BEYOND THE “BOMBER”:
The New Long-Range Sensor-Shooter Aircraft
AND United States National Security

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Lieutenant General David A. Deptula, USAF (Ret.)
• Strategic Guidance
• The Legacy of Long Range Airpower Projection
• The Current Force
• The Imperatives of Long-Range Airpower
  • Anti Access/Area Denial
  • Long Range
  • Large Payload
  • High Survivability
  • Versatility
• Value Verses Cost
• Changing the “Bomber” Paradigm
• Combat Cloud

Answering the question: “Why does America need a new bomber?”
The Legacy of Long Range Airpower

• The quest for long range strike originated during World War I
  • Airmen sought to fly past the battle lines and target enemy centers of gravity—breaking free of strategies wholly dependent upon occupation and attrition
• Their vision was put to the test in World War II
  • Bombing worked: territory that saw a half-decade long bloody stalemate during World War I was captured by the Allies in 11 months
  • Pacific air strikes brought victory against Japan
• Empowered strategic deterrence during the Cold War
• Accomplished in 11 days what the previous 8 years of land warfare did not—Drove North Vietnam to a settlement
• Desert Storm and subsequent conflicts saw the notion of strategic attack radically enhanced
  • Unmatched precision
  • Stealth-enabled survivability
  • Rapid response on a global basis
  • Exceedingly favorable cost-per-effect
The Present Force

- 87% of today’s long range strike fleet is predates stealth technology.
- 20 B-2s are the only long range US aircraft that can access high threat locations and survive.
  - Last production since 1993, affording no replacements to backfill losses.
  - When a B-2 crashed in 2007, the US lost 5% of its stealthy long range strike force.
- The B-52 and B-1 have been upgraded numerous times to take advantage of new technology.
  - Stealth can never be incorporated into these aircraft and they will remain vulnerable.
  - During the final days of Vietnam the Air Force lost 15 B-52s in 11 days.
  - Air defenses have advanced markedly since then, but nearly half of the long range strike fleet is comprised of these same B-52s.

<table>
<thead>
<tr>
<th>Type</th>
<th>Total Inventory</th>
<th>Mission Capable</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-1B Lancer</td>
<td>63</td>
<td>51</td>
</tr>
<tr>
<td>B-2A Spirit</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>B-52H Stratofortress</td>
<td>76</td>
<td>54</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>159</strong></td>
<td><strong>83</strong></td>
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</tbody>
</table>

A Geriatric Force
The Imperative: A2/AD & Survivability

Modern A2/AD threats require non-stealth combat aircraft and associated support assets like aircraft carriers, AWACS, aerial tankers to stand off at range.

Stealthy long range strike aircraft operating from bases at range can survive amidst threats and project precise power deep into enemy territory.

- There is a reason why B-2s were used the opening night of the last 4 major US air campaigns:
  - Operation Allied Force, 1999
  - Operation Enduring Freedom, 2001
  - Operation Iraqi Freedom, 2003
  - Operation Odyssey Dawn, 2011
Value Verses Cost--The Proposition Circa 1991

LEVERAGE = ECONOMY: Forces, Personnel, and Dollars
(Equivalent force to hit 16 aimpoints—force package on left from actual Desert Storm attack)

- Forces: 75
- Aircrew: 147
- Dollars (FY 95): $7.5B

- Forces: 1 (2)
- Aircrew: 2 (4)
- Dollars (FY 95): $1.1B ($2.2B)

Need to shift from cost per unit to cost per desired effect

From testimony of the Secretary and Chief of Staff of the Air Force to the Senate Armed Services Committee, 19 June 1991. Dollar figures adjusted to FY 95 amounts.
• 1999: During Operation Allied Force B-2s flew only 3% of all sorties, but struck 33% of the total targets

• 2001: In the initial phase of Operation Enduring Freedom long range strike aircraft flew 11% of the sorties, but dropped 75% of the munitions expended

• 2003: B-1s flying in Operation Iraqi Freedom flew 1% of the sorties, but dropped 43% of all JDAMs and 22% of all guided munitions

• 2011: 3 B-2s flying during Operation Odyssey Dawn destroyed 45 separate targets

• 2014: 1 B-1 carries the equivalent of 40 F/A-18 sorties in Operation Inherent Resolve (operations against Islamic State)

• Long range strike aircraft carrying a vast payload affords tremendous operational capability and efficiency

• Real-time targeting further enhances the potential afforded by a bomber’s payload

When it comes to projecting prudent, sustainable combat power, it’s critical to consider cost per-desired effect (value) verses simply cost per unit
Changing the “Bomber” Paradigm: The Long Range Sensor-Shooter

• The information age is enabling a paradigm shift in the role modern aircraft play in meeting U.S. security needs:
  • Since the last B-2 was produced in 1993, 15 Moore’s Law cycles have occurred—yielding an exponential increase in electronic processing and a massive decrease in cost
  • It’s now possible to incorporate sensors, processing capability, and avionics in a single aircraft at decreasing cost
  • What we previously labeled as “bombers” can now play dramatically broader roles than they ever did in the past—they are more appropriately known as long-range sensor-shooters (LRSS)
  • This means the aircraft will have the ability to act as key nodes in a concept known as the “combat cloud”—a self-forming, self-healing ISR-strike-maneuver complex—affording an unrivaled “sensor-shooter” capability

Modern aircraft are much different in terms of capability than their predecessors: so much so that traditional nomenclature is becoming obsolescent
The Imperative: Combat Cloud

• The speed of information, advances in stealth, precision, next-generation sensors, and other technologies permit moving beyond building aircraft with segregated missions

• Modern aircraft will become nodes of a “combat cloud” that will form the foundation of the third offset strategy

• The combat cloud will eventually become a self-forming/self-healing ISR/Strike/Maneuver/Sustainment “complex” that leverages respective strengths, while circumventing individual weaknesses of the contributing systems

• Fifth generation aircraft are evidencing this vector today

• The evidence: F-22 combat ops over Syria—on one sortie, the F-22 pilot performed the following missions:
  • *Strike* against a pre-planned target
  • *ISR* collecting immediate information about the enemy
  • *Battle management*—relaying real-time information to other aircraft and directing them to negate enemy moves
  • *AWACS*-like detection & then *Interception* of enemy aircraft
  • Real-time re-tasking to strike new time-critical targets

Failing to harness the potential of Combat Cloud—the ubiquitous sharing of information—is like buying a rotary phone in an era of smart devices.
A Necessary Future: LRSS

- The National Security requirement for a long-range, high payload sensor-shooter stands firm: emphasized in all key national security policy documents
- Long range strike has proven of unique value since its inception
- Long range strike aircraft afford tremendous operational effectiveness—throughout the conflict spectrum
- Burgeoning global A2/AD threats heighten the need for range, payload, survivability, and information dominance
- In an era of rapid developments, the unmatched response that LRSS affords on a global scale is invaluable
- The present long range strike fleet is small, aging, and increasingly unable to meet national security requirements
- US national security leaders will continue to require policy options facilitated by range, payload, survivability, and an ability to dominate in the information as critical elements of the Combat Cloud

Long-range sensor-shooter capability is an American asymmetric advantage that:
1) Is indispensable for deterrence and crisis management
2) Is a fundamental underpinning of U.S. military power
3) Is a discriminator of the U.S. as the world’s sole superpower
Background

• Power projection is a core function of the US armed forces:
  • Shape key regions and preserve stability
  • Reassure allies and build collaborative relationships
  • Deter adversaries through demonstration of force
  • Deliver decisive war-winning effects in time of war

• Global reach demands access, something adversaries are increasingly seeking to block by:
  • Advanced air defenses—interceptors, surface-to-air missiles (SAMs), and radar networks
  • Ballistic and cruise missiles to attack regional bases and naval forces
  • Hardened facilities to avoid strike damage
  • Mobile systems to increase targeting challenges
  • Submarines to interdict sea lines of communication
  • Cyber attacks to disrupt planning and operations

• The AF's next generation “bomber” answers these requirements by projecting power without projecting undue vulnerability

*It’s not a question of “if” we are going to have to project power at range into highly defended regions, it’s simply a matter of asking “when”*
Strategic Guidance

• Current US national security policy documents prioritize multiple attributes afforded by long range strike—key themes:
  • Maintain safe, secure, and effective nuclear deterrent
  • Provide stabilizing presence in key regions
  • Guarantee access to the commons
  • Deterring aggression in times of peace and decisively defeating wartime aggression
  • Preserve the ability to project power despite A2/AD efforts
  • Maneuver directly against key objectives from long range
  • Project effective power, not vulnerability and liability

The best way to hedge against an overt military competition...
• First, we have to overmatch any potential competitor in the military technical realm.
• Second, we have to maintain the ability to project power across transoceanic distances and defeat any competitor's attempt to project power over intra or inter-theater ranges.
• And third, we have to routinely demonstrate both our technical capabilities, as well as our operational capabilities.

Without these three fundamental things, our conventional deterrence posture will be less effective, our overseas alliances and partnerships will be weakened, and crisis stability will be undermined.

The Imperative: A2/AD

- Operations in forward locations requires access to ports, airfields, airspace, and sea lanes
- A2/AD seeks to hold these elements at risk—thereby pushing American airpower out to a range from which it cannot operate effectively
  - **Ballistic and cruise missiles** target airfields, ports, command and control hubs, logistics, and ships
  - **Weapons of mass destruction** risk catastrophic destruction of forward locations and ships
  - **Surface-to-air missiles** with ranges extending hundreds of miles are increasing in lethality
  - **Mobile, hardened, and deeply buried targets** are difficult to locate, target, and eliminate
  - **Cyber attacks** threaten everything from command and control to planning and logistics coordination
  - **Standoff munitions are** increasingly less survivable unless designed to incorporate stealth

*The only thing more expensive than a first rate Air Force, is a second rate AF...*
The Imperative: Range

• Long-range strike (LRS) projection tools are only effective if they can reach their desired objectives
  • LRS affords access to a wide variety of bases—even conducting global missions from the US
  • Shortens logistics supply lines and vulnerability
  • Fewer tanker requirements
  • Keeps bases outside enemy threat projection reach
  • Circumvents political base access challenges
  • Reduces forward operating location defense
  • Vastly complicates enemy’s A2/AD calculus and imposes significant defensive costs
  • Able to swing on a between theaters in hours
  • Can reach enemy targets in depth

<table>
<thead>
<tr>
<th>Year</th>
<th>Mission</th>
<th>Aircraft</th>
<th>Range</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1972</td>
<td>Linebacker II—Guam to North Vietnam</td>
<td>B-52</td>
<td>8,200 mile round trip</td>
<td>18 hr round trip</td>
</tr>
<tr>
<td>1982</td>
<td>Falklands War—Ascension Island to Falklands</td>
<td>Vulcan</td>
<td>7,900 mile round trip</td>
<td>16 hr round trip</td>
</tr>
<tr>
<td>1991</td>
<td>Desert Storm—Barksdale AFB, LA to Iraq</td>
<td>B-52</td>
<td>14,000 mile round trip</td>
<td>35 hr round trip</td>
</tr>
<tr>
<td>1999</td>
<td>Operation Allied Force—Whitman AFB, MO to Serbia</td>
<td>B-2</td>
<td>11,000 mile round trip</td>
<td>30 hr round trip</td>
</tr>
<tr>
<td>2003</td>
<td>Operation Enduring Freedom—Whitman AFB, MO to Afghanistan</td>
<td>B-2</td>
<td>20,000+ mile round trip</td>
<td>74 hr round trip—exchanged flight crew in Diego Garcia</td>
</tr>
<tr>
<td>2011</td>
<td>Odyssey Dawn—Whitman AFB, MO to Libya</td>
<td>B-2</td>
<td>11,418 mile round trip</td>
<td>25 hr round trip</td>
</tr>
<tr>
<td>2011</td>
<td>Odyssey Dawn—Ellsworth AFB, SD to Libya</td>
<td>B-1</td>
<td>12,000 mile round trip</td>
<td>Rearmed, struck additional targets, and returned to SD</td>
</tr>
</tbody>
</table>
Modern defense requirements demand range—it’s simply a matter of geography
The Imperative: Payload

Comparative Fighter and Bomber Payloads

Long range strike aircraft might have a sizable up-front per-tail acquisition cost, but their unrivaled capacity and capability drives massive long term savings when calculated from an operational lifecycle perspective.
The Imperative: Sustained Operations

- While stand-off munitions afford certain benefits, their high per-unit cost combined with their single mission lifespan makes them exceedingly expensive when used in volumes required over a multi-day period.
  - Beyond 22 days of operations, firing 12 cruise missiles per day cost more than procuring a long range strike aircraft.
  - Long range strike aircraft can be reused and their munitions are comparatively inexpensive.

30-Year Costs (NPV) by Total Days of Conflict

Assumptions:
- Total life cycle cost of bomber (procurement plus O&S)
- Cost to procure cruise missiles
- Cruise missile launch vehicle costs not included

Source: Thomas Hamilton, Comparing the Cost of Penetrating Bombers to Expendable Missiles Over Thirty Years (RAND Corporation), WR-778-AX, 2016
Reusable (Bomber) Versus Expendable (Stand-off) Costs and Historical Conflicts

The Imperative: Versatility—Rapid Response

- Long-range aircraft can be anywhere over the world from the continental United States in less than 24 hours—no other kinetic system provides that capability.

  - **Fighters take days**
    - It’s not just a matter the aircraft, must also deploy support personnel, munitions, arrange forward operating locations, etc.
  
  - **Ships take weeks to month**
    - Norfolk, VA, to the Eastern Mediterranean Sea at 28 knots, takes 8.3 days
    - Norfolk, VA, to the Persian Gulf via the Suez Canal at 28 knots, takes 12.8 days
    - USNS Mercy took 32 days from San Diego to Indonesia for Operation Unified Assistance
  
  - **Divisions take months**
    - Took 6 months to preposition necessary ground forces for Operation Desert Storm
The Imperative: Versatility—Nuclear Deterrence

- Nuclear deterrence isn’t an obsolete Cold War concept
  - Proliferation demands continued nuclear deterrence
  - Allies depend on the US nuclear deterrent umbrella
  - Current Administration desire to draw-down nuclear capabilities is not matched by competing nations
  - Russia, China, and other nations are spending significant sums modernizing their nuclear enterprises
- The long range strike aircraft is a core facet of the triad, with the 2010 nuclear Posture Review Report declaring:
  
  “Unlike ICBMs and SLBMs, nuclear-capable bombers can be visibly forward deployed, thereby signaling US resolve and commitment in crisis.”

- The long range strike leg of the triad resides upon the 1950’s era B-52 fleet and a handful of B-2s
  - Sustaining a credible capability requires a new aircraft

B-52s worked for President Eisenhower, but 21st century demands require a new long-range, nuclear capable aircraft