Nuclear Command and Control for the 21st Century

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I am pleased to be here today to kick off your meeting. I intend to spend a few minutes addressing nuclear command and control (NC2) needs for conflicts we might anticipate in the 21st Century, with a focus on Presidential Decision Support.

First, I would point out that I am one of you. Really! My first assignment as a young PhD at Lawrence Livermore in the late 1970’s was to calculate the prompt and delayed radiation environment to U.S. space systems from high altitude nuclear detonations. Such detonations augment the trapped electron flux in the naturally-occurring Van Allen radiation belts. My job was to determine the dose to satellites flying through those augmented belts so that degradations in system performance and lifetime could be assessed. Not to be too cute—but, it was a blast!

One of the guys I used to hang out with then began his career in national security with a similar focus on the NC2 system and its survivability to Cold War threats. Although proceeding on different paths, he, as I, retained a career-long interest in the health and vigor of what is a critical, if often under appreciated, element of nuclear deterrence.

That guy—Ash Carter—significantly increased high-level attention to the modernization of essential NC2 systems and capabilities during his recent tour as Deputy Secretary. Partly at his urging, a new NC2 Council within the Department, co-chaired by the Under Secretary for AT&L and the Vice Chairman, has been established by Congress.

By the way, I cant even begin to pronounce the full acronym so I thought I would just call it the NC2 Council. But in acronemics that’s NC3—which is even more confusing. So I’ll just call it the Council. (Should have just continued to call it the SNOC!)

In any case, the job of the Council is to oversee NC2 R&D, acquisition, and operational activities as well as facilitate high-quality communications links supporting Presidential conferencing and continuity of executive branch operations, both day-to-day or in crises.

Also at Ash’s behest, a new organization under the CIO—the Strategic and National Command, Control, Communications and Intelligence (SNC3I) Joint Systems Engineering and Integration Office (JSEIO) (whew!)—was established as the principal systems architect for NC2 within the Department. The JSEIO is to provide annual guidance to the Services and Defense Agencies regarding programmatic activities to be carried out in support of the overall NC2 system.

1 A portion of my remarks was adapted from earlier work I conducted for the National Institute for Public Policy.
Thanks to Ash, we have a vigorous NC2 modernization program underway, and the basic organizational elements in place to ensure very senior level engagement in that program. It’s the job of many of you here today to ensure that these reforms succeed in ensuring that survivable and enduring NC2 remains a “going concern” within DoD.

Nuclear Command and Control

Turning to specifics, the 2010 Nuclear Posture Review concluded that the U.S., under New START, will retain a strategic nuclear triad composed of ICBMs, SLBMs, nuclear-capable heavy bombers, and a small but important component of non-strategic nuclear forces consisting of dual capable fighter aircraft.

Critical to nuclear deterrence is the command and control system that links these forces with Presidential authority. Robust, secure, survivable systems for early warning, attack assessment, senior leader conferencing and force direction are needed to support existing nuclear employment plans and associated contingencies. We need this capability independent of the number of delivery systems and warheads deployed. Positive and negative control of nuclear forces must be assured even under the enormous stress of a nuclear crisis.

The basic elements of today’s NC2 architecture include:

- Launch detection satellites and ground-based radars for early warning of attack,
- Facilities to interpret early warning information,
- Air, ground-mobile, and fixed command and control posts,
- Satellite, other RF, and land-line communications.

In fielding and modernizing NC2 systems, we rely on a discipline grounded in certain key principles including dual phenomenology—both infrared sensor and radar detection—for ballistic missile early warning and threat assessment, redundant survivable communications links, and hardening of essential NC2 systems to robust nuclear environments.

Modernizing the “Thin Line”

To address several years of relative neglect to NC2, coupled with fact of life delays in major programs, significant investment today is focused on sustaining and modernizing the so-called “thin line”. The thin line is that part of the architecture that must function after the EMP effects from precursor high altitude nuclear detonations. It includes alerted air and ground mobile C2 nodes, early warning and communications satellites (but not necessarily all communications links to the ground) and surviving forces. Over the next five years, we will spend $18 billion on R&D, procurement, operations, and support to maintain the thin line in areas such as:

- Survivable satellite communications (evolution of Defense Satellite Communications System/MILSTAR to Advanced Extremely High Frequency)
- Survivable communications to forces (B-2 LF, EHF terminals, Minuteman updates)
- Early warning satellite modernization (evolution of Defense Support Program (DSP) to Space Based Infra-Red System (SBIRS) satellites)
- Upgraded early warning radars
- Improved secure senior leader conferencing (day to day and stressed environments)
- EMP hardening of critical communications links
• Airborne and ground-mobile command post sustainment and modernization (National Airborne Operations Center, Mobile Consolidated Control Center)
• TACAMO operations and a
• Cyber vulnerability assessment of the NC2 system and subsequent mitigation.

**NC2 Attributes for a Changing Security Environment**

During the Cold War, the most likely scenario involved escalation of a conventional conflict to nuclear. The conventional war we saw as “over there”—that is, in Europe or Asia—with the U.S. homeland relatively unscathed. Escalation to nuclear would therefore evolve with a fully alert force that was not degraded from strikes during the conventional phase.

A massive bolt-from-the-blue attack was viewed as possible, if not plausible, and U.S. forces were also postured to be resilient to that threat (e.g., by deploying SSBNs at sea, maintaining bombers on ground alert, and keeping airborne NC2 assets “up and available” 24/7).

While it is still important to consider NC2 performance to Cold War threats—indeed, such threats could return—we must also anticipate a much more dynamic security environment featuring multiple, potential sources of conflict with peer competitors, and with the emergence of nuclear-armed regional actors. This environment poses more varied and complex conflict scenarios which are potentially more stressing to NC2 than the traditional Cold War threats.

Three emerging developments are driving these considerations: (1) increasing capabilities for attacks on satellites (not just from Russia and China), (2) increasing foreign capabilities for global conventional strike, and (3) the fact that U.S. communications satellites are becoming more and more dual-purpose assets, providing C2 for conventional as well as nuclear operations.

Consider the impact of a regional conflict that escalates to a global conventional phase in which U.S. nuclear forces and NC2 are degraded initially by cyber and anti-satellite attacks and, later in that phase, by long-range precision conventional strikes on military forces.

Conventional attacks on tactical communications—e.g., an attack on the AEHF satellite—could degrade nuclear communications provided by that satellite.

Escalation to a “small” nuclear attack could feature high-altitude EMP and space use of nuclear weapons, along with more widespread non-nuclear attacks on C2.

Escalation to a “large” nuclear attack with multiple detonations on U.S. territory—i.e., the Cold War scenario—could thus begin with severely degraded NC2.

During the Cold War, the focus of NC2 was to ensure that a Presidential decision could be made, and an execution order communicated to forces before they were destroyed. In future conflict, in which the nuclear component initially may be quite limited, we must anticipate that a President will seek a much broader range of consultations, employing much higher quality communications, with senior advisors, allied leaders, and possibly even with adversaries.
Consultations could take place with the President either “on the move” or at a covert location. The demand for high quality voice, video and data transmissions in these contingencies, and in potentially stressed environments, greatly exceed the capabilities developed for the Cold War.

**Increased Presidential Decision Time**

In addition to high-band width communications capability to support decisions, President Obama, in recent guidance, has directed a re-look at force posture adjustments that could *increase the time* to make critical decisions bearing on national survival.

No President, including this one, has ever fancied the choice to either launch ICBMs quickly before enemy warheads arrive on the missile fields, or wait and thus lose them. Acknowledging the “significantly diminished probability of a disarming surprise nuclear attack”, the President’s nuclear employment policy issued last year directed DoD to examine options to reduce the role of Launch Under Attack in U.S. planning while still retaining an option to do so.\(^2\)

ICBMs provide a force that is on alert and thus responsive on short notice. The evolution to single-warhead missiles makes this force a less attractive target to potential adversaries than it was when each U.S. ICBM carried three or ten warheads. Unlike SSBNs at sea, however, silo-based ICBMs are not inherently survivable to a large precision attack.

Because ICBM vulnerability is a driver for rapid launch, one solution would be to field survivable ICBMs. In the 1970s-80s, when Russia’s large, accurate, highly-MIRVed ICBMs posed a considerable threat to U.S. ICBMs, significant resources (and debate) were devoted to establishing a politically-viable, technically-achievable and cost-effective solution to ICBM survivability. Approaches involving deceptive basing, mobility, and increased hardness were examined. All failed on one or more counts. Nearly three decades have passed since the last attempt to develop survivable ICBM basing, is it time to take another look?

The Cold War scenario that most stressed nuclear command and control was the zero (or very short) warning “decapitation” attack on Washington from a low-flying cruise missile launched from a quiet Russian submarine patrolling close to the U.S. east coast. Indeed, this scenario, coupled with a follow on attack on ICBMs, drove a rapid decision to retaliate. If a close-in sub were detected, certain steps could be taken to make forces, national leadership and associated NC2 more survivable and resilient. But we never adequately solved this problem. In the future, we should expect other potential adversaries to acquire capabilities for short warning attack.

Finally, substantial U.S. nuclear warheads today are deployed at sea on Trident SSBNs which are inherently survivable (at least for the time being!). These forces provide the President with a viable choice not to make a rapid decision, but to “ride out” an attack while still retaining capabilities to achieve critical targeting objectives.

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\(^2\) Whether any President would execute such a launch in even the most dire circumstance is an open question. That said, this option is planned for, and exercised, so that no potential adversary poised to strike the U.S. could ever be certain that we wouldn’t or couldn’t.
**Recommendations**

So what do we do? Let me offer some ideas. To provide the President with flexible and resilient NC2 options to address the complexities of potential future conflict, and to increase decision time, modernization programs should:

- Seek improved connectivity with a President “on the move”.

- Seek vastly improved senior leader conferencing capabilities to support decisions that go beyond the Cold War’s “multiple choice test” to the “essay test” involving consultations not just on offense, but offense and defense combined, and not just a dialog among senior advisors, but among allies and partners. This will require global, secure, high quality voice, video and data transmissions that are resilient in stressed environments.

- Address options for resilient communications to hedge loss of SATCOM to conventional ASAT attack. Options include small, single-purpose “cheap-SATs” to replenish lost communication or GPS functionality, and long-range airborne communications relay networks that could be stood up on short notice.

- Take another look, as part of the Air Force’s GBSD program, at survivable ICBM basing particularly in light of potential new technology that could make such basing affordable, and the President’s desire for increased decision time when considering nuclear employment.

- Examine systems and technologies to detect close-in submarines, and provide early warning of cruise missile launch from those submarines (facilitating evacuation of national leaders and reducing pressures for an early decision to respond). Recent DoD efforts to apply JLENS technology (tethered aerostats deployed with advanced radars) to detect and track cruise missiles that could threaten Washington are to be commended.

- Fund robust S&T efforts to understand, and help remediate, future force vulnerabilities to advanced capabilities for locating quiet SSBNs at sea. After all, follow-on Ohio class submarines are to be fielded through 2080; their long-term survivability is not a given.

**Events in Ukraine and Implications for Future Conflict**

I conclude with a real world illustration for how future conflict could emerge that draws from events this past year in Ukraine.

Mr. Putin believes he has a “responsibility to protect” ethnic Russians wherever they reside. He has used this argument to intervene in the internal affairs of Moldova, Georgia and now Ukraine. Putin’s modus operandi in Ukraine has not been an all-out armored assault with tank battalions as the Soviets did in Hungary in 1956 and Czechoslovakia in 1968.

Rather, he seeks to achieve his political ends by introducing covert forces employing “gray ops” (aka “hybrid warfare”) to incite, or amplify, instabilities and insurgencies among fringe elements in Eastern Ukraine.
His special operations forces have demonstrated enormous skill in carrying out their military mission and remarkable discipline in dealing with the media in the war zone. No doubt they were involved in the trumped up referendum leading to Russia’s illegal annexation of Crimea. Putin has coupled these efforts with a relentless media blitz by Kremlin-controlled television to foment the very instability needed to justify his interventions.

We pose several questions: What does this mean for NATO members such as Latvia and Estonia with sizable ethnic Russian populations? Would NATO even recognize that a member state was under such covert assault? How would other members respond under the Article V commitment to defend that member? How should these events be reflected in U.S. and NATO security posture and planning? Most of these questions remain to be answered.

A decade ago, few would have imagined the events of the past year in Ukraine. Today, it must inform our thinking about future conflict—about how such conflict could evolve from covert destabilization to overt conflict, from regional to global, and from conventional to nuclear.

For these and other scenarios, at the very least, credible, survivable, and enduring connectivity with forces, under the most stressing environments and conditions of warning and alert, enables flexible force execution under Presidential authority. It also conveys an important message for deterrence—that is, U.S. forces cannot be neutralized by attacks on the NC2 system.

Let me stop there and take any questions.