DoD Nuclear Survivability Program

Dr. John Kuspa

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History of DoD Nuclear Survivability

- DoD nuclear survivability is firmly rooted in the Cold War
  - Strategy was to defeat a peer adversary
  - To counter the Soviet threat, DoD maintained very strict survivability standards ensured with rigorous testing and maintenance

- Collapse of Soviet Union significantly altered role/need for nuclear survivability
  - With no perceived threat, there was little incentive to harden systems; but plenty of savings

History of DoD Nuclear Survivability (cont)

- **The relaxing of DoD survivability standards: 1991-1996**
  - DoDD 4254 "Acquisition of Nuclear Survivable Systems" mandated that:

    "DoD components shall ensure that the nuclear survivability of non-major systems is evaluated for possible operational impacts on critical functions supporting vital missions."

    - Directive also spelled our responsibilities for oversight and management of nuclear survivability
      - Each DoD Component developing or procuring a system was responsible for verifying nuclear survivability/hardness and to develop hardness maintenance/sustainability over each system's lifetime
  - In 1991, the DoD 5000 series was first published to address the post-Cold War environment
    - Nuclear survivability was now to be addressed in a "cost-effective manner"
    - Specific responsibilities for nuclear survivability oversight and management were no longer identified

History of DoD Nuclear Survivability (cont)

- **The rise of COTS: 1996-2002**
  - All references to nuclear survivability were deleted in the 1996 5000-series revision
    - *"Unless waived by the Milestone Decision Authority, mission critical systems shall be survivable to the threat levels anticipated in their operational environment."*
    - With survivability no longer emphasized, U.S.-Russian détente and the push for rapid acquisition through COTS, survivability was quickly dumped by program managers, the Services, etc.
  - The 2000 revisions did not address how to acquire nuclear survivable systems nor did they assign OSD responsibility for oversight

History of DoD Nuclear Survivability (cont)

- **Alarm bells: EMP Commission 2001**
  - By 2000, nuclear survivability became a casualty of cost-cutting, COTS usage, and the "Cold War" perception
    - This was aggravated by the "capabilities" based, spiral development acquisition strategy
  - Congressional hearings and inquiries on the matter were met with unsatisfactory responses by DoD
  - 2001 Defense Authorization Bill established an EMP Commission to assess the EMP threat to the United States, U.S. ability to recover, and recommend protection steps
    - Two iterations of Commission: final report released in 2009
  - Efforts of Commission shed light onto overall nuclear survivability decline within DoD and the vulnerability of our national infrastructure (lead issues for DHS, DOE, White House)

DoDI 3150.09 *CBRN Survivability Policy*

- My position created within NCB/Nuclear Matters office in 2006
  - Key goals to accomplish:
    - Re-introduce nuclear survivability as a key parameter into DoD Directives, Instructions, and Manuals
    - Assign responsibilities for CBRN Survivability
    - Re-establish acquisition processes for nuclear survivability; especially CBRN mission critical systems
    - Require annual survivability reports from the Services and MDA
    - Establish the CBRN Survivability Oversight Group Nuclear (CSOG-N) to oversee DoD CBRN survivability policy
  - DoDI 3150.09 was approved in 2008 to accomplish the above tasks

DoDI 3150.09's Scope

DoDI 3150.09

DoDI 3150.3 (1994)

Nuclear C3 & Nuclear Delivery Systems (must be survivable)

well beyond NUC threats

CBR

PERSONNEL

Major Combat Systems

Ships, Aircraft, Family of Combat Vehicles, Missiles, etc.

CBR

Other Systems & Equipment

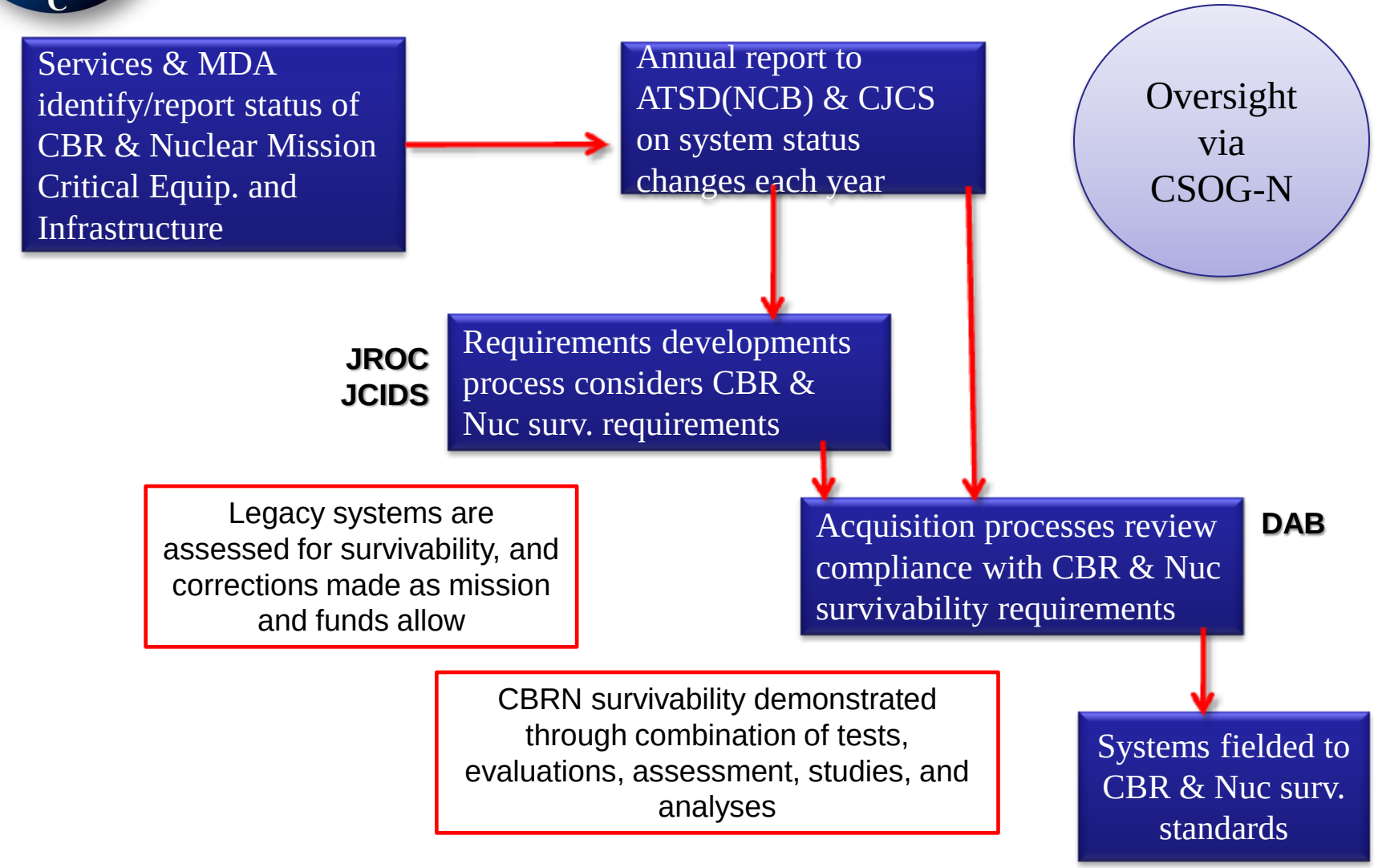
Personnel Protection, C3, Conventional Comm Ctrs, Major HQs, MHE

Supporting Infrastructure

Ports, Airfields, Bases, transportation nodes, electric power assets, …

MISSION CRITICAL EQUIPMENT

Mission-Critical Equipment Process



Illustrative Mission Critical Report Overview

ORG	Total CBRN MSN Critical	Legacy & New Systems	Total Nuc & EMP	Nuclear Hard Requirement	EMP Survivability Requirement	HM/HS Program
Army	127	72/55	104	69	98	13
Navy	173	160/13	171	10	173	10
Air Force	199	191/8	47	40	47	24
MDA	67	62/5	65	14	20	24
Total	**566**	**485/81**	**387**	**133**	**338**	**71**

Annual Mission Critical Report
(format revised for 2010)

		Mission Critical Environment							Acquisition Management Info						OPTIONAL		Survivability Status & Funding to Identify and Mitigate Vulnerabilities																							
																	Chemical		Biological		Radiological		CBR HM/HS		Nuclear Blast		Nuclear Thermal		Nuclear Prompt Radiological		EMP		Pumped Belts / Disturbed		Nuclear HM/HS					
Report Item #	Mission Critical System Name (regardless of threat environment)	"CBRN Mission Critical"	Chemical	Biological	Radiological	Nuclear	EMP	ACAT	Last Milestone / Program Review	Material Sol'n Analysis	Technology Development	Engineering & Manufacturing Development	Production and Deployment	Operations & Support	Rad Hard Microelectronics	HPM/RF Energy Mitigation?	Compliance	Funding	Compliance	Funding	Compliance	Funding	Compliance	Funding	Compliance	Funding	Compliance	Funding	Compliance	Funding	Compliance	Funding	Compliance	Funding	Compliance	Funding	Compliance	Funding	Compliance	Funding
a	b	c	d	e	f	g	h	i1	i2	j	k	l	m	n	o1	o2	q1	q2	r1	r2	s1	s2	t1	t2	u1	u2	v1	v2	w1	w2	x1	x2	y1	y2	z1	z2				
1	Widget #1	Y	N	N	N	N	N	II	02/07	N	Y	Y	Y	N	N	N	P	P	NA	NA	P	N	P	N	NC	?	NC	N	P	Y	NC	N	NC	Y	NC	Y				

a	**Documented Survivability Requirements (Priority of Program)**	*What is the survivability requirement (in ROC, ICD, CDD, CPD, RDD, JUON, JROC Interest, KSA, KPP) and CONOPs environment? (OPTIONAL: Identify priority or tier-level, as appropriate, used by Service or MDA management.*
b	**Information on Last Milestone / Program Review (column I)**	*Milestone / Program Review and applicable documentation (e.g., ADM, TDS, AS, Pgm Baseline, TEMP, ...)*
c	**Plan for achieving CBRN survivability**	*Text indicating the approach to achieving system survivability (e.g., through hardening, timely resupply, redundancy, mitigation techniques, or a combination)*
d	**How compliance is determined**	*Explanatory text on how survivability status is validated (e.g., last test or evaluation, plans for next test, ...)*
e	**Follow-on system (planned or under consideration)**	*Enter "Report Item #" for cross reference, and vice versa.*
f	**At least for Nuclear Weapon Delivery Systems and Nuclear Command and Control Systems: What critical mission-support equipment is related to this item?**	*"None." Or report here or as a separate item any (1) sets, kits, & outfits; (2) material handling equipment; (3) electronic or other keying or enabling devices; (4) etc. that are essential for mission accomplishment and their CBRN survivability status, as appropriate.*
g	**COCOM support for, or requirements for, this item to be CBR, or Nuclear, or EMP survivable.**	*Which COCOMs have submitted requirements or expressions of need (JUONS/ONS/UNS, IPLs, CDD, etc.) apply to this item's CBRN suvivability?*
h	**Issues or concerns to note**	*Explanatory text on matters the Department or Agency wishes to highlight (e.g., inadequate test facilities or infrastructure, ...)*

Successes and Drivers since 3150.09 (2008)

- **CSOG-N Principals**
  - Flag-level oversight of processes
- **Testing of aircraft (E-4B & B-2)**
  - **Aug 2010**: Verified E-4B survivability to MIL-STD 2169B
  - Used MIL-STD 3023 (DRAFT) as test approach & protocol
  - E-4B Aircraft passed with flying colors
  - **Mar-Apr 2011**: B-2 bomber just completed initial testing: test results due soon.

- **Congressional interest**
  - Testimony of senior leadership on HEMP
  - House EMP Caucus: Focus on infrastructure (EMP on electrical grid)
  - DoD reports on EMP -- 2009, 2011, 2013, 2015
  - GAO investigating CBRN survivability program & process

2011 Actions under the CSOG-N

- **3150.09 Revision**
  - Our office, in conjunction with NCB/CBD, is beginning a revision of the current DoDI
  - Items addressed in the revised instruction:
    - COCOM input/assessments of the MCRs
    - Specific language to generate renewed interest in nuclear effects within wargames & simulations
- **S&T Roadmap for Mission Assurance**
  - Infrastructure
  - DCIP
- **Resurrecting nuclear survivability standards (next slide)**

Focus Example: Resurrecting Standards

- **MIL-STDs were largely weakened or ignored**
  - Many nuclear survivability standards now provide only general guidance:
    - *"Compliance shall be verified by system, subsystem, and equipment-level tests, analyses, or a combination thereof."*
  - In 2007, USSTRATCOM requested DTRA develop an upgraded and extended HEMP survivability standard
    - Goal was to provide quantifiable mission assurance
  - MIL-STD 3023 "HEMP Protection for Military Aircraft" provides a set core of requirements/metrics for hardening and testing aircraft to a fixed design margin
    - Contention on fixed vs. tailorable design margins

- Other standards on the way: maritime and space

"Technology Strategy for Mission Assurance in Electromagnetic Pulse Environments"

- ODDRE (now ASD(R&E) asked NM to lead the development of an 'S&T Roadmap for EMP Hardening'.
- Vision: Provide a mean for promulgating technology solutions across the DoD and the Interagency to enable a more coherent and focused portfolio of EMP mission assurance programs.
- What: Strategic-level document that:
  - provides overall guidance to the Office of the Secretary of Defense (OSD), the Services, Combatant Commands and technology managers throughout the DoD
  - will inform the Department of Energy, Department of Homeland Security and the Office of Science and Technology Policy.
  - will inform decision makers about the vulnerability of our systems and provide strategies for reducing those vulnerabilities
  - identifies areas of current and future science and technology that address EMP survivability needs for the next 15 years.
- Goal: Publish by 1 August 2011 -- ***Still time for your ideas!***

Points of Contact on Nuclear Survivability in ODASD(Nuclear Matters)

- Dr. John Kuspa, Chief, Nuc. Survivability, ATL-NCB-NM, 703-693-9409; John.Kuspa@osd.(smil.)mil, Pentagon 3B884
- Dr. Greg Simonson, Special Asst to DASD(NM) from LLNL, 703-693-4291; Greg.Simonson@osd.(smil.)mil
- Dr. Lisa Andivahis, contract support to ODASD(NM), Lisa.Andivahis.CTR@osd.(smil.)mil; 703-697-3097
- Mr. Zach Becker, contract support to ODASD(NM), Zach.Becker.CTR@osd.(smil.)mil; 703-614-9098

Questions?