

Strayed Spears:

U.S. Air Force Unauthorized Nuclear Weapons Transfer

Leadership ViTS Meeting

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THE MISHAP

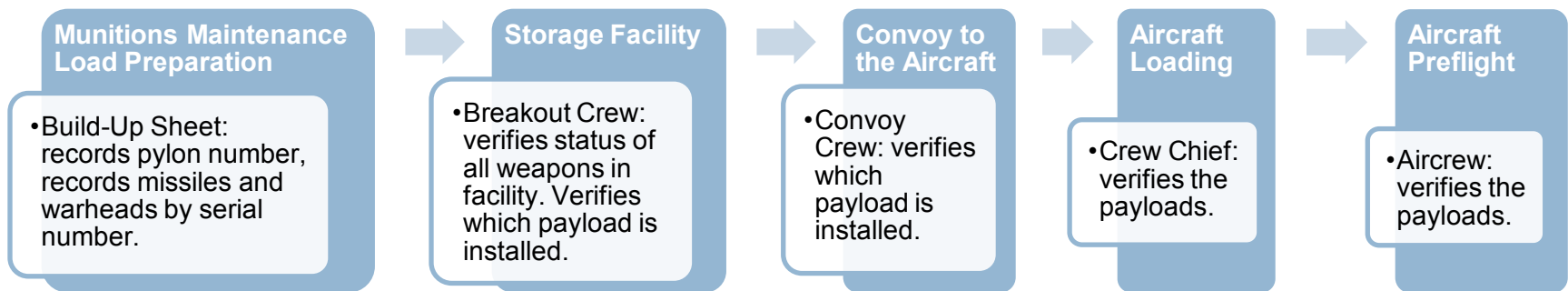
During a 36-hour period on August 29-30, 2007, six nuclear warheads were flown in U.S. airspace without proper authorization. The warheads, mistaken for inert warheads, were loaded onto a B-52 bomber and transported from Minot Air Force Base, North Dakota to Barksdale Air Force Base, Louisiana. Nine hours after the Minot B-52's arrival, Barksdale crews identified the warheads and officers alerted the National Military Command Center at the Pentagon. In the aftermath, a Defense Science Board study publicly examined what Air Force officials considered to be an unprecedented breach in nuclear weapons "surety," or the positive control of nuclear weapons.

Tactical Ferry Mission

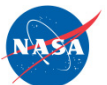
- In 2007, the U.S. Air Force used B-52's to transfer stored AGM-129 Advanced Cruise Missiles from Minot Air Force Base, ND to Barksdale Air Force Base, LA.
- The missile transfer procedure at the time (known as a tactical ferry) called for airmen to remove nuclear warheads from the cruise missiles and replace them with inert warheads. During storage, cruise missiles were divided into groups of 6 and fixed to pylons that could be attached beneath a wing of a B-52.

Transport Procedures

- Because nuclear weapons, nuclear training, and nuclear test devices all shared the same storage bunker and were nearly identical in appearance, airmen were required to follow identical procedures for transferring inert and live weapons.
- Airmen were required to verify each missile's payload at every step in the transport process. Verification was possible through physical placards placed on the warheads, serial numbers on the warhead's exterior, digital tracking, and physical markings on the warhead itself.



Process for Bomber Weapons Movement (Adapted from Defense Science Board)



WHAT HAPPENED?

Procedural Breakdowns

- Two pylons were scheduled for transfer to Barksdale AFB on August 30, 2007. Some time before this date, the Minot Munitions Maintenance Squadron determined that one of those two pylons would remain behind, and a pylon carrying missiles with components closer to their expiration dates would be sent to Barksdale in its place.
- The change was entered in the electronic tracking database but not on internal documents used for weapons coordination in the bunker.
- Using the internal paper form, the Breakout Crew remained unaware that one of the originally scheduled pylons had been replaced and a new pylon had been prepared for tactical ferry in its stead.
- On the morning of August 29, 2007, the Breakout Crew entered the weapons bunker and began verifying each weapon contained therein.
- In a breach of established procedure, the Convoy Crew entered the weapons bunker at the same time. While the Breakout Crew was still working, the Convoy Crew began transferring pylons to the munitions trailer.
- In the confusion, the Breakout Crew failed to verify the payloads of several pylons, including the ones that the Convoy Crew had already begun to tow away.
- Established processes mandated written verification of the payload and weapon status each time the weapons changed hands, but crews appeared to misinterpret this regulation at each stage in transit from Minot Air Force Base to Barksdale Air Force Base.
- Though the bomber remained within a secure perimeter and the warheads never left U.S. Air Force control, the missiles did not receive appropriate security because the airmen did not realize the payload consisted of real nuclear warheads as opposed to inert substitutes.



The nuclear warheads slipped through 5 safety nets and were exposed to risks of threat or damage for a combined time period of 36 hours. (Map Credit: USA Today. Photo Credit: USAF)



PROXIMATE CAUSE

The pylon carrying six nuclear warheads was inadvertently transported across the country due to local process changes that compromised established procedure. Remarkably, the warheads slipped through 5 safety nets and were exposed to risks of theft or damage for a combined time period of 36 hours.



UNDERLYING ISSUES



Nuclear Enterprise Focus Lost

- A Defense Science Board investigation released in February 2008 places the event in context of a national “nuclear enterprise.” The operational zenith of the nuclear enterprise to date occurred during the Cold War, when USAF bomber and ICBM squadron personnel often lived and worked under elevated real-world alert conditions.
- With national security on the line, unsurpassed attention was given to demonstrating 100% positive control of nuclear weapons, translating into zero-defect procedural excellence in every aspect of handling and delivery.
- Fears of nuclear attack dissipated at the end of the Cold War in 1991. As national security priorities shifted, some USAF resources dedicated to the nuclear mission were dispersed to address a growing list of conventional warfare missions.
- Policy changes called for a significant reduction in nuclear arms, and downsizing within nuclear sectors diminished the availability of nuclear expertise.
- As time passed, the majority of Cold-War experienced personnel had left service and were replaced by an officer and enlisted complement with far less nuclear mission training and only exercise-level experience upon which to rely.



Eroding Adherence to Processes

- DSB discovered the Breakout, Convoy, Loading, and Air Crews had, for some time, dispensed with the practice of documenting the payload each time it changed hands; bomber weapons were only moved around as exercises so the formality seemed excessive.
- Although the errors of the handling crews and flight crew played a significant role in this mishap, the DSB investigation found facts that made it possible to misinterpret rules because procedures appeared unclear.
- Confusion extended beyond storage regulations and transport processes to scheduling practices. Investigators found that formal scheduling procedures assigning the movements of the pylons, for the most part, were nonexistent.
- Investigators could not find a clear understanding of who was explicitly accountable for weapons movement outside the storage area. Without an authority figure to define and enforce guidelines, it was only a matter of time before procedures broke down.

FOR FUTURE NASA MISSIONS



Top: A B-52 pictured on the runway at Minot AFB.
Bottom: Airmen attach a pylon of AGM-129 Advanced Cruise Missiles to the wing of a B-52.

- Even processes that survive for decades can fail where training and inspection requirements fall away. Misguided efforts to increase efficiency can override quality controls. Bonded or aerospace-grade stores can be mixed with common-use parts of similar function.

- When loss or apparent risk seems low, operators can face pressure to streamline procedures that seem cumbersome and time-consuming, leading them to simplify processes and create “efficiencies” that ultimately diminish safety barriers.

- NASA engineers and SMA professionals apply a broad range of procedures and processes to high-energy systems (some older than their operators) every day.

- It is not enough to comprehend the procedural steps involved; as technical professionals who become managers, we must gain the system knowledge that caused the procedures to exist. This includes software, hardware, environmental and human failure modes and consequences.

- As years and competing priorities buffet the system and all charged with its operation, this system knowledge supports thoroughness in the face of constant demands for efficiency.