals. This experience is rare for junior officers and I am fortunate to have experienced such a process at the SSG. Critically evaluating the work of others and having your work evaluated as well, forges professional relationships not based on rank, but on mutual respect.

Of the many developmental lessons that I have learned during my time at the SSG, the following are the most prevalent:

- Read and write early and often

- Critically review the writings of others and provide thorough and honest feedback
- People are people. Rank or position does not make a person a supernatural omniscient being. Always challenge information and search for answers from many credible sources.
- There is a right time and place to express an idea; if the time is not right, write it down and save it for later.

- Fight the temptation to let impressions close your ears.

- Talk is cheap.

- Opinions alone do not change the minds of others or strengthen a cause without supporting research.

The Naval Postgraduate School plays an important role in the SSG. Quality Associates are selected from the pool of talented officers and the correspondence that I enjoyed with NPS faculty enhanced the experience of innovation. I am sure that fostering the relationship between the CNO SSG and NPS could bring forth many successful studies beneficial to all branches of the service.

Appendix G – Leadership and Life Philosophy

<u>Some Leadership Philosophy</u>

Leadership is as old as human evolution!

Methods of application have expanded over time, yet the fundamentals remain the same.

For example, Aristotle practiced and wrote about leadership in powerful ways, as shown in this quote from his papers:

"<u>Leadership</u>, among other things...is about dealing with fellow-citizens where each looks the other in the eye and says, you are part of my future, no matter how this turns out."

How would we relate Aristotle's leadership approach to leadership in our modern time?

In the Navy, we call it "Covenant Leadership". It goes like this:

"In preparing for difficult times, a true leader looks his subordinate in the eye and says, you are part of my future and the future of our Command. No matter how this turns out, I will stand by you and I will expect you to do the same in supporting me and our mission."

I tell Military Officers to try it out, then keep trying until covenant leadership becomes embedded in their personalities.
When that happens, they will elevate their relationships, both professional and personal, to new levels.

Here is something else to think about.

There is a personal touch to leadership that cannot be replaced by technology.

It is true at all levels of an organization. It is based on a person-to-person relation-ship.

For example, you learn that one of the people in the group you lead is getting a promotion. You want to congratulate her, of course. Do you call, write a note, or walk a block to her office and do it in person? Or maybe a combination of these?

You will find many examples of person-to-person leadership. Some positive, some during periods of hard times and not so positive.

But, your covenant commitment will carry your Group to success under all circumstances.

Leadership has many facets. A key one is cultural, in that a Leader knows that ingrained, institutional culture is the biggest barrier to change. The leader must break down cultural barriers, opening the environment to creative thinking.

Just remember the bottom line in the leadership equation: "people are what make the difference in life".

So, for example, if you were to ask what my most memorable experiences in the military have been, I would answer: "the experiences have not been memorable, it is the people I had the experiences with that made them so memorable."

Also, it is your relationships with these people that will bring success and happiness. The way I think of relationships, they are not just at the work place. Let's start with the family. Husband and wife, parents with their children. Then move to relationships with extended family, with friends, with church and other civic organizations, and with those in the workplace, your profession.

These circles or clusters of relationships, and others like them, are truly what life is all about. The world turns on relationships! Always try to build them in a positive way.
In closing, let me point out that everybody needs a "Philosophy of Life". Beyond your integrity and your fundamental values, it ensures stability in your life.
Here is an example of a philosophy of life, as a generalization:

"Those who look at the world as a series of challenges and opportunities rather than problems and burdens are those who, over time, will be the most successful."

Why is that? Because their positive attitudes help generate success in many ways. Attitudes and success or failure have a direct relationship. It is a natural phenomenon. A human instinct.

By the way, here is my Philosophy of Life:

> "Every day, at the end of the day you are a better person or you are worse. And it's all up to you."

That's it. Short and simple. Sometimes difficult to follow though, yet easy to understand and hard to forget. I like it. It works for me.

Put one together that works for you!

5/2010

Appendix H – Mentoring

<u>Innovative Thinking and Leadership</u>

There is a direct relationship between
Innovative Thinking and Senior-Level leadership:

Let me explain.

There are people capable of innovative thinking all over the place in industry. You would hear more about them if there weren't so many cultural barriers in our society.

Said another way, the amount of innovative thinking in an organization is related directly to the leadership skills of the boss.

So generating and pursuing innovative ideas successfully springs from positive leadership at the top; and, in particular, by the way senior leaders foster collaboration among the people they lead.

I single out collaboration because without collaboration there is little innovation.

<div align="center">

// Boss Hogg //
2/2012

</div>

<u>Critical Components</u>

The SSG's Process of Innovation

Group diversity

Resource support

Right environment

Top leadership commitment (direct)

Access authority

Ability to collaborate, based on group

Teamwork.

All must be codified, as appropriate, and pursued relentlessly.

// Boss Hogg //
3/2012

Innovative Thinking (Part I)

What is this ability to think "innovatively" all about? What makes innovative thinkers?

There are a number of ways to think about it. I'll call them comparisons. Some may come across as clichés, but all of them relate. Let's put them, mentally, in two columns.

For the first comparison:

On the left is "Vertical", or a search for truth, and

On the right is "Lateral", or a search for ideas.

The second comparison:

On the left is "Linear", in Geometry a straight line, and

On the right is "Non-linear" which can be defined as "anything but a straight line".

The next:

On the left is "Bound", to bound a problem, such as an Engineer is taught in order to define and then to solve it, and

On the right is "Open up", to open up and to keep opening up, such as a Physicist is taught in a process of continuous exploration and discovery.

The next:

On the left is "Deductive", to think in a deductive manner with precision, definition, and rule sets, and

On the right is "Inductive", to think inductively, using logic and reasoning.

And, finally:

We have "Convergence" on the left and

"Divergence" on the right.

Now the question: which column, left or right, do you think represents the better opportunity for creation or innovation?

The answer: A mix of the two, a time line.

I urge members of the SSG to stay in the right hand column for the first seven months of their work, moving to the left for the final three. This sets up a balance between the open space that spawns innovative thinking, and the defined space that bounds ideas and enables construction of the solution.

Just one more comment on this – and quickly, before I lose my Engineer's license -- we need to understand that no innovative idea, no matter how good, that entails real world physical dimension, will ever be built until it is engineered.

// Boss Hogg //

Innovative Thinking (Part II)

Examples of past innovative thinking and the barriers, mostly cultural, that might stand in their way:

The Telegraph is a good one. Back in 1844, faced with invention of the Telegraph, the first reaction by the Pony Express industry was to buy faster horses. When that failed, they tried to hire better riders. They set up a weight loss program for the riders, and came up with innovative thoughts within their "defined" world. The culture embedded in their business blinded them to the fact that their world was changing. They were linear thinkers!

A perceptive comment by Henry Ford: "If I had asked people what they wanted, as I was making affordable cars for everyday workers, they would have said faster horses." Henry was a non-linear kind of guy!

Thomas Watson, Sr., the President of IBM in the last 1940's, after producing the first main-line computer -- about the size of this room -- said "I think the world can use four or five of these." Tom was stuck in the linear box!

Actually, technology was the enabler in these three examples. But it didn't create the new ideas. These were "Tech pull", not "Tech push".

And, it is not unusual for old technologies to combine with new processes to generate new things, or for new ideas to be generated by looking at current processes in different ways. Chalk that up to Inductive Thinking.

An example is the DC3 aircraft. General Eisenhower said it was the single most effective capability in Europe in WW II.

How was it built? Through a process of creative synthesis. It was designed and built quickly with proven technologies and existing components. The result, a dominant design for its time.

It was not the fastest, nor the largest, nor the longest range aircraft; but, at the time, it was the only fast, large, long range aircraft.

That supports one of the rules for information age innovation, which is "Innovative concepts are most valuable when the focus is on process and opportunity, rather than pure technology."

Again, "Tech pull, not Tech push."

And, it brings us to a fundamental element of successful innovation – which is, collaboration. Collaboration, the sharing of information and ideas combined with close teamwork. I know this from experience, and I am not alone. Kotter, in his book, Leading Change, says: "Good innovation is the product of great innovators, while great innovation is the product of good innovators sharing their ideas."

Information sharing is key to collaboration.

Without it, there is none!

There is even a bit of philosophy here, as we move through the IT Age and into the "Age of Cognition."

The 20th Century Philosopher said: "Information is power; therefore, we must hold it close to maintain advantage and retain our power."

In contradiction, the 21st Century Philosopher says: "Information will generate situational awareness at every level of our organizations; therefore, it should be opened to all in order to facilitate collaboration that, in turn, will bring new innovative ideas and increase our success." (Wise old philosopher in a Yellow Book ad).

Moving on, the ability to think innovatively is enhanced by "Mind Stretching."

I'll give you an example.

We'll start with a question:

What will our communications or IT infrastructure look like in 40-50 years, and what societal changes will that bring?

The answer: Nobody really knows. So let's mind stretch by considering a comparable example from the past -- the Interstate Highway System circa the mid-1950s.

It was designed and funded based on the need, made obvious in WW II, for fast trans-national movements to support wartime logistic needs. Rail was insufficient, not enough capacity, and trucking was limited in most regions of the country to 2-lane highways. Too slow. So, the Interstate System was built based on National Security needs.

Beyond a successful National Security solution, what societal changes came from the Interstate system? It turns out, there were at least four. A couple were obvious, others not so.

It provided personal mobility not dreamed of previously.

It generated a fast transit commercial trucking capability that today distributes fresh produce nationwide in 24 hours.

The motel industry was spawned.

As was the fast-food industry, like it or not!

One last comment about "creativity".

An organization can put together a team, with a process, that will lead to innovation. There are case studies to prove it.

The SSG has picked up on this.

It has a process, whose elements include:

-- An environment as unconstrained as possible.

-- Participants with a great deal of diversity -- ethnic, gender, age, background, professional qualifications.

-- Easy access to Science and Technology.

-- A leader at the very top of the organization who is committed to the SSG's work.

-- And, most of all, interactions among the team members fostered by teamwork that enables collaboration!

Put together everything I have said and the bottom line is that the SSG wants those in our program to depart with the ability to think creatively "seared into their souls"!

Yes, you will think differently when you leave here!

<p align="center">// Boss Hogg //</p>

Boldness and Critical Thinking

The two are intertwined,

First, I'll explain what "Boldness" means in the SSG, because it is a key dynamic in the innovation process.

Be bold, aggressively bold, constantly bold. No matter the topic.

Always ask yourself "how can we take this beyond the next horizon? Way beyond!"

Think Boldly about everything you do, everything you are exposed to. Everything.

Do this until Boldness, not arrogance but Boldness, becomes natural to your way of thinking.

Until it is hard-wired into your brain.

This will open your minds to think in non-linear ways. Ways that will stretch your mind, open your mind to new areas of thought or to different ways to address a current thought.

When travelling, mentally on a linear path from point A to point B, forget about point B and leap ahead and around to point D or, even better, to point Z!

A linear path most likely generates a "single point" solution.

That's not what you want.

Anybody can go down a linear path to single point solution which, by the laws of nature, is all that will come out of it no matter how hard one tries -- a single point solution.

You want to go down multiple paths, in several dimensions, from various non-linear angles and aspects.

This approach, this non-linear way of thinking, with Boldness could take you to solutions that nobody has ever thought of and that, with a high level of collaboration, could become so powerful that you will change the Navy!

Always remember, you are here to generate concepts to change the Navy! That is what the CNO wants and expects. That is your job!

And you must do it boldly to succeed!

Never lose sight of the SSG's mission, and always keep in mind that you will only achieve it by being a cohesive team and by being BOLD!

Now, after all that hype about Boldness, there is another consideration: Critical Thinking!

In the SSG, your concept generation process demands critical thinking. This is especially so in the creative and intuitive realms.

So you need to be aware that Boldness based on mistaken hypothesis or flawed assumptions will drive you to failure; whereas,

Boldness, given a solid foundation of understanding with good assumptions, will drive you to success.

The point being: Come up with a bold objective, then challenge all assumptions through Critical Thinking before committing.

Here are a couple of additional thoughts, along this line, to keep in mind:

"Don't mistake enthusiasm with capability",

  C/O General Shumaker, Army Chief of Staff,

"If you accept something to be true, without overwhelming fact, it is no more than an assumption"

  C/O "Boss" Hogg, SSG Director

<div align="center">// Boss Hogg //</div>

<u>Success</u>

How far can you go with this year's work?

Once you come together as a solid, highly motivated team, you will only be limited by your ability to think innovatively and your energy levels.

Take up the credo "Teamwork to collaborate."

Always keep in mind that you have an opportunity, an obligation, to move the Navy forward.

Finally, be physically and mentally prepared for a full-court press from mid-May through the final report out to the CNO!

Do all that as a team and I guarantee your success; plus, you will have the satisfaction of knowing you have gone as far as you could go, and the reward of observing the Navy over the next several years actually implement your ideas!

// Boss Hogg //

Appendix I – Tips for Preparing Your Narrative

SSG 32: TIPS FOR PREPARING YOUR NARRATIVE

A few tips on how to develop and improve your narrative. I call it narrative, not script; since in your narrative you are "talking a story", not reading the scriptures.

Write down what you want to say, what you believe in. Mull it over. Wordsmith it. Make it concise, to the point – exactly <u>to the point</u> – with a "touch of elegance!"

These words you write down and wordsmith become your narrative. "Live with them!" By that, I mean, think about them a lot, visualize yourself saying the words. And, when you see a way to "turn a phrase" more powerfully, or say something more directly, pull your narrative out and make the change right then. On the spot!

Military briefings and presentations are <u>highly "stylistic"</u> by design.

<u>Drop it</u>! Stylistic is not for you. Not for this SSG briefing!

Get right to the point. No "preamble" needed or desired.

Be cryptic and terse in your comments. You do not always need complete sentences. Inference will frequently make your point, and make it in a lasting manner with your audience.

Write your narrative out <u>the way you personally talk</u>. That will kill stylistic phrases and make it easier for you to talk it, <u>not</u> read it, while maintaining the tempo you want.

It will also take away the "drone" effect that is generated when you purely read a "script".

You must stay away from the "drone" effect. It, more than anything else brings on MEGO [my eyes glaze over]in your audience, and MEGO is "The kiss of death".

On to the most typical challenge in narrative preparation: <u>too many words</u>. This means your worst enemy, the villain in your story, has taken over. This villain is rhetoric, a style of speaking or writing that is elaborate and pretentious, with <u>way too many words</u>. Rhetoric dilutes, then systematically kills off terse and hard hitting phrases. So you must confront the villain, rhetoric, and eliminate it totally.

Here is a simple example of rhetoric:

"The next section of the briefing will cover the need for field testing of lasers at various level of intensity in a real-world environment similar to the challenging operational environment in which maritime forces typically operate at sea in forward areas."

A beautiful sentence, all 42 words of it, with great flow!

The Joint Staff will love you!

JPME 2 is a lock!

All of this is right <u>for the wrong reasons</u>! Drop it!

Try this instead:

"We'll move now to laser field testing in the maritime environment, which is essential."

That's down to 14 words, yet I bet you can make shorter and more powerful through group critique; and, by inclusion of an insightful icon, sketch, diagram, or picture on the screen that complements or reinforces your words, your narrative.

The world is full of examples of the power of conciseness and the clever use of inference.

Admiral Arleigh Burke, when commissioning the lead ship in the Burke Class of DDGs said:

"This ship is built to fight. You had better know how."

A Medal of Honor recipient, when asked if he believed in God, said:

"There are no atheists in a fire fight."

President Reagan, when asked the best route to accomplishment said:

"It is amazing what you can accomplish when you don't
care who gets the credit."

Willy Nelson, when asked what a country song is, said:

"Three cords and the truth."

These statements are profound in their simplicity.

All express the individual's personal belief, all are declarative, precise, and to the point, without embellishment. They are "winners"!

You can come up with "winners", too. It just takes creative thinking and lots of serious thought, meaning hard work. Just your recognition of the need for these "winners" will <u>carry you half-way to success</u>!

You have all been told, at times, "don't take your work home". That's good advice. When you leave your workplace for the day you should relax and regenerate. Nevertheless, some of your best, most exciting, ideas will come to you in a non-working environment. They'll just pop out! Capture them just by jotting down a few phrases. Then, next day at work, pull out those notes and make the changes immediately.

Keep pressing on <u>regardless</u>!

                                        // Boss Hogg //
                                        6/6/13

Appendix J – SSG's Long Range View for Future Maritime Operations

The Navy, beyond its robust "War at Sea" or "Blue Water" strength, will evolve to become a major participant in littoral land campaigns. Emphasis will be on: assuring access, command and control, and attack fires, logistics support of the troops ashore, theater air defense and theater ballistic missile defense -- in multi-service, joint and multi-national or coalition arrangements.

Maritime capabilities will be distributed across geographically dispersed, but mutually supportive combatant platforms which, in turn, will extend their individual reach by employing large numbers of air, surface and sub-surface unmanned vehicles. These unmanned vehicles will build the capabilities and extend the reach of the platforms and, through onboard modular change outs, will increase mission areas and operational flexibility many fold.

Navy and Marine Corps operating forces will have integrated command and control functions; will have combined battle group, amphibious and landing force staffs; will use the same architecture of sensors and weapons; will be supported by the same sustainment processes, in-stride with their operations; and, will restructure their capabilities so that they can carry out seamless operations from the Maritime Amphibious Force through the Expeditionary Force and on to the conclusion of the land engagement.

Combat logistics forces, amphibious assault forces, and maritime prepositioned forces will be functionally integrated. They will be supported by a set of modular platforms and families of unmanned vehicles, all operating in the Maritime Force.

This Maritime Force will require extensive wide-band connectivity so that all platforms, all "off-board" systems, all sensors and all shooters can be totally connected in both command, collaboration and fire control channels. This means they will be netted and linked for cooperative engagement in a manner that fully nets the force.

Call this full dimension FORCEnet: the operationalization of net centric warfare, with integration of the fully netted force and the warfighter.

FORCEnet will operate on a dramatically compressed timeline. Further, control of the timeline coupled with an information advantage, called "speed of command", will enable the force to operate on timelines as short as micro-seconds in response to the battle rhythm.

An example is a call for fire from a spotter on the beach. The call would be answered by a weapon on target just seconds beyond the time of flight of the weapon itself. Another example is self-defense against anti-ship cruise missiles and torpedoes, which today is typically the province of individual ships. In a fully-netted force, detection and neutralization of these threats will be a force-wide collaborative function.

Dominant features of this force will be nets, sensors and advanced weapons – both on-board and off-board Maritime platforms.

Platforms will still be needed, of course, as the support frames for these capabilities. Of importance, each platform will contribute in some way to the Maritime Force's "arsenal" capability that will provide fires across the depth and breadth of the battlefield in deep prevision strike, mid-range interdiction and close support of maneuvering troops -- from "silver bullets" to high volume munitions -- for the full duration of the conflict.

This "arsenal" capability will be described as a "Maritime Combined Arms" mission area. It will include the replacement of heavy field artillery ashore with accurate and low-cost maritime fires afloat. This will do away with the tethered range limitations between maneuvering troops and their supporting fires. In maritime combined arms, both troops ashore and forces at sea will, in effect, maneuver; such that, no matter how mobile the troops, they will have continuous fire support to the depth and breadth of their tactical battlefield.

We will know we have arrived at this advanced state of warfighting when operational commanders think of combat orders-of-battle not in terms of ships, aircraft, submarines and electronics, the classic indicators, but in terms of nets, sensors and weapon systems.

At that point, the location of sensors will be of greatest importance to operational commanders, and the nets they fuel -- through automated protocol -- will de-conflict the battlefield. This will open the engagement profile to allow simultaneous maritime engagement of an adversary's forces across a much larger land mass. In other words, our maritime force will achieve the "effects of mass" by dispersed platforms, applying distributed fires across an expanded battlefield. Support for this will be generated by national assets and off-board organic systems -- probably hundreds of unmanned vehicles in a multi-tiered surveillance network.

This surveillance network will be integral to the Maritime force while it conducts the full range of naval operations -- peace to war –- as a component of a Joint Task Force.

The 21st century warrior who mans and fights in this fully-netted environment will be different from sailors of today. Every system in the force will be designed from the beginning to enhance the warrior's capabilities and performance.

Continuous learning, education and personal/professional development will be inherent in the careers of all warriors, thereby enhancing their operational dexterity. And, information technology will allow off-ship personnel and non-deployed staffs to have a full understanding of in-theater conditions well before they arrive forward.

// Boss Hogg //

Appendix K – Keynote Address to 2016
18th Electromagnetic Launch Symposium

Good morning to our distinguished audience.

It is my distinct pleasure to be with you today, participating in this significant scientific forum.

At the outset, I would like to recognize and thank our Symposium Chairman and Host, Professor
Jun Li, and our Symposium Co-host, Dr. Harry Fair for all their efforts in planning and executing this important event.

I will provide some Rail Gun developmental history from our Navy's perspective.

My involvement in Electro-magnetic Launch (EML) and Rail Gun development started in 1995 when I became Director of the U.S. Navy's Strategic Studies Group, or SSG.

The SSG was re-chartered that year, by the Chief of Naval Operations, to transform it from a Group involved in Strategic Studies to a Group whose sole purpose was to generate revolutionary war fighting concepts for the future -- all intended to change the Navy.

One of the SSG's primary interests in 1995 was "Land Attack from the Sea" by ships, and one of the first people who talked to us was Dr. Bill Weldon who was at the University of Texas in its Center for Electro Mechanics.

Bill spoke eloquently about the potential for Electromagnetic Launch and what he called "Electric Gun". The SSG was intrigued, took it aboard, and set upon a rigorous analytic-based Concept Generation process for Rail Gun that, along with a number of related interest areas, continued for five years — through 1999.

Two Navy Lieutenants — serving as SSG Director Fellows — were the early heavy lifters. These young officers, both Nuclear Engineers, were knowledgeable in both Rail Gun technology and its war fighting value; so much so that — at that moment in time — I half-jokingly would say that they could discuss Rail Gun more fluently than all the scientists and engineers in our Navy combined. While this might seem unusual, at the time I suspect there was a practical reason.

I am sure the Navy's scientific community was well aware of Rail Gun, but Navy's leadership did not seem interested from an operational viewpoint.

No question, in 1995 the engineering challenges were huge and the Navy saw Rail Gun as a very high risk possibility -- way out into the future. With the information available at the time, who could blame them? Take barrel life. In 1995 it was "1 round, 1 barrel" with severe arching — thus gouging and damage — across the rail. Little consideration had been given to the projectile or to its stability in flight at hypersonic speeds. Accumulation

of multi-mega joules of energy required massive space, and significant technical breakthroughs. Not to mention where the energy would even come from.

But, these were engineering challenges, not fundamental barriers in terms of "The Laws of Physics". And the SSG would see significant progress over the next 5 years, as it became more deeply involved. To the point that the SSG envisioned Rail Gun to be operational and onboard surface combatant ships in 25-30 years.

Soon after the session with Bill Weldon the SSG discovered a research and development center supported by the Army, called the Institute for Advanced Technology, or IAT, in Austin, Texas. The center was led by none other than Dr. Harry Fair and a team of very smart people. Which included Ian McNab who is with us today in spirit.

IAT's purpose in life was to develop Rail Gun and integrate it into the Army's Main Battle Tank. A rather daunting task; especially so, as successive Army Chiefs of Staff down-sized the Tank from 60 tons to 18 tons. One thing the SSG learned quickly, for Rail Gun development, was that it is much easier to scale up than to scale down. So, for the engineers, if the energy issue could be solved, scaling up to shipboard installation probably looked feasible.

The SSG was very impressed with IAT — with Harry Fair and his Team -- because they had already done the basic research, they had already built a test platform, and they were actually conducting live-fire experiments which I personal observed.

We told the CNO that the Navy should piggy back on IAT's success. Not long after our first visit to IAT, the SSG met Dr. Hans Mark, a scientist who over time served as Director of Defense Research and Engineering, as Director of the National Reconnaissance Office, as Secretary of the Air Force, and as Chancellor of the University of Texas.

Dr. Mark met frequently with the SSG -- discussing various aspects of warfighting -- with emphasis on the high potential for Rail Gun. He was always an inspiration for our Group and a strong proponent of Rail Gun. Hans believed deeply in the ability of smart and dedicated engineers, adequately funded, to overcome the developmental challenges.

It is fair to say, in the 1990's, that the SSG "bonded" intellectually with Dr.'s Weldon, Fair and Mark. And we continue to thank all three of them!

This moves us forward to 1998 on the Rail Gun developmental timeline, when the SSG asked itself "How can we get the Navy's leadership interested?" The senior scientists and the Admirals? The Group's task from the CNO that year was to quote "engage the most difficult land targets from the sea". Difficult was defined as those targets that were concealed, buried, mobile, and moving.

To provide an analytic basis for this work, the SSG put together a War Game scenario designed to stop a two corps army dead in its tracks, in 72 hours, as it maneuvered from Baghdad to Kuwait. An estimate of 100 thousand target sets was postulated. Ten surface combatant ships, each engaging with one of its two Rail Gun mounts --at a firing rate of 6 rounds per

minute -- fired 3,600 rounds an hour; which, extended over the 72-hour battle, totaled 259 thousand rounds. Easily enough to cover the 100 thousand target sets. Today's firing rate is estimated at 10 rounds per minute, or 432 thousand rounds, total. For the war game, that only added to the margin of success.

The SSG played out its War Game, show-casing Rail Gun with its high rates of fire and speed and, guess what, we won!

Yet, when the Group's Final Report for the year titled "Sea Strike" was distributed, flack came in from all quadrants. A typical comment was: "There are not enough ammunition ships in the world to provide the projectiles to engage in those numbers that quickly". This challenge simply inspired the SSG to think more innovatively, while going deeper into research.

The Group visited several Skunk Works looking for a solution to the ammunition limitation and was exposed to Solid Free Form Fabrication, a fledgling molecular process to fabricate objects from metallic powders. Molecule-by-molecule through computer-assisted design. It was a precursor to what is now called Additive Manufacturing, with 3-D printing a popular sub-set. The SSG immediately saw the potential to manufacture shell casings, and other parts as well, onboard ship as needed; such that the shipboard Machine Repairman of the 20th Century would become the shipboard Molecular Engineer of the 21st Century.

Plus, the Navy would not need to invest a dime in Research and Development -- R and D — for this capability, since the private sector was the driver. Ship integration costs would come much later.

So, circa 1998 the SSG reported to the CNO that Rail Gun, with adequate R and D funding, could be operational in the 25-year timeframe at an R and D cost of about $500M — and, by that time, through Free Form Fabrication, ships with Rail Guns would make their shell casings onboard while underway in operational and combat environments.

Taking this a step further, these ships would deploy with all the materials needed to assemble the entire projectile onboard; and, with hypersonic impact velocity, an explosive warhead would not be needed. A small bundle of pencil-size tungsten steel rods would suffice, with plenty of storage space below the ship's center of gravity. The third projectile component would be a plug-in nose cone, with miniaturized GPS/INS, which Draper Laboratory in Cambridge, Massachusetts happened to be working on at that time. These initiatives appeared to be adequate response to the critics, but we all knew the proof must be an operational capability.

And the final challenge for the SSG's Rail Gun concept was Energy. How could a ship generate enough electrical energy to propel a projectile 100 miles in Block 1; then 200 miles in Block 2; and, eventually, a Block 3 range of 300-plus miles? With roughly 32, 64, and 133 mega-joules of energy required, per round fired, for each successive block?

The basic answer: electric drive with IPS — an Integrated Power System -- netted across the ship, so that the ship's propulsion power could be shared with Rail Gun.

For 3 years running, 1996-1998, the SSG recommended to the CNO that the Navy develop Electric Drive / IPS for all combatant ships. This was not a new thought but, during a period of severe post-Cold War down-sizing, the Navy had not seen a compelling reason to do so. The expense in R and D and engineering development would be high.

The SSG pointed out that its recommendation was not for the reasons set forth in the past; such as a 30% increase in fuel efficiency, and elimination of the main engines and shafts to open up lower deck spaces. Instead, the SSG told the CNO: "If the Navy does its R and D properly, in the next 20-25 years High Energy weapons will be employed onboard its combatant ships. Maybe Rail Gun, maybe high-powered lasers, may be something else". The point being, the Navy could not afford to wait until that offensive capability arrived to start developing its shipboard energy source. The two must be developed in parallel.
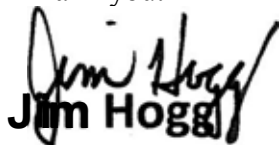
The CNO bought in! And the first surface combatant with Electric Drive / IPS is a Guided Missile Destroyer, DDG 1000, the USS Zumwalt, which was commissioned ten days ago in Baltimore, Maryland. A major step forward, as a platform for Rail Gun installation in the future.

There is another SSG contribution to DDG 1000 and Rail Gun since it is no coincidence that the ship's displacement is around 15 thousand tons. In 1999 the SSG asked the Naval Sea Systems Command for an estimate of the necessary displacement for a Surface Combatant ship outfitted with two Rail Gun mounts. The answer: 14 thousand 500 tons! Very close!

Everything I have covered today relates to the SSG's efforts in Rail Gun CONCEPT development, which was basically completed by the year 2000. At that point it was time for the Navy to move Rail Gun from a Concept to reality; so, the SSG was no longer a primary participant in the process. Rail Gun would soon become a fully-funded program at the Science and Technology level of development.

While future Groups continued to show-case the warfighting potential of the weapon system, the SSG moved on to generate revolutionary concepts in other warfare areas. Their Rail Gun mission accomplished!

Thank you.

Jim Hogg
Admiral, U.S. Navy (Ret.)
And member of the U.S. "Institute for Strategic and Innovative Technologies" Delegation to the 18th EML Scientific Symposium held in Wuhan, China, October 2016.