Red China’s “Capitalist Bomb”: Inside the Chinese Neutron Bomb Program

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The Puzzles

Puzzle: Why did China develop a neutron bomb but not deploy it?

- Definition of neutron bomb or enhanced radiation weapon (ERW)
- Declassified intelligence reports and Chinese statements indicate program was active from 1977 to 1988, but give no evidence of deployment
- Current literature is limited to speculation

Other puzzles: The program’s characteristics and timing pose additional questions.

Why did China:

- Develop a weapon contrary to its doctrine?
- Choose an expensive weapon when “the country was broke”?
- Pause testing from 1984 to 1988 after a rapid series of nuclear tests?
Research Methodology

Sources:
• Memoirs of key personnel
• Press reports
• Technical articles

**Key Leaders**
- Deng Xiaoping (邓小平)
- Zhang Aiping (张爱萍)

**Key Personnel**
- Zhu Guangya (朱光亚)
- Zhou Guangzhao (周光召)
- Deng Jiaxian (邓稼先)
- Yu Min (于敏)
- He Xiantu (贺贤土)

**Political Structure of ERW Development 1977 - 1988**
- Central Committee
- Politburo
- State Council
- Central Special Commission (CSC)
- Central Military Commission
- Science & Technology Equipment Committee
- National Defense Science and Technology Commission (NDSTC)
- Second Ministry of Machine Building
- Ninth Academy
- Ministry of Nuclear Industry
- China Academy of Engineering Physics (CAEP)
Case Study & Analytical Framework

Variables to consider in each phase:

- Strategic Environment of PRC
- Strategic Value of ERW
- Normative Value of ERW
- Technical Feasibility of ERW
- Resource Demands of ERW
- Coalition Politics

|--------------------------------------|---------------------------------|------------------------------------------|----------------------------------------|

1977-1980: Decision & Initial Research

1980-1984: Developing & Testing

1985-1988: Reevaluation before Completion

1989-1996: Last Round of Modernization
June 1977: Carter Administration and the ERW controversy
July 1977: Deng returns to power
Soviet-Chinese media war
September 1977: General Zhang breaks silence with... a poem
1977 – 1979: Weaponeers’ initial research, resistance, and acquiescence

Decision and Initial Research:
“What others have already done, we also must do.” – Deng Xiaoping

1977 – 1979

Steel alloys are not strong, and Neutron bombs are not difficult. When heroes study the sciences intensely, They can storm all earth’s strategic passes.

General Zhang Aiping in People’s Daily, September 21, 1977

DF-5 ICBMs
• Soviet aggression, and PRC military doctrine changes
• Zhang Aiping’s rise in power
• French ERW program
• Weaponeers’ “principles” approach
  - Combined miniaturization & ERW research programs
  - Phased approach for “principles”
  - December 1984 “principles breakthrough” test

Development and Testing:
“The second generation of light boats has passed the bridge”

1980 – 1984
• Deng Xiaoping’s more relaxed strategic outlook
  o Improved Sino-Soviet relations and reduced military spending
  o New retirement policy neutralizes ERW proponents
  o Soviet-U.S. moratorium on nuclear testing

• Weaponeers without a patron or mission
  o Deng Jiaxian and other weaponeers warn of test ban treaty constraining China’s nuclear force modernization
  o Tests on June 5, 1987 (DF-5 warhead?) and on September 29, 1988 for the neutron bomb

• Adding the neutron bomb to “technology reserve”
• Early 1989: Xue Bencheng, Chief Engineer for ERW and miniaturization, led a small group that “put forth a conceptual design for a new type of nuclear device, whose performance should meet the most advanced international standards.”

• 1990 – 1996: Eleven nuclear tests to finalize warhead designs in advance of CTBT

• Xue emphasized the program’s limited resources and delicate calculations. He called this effort “climbing the precipice (爬陡坡)”
Analysis and Implications for Today

What strands produced the outcome of ERW development without deployment, and to what extent do they apply today?

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<tbody>
<tr>
<td><strong>Strategic Environment of PRC</strong></td>
<td>Very tense</td>
<td>Very tense</td>
<td>Relaxed</td>
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<tr>
<td><strong>Strategic value of the ERW</strong></td>
<td>Debated</td>
<td>High</td>
<td>Low</td>
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<td><strong>Normative value of the ERW</strong></td>
<td>Very positive</td>
<td>Positive but debated</td>
<td>Negative</td>
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<td><strong>Resource Demands</strong></td>
<td>High and disruptive</td>
<td>Lowered by synergy with miniaturization program</td>
<td>Low demands to complete design, but high for production</td>
</tr>
<tr>
<td><strong>Technological Feasibility</strong></td>
<td>Very difficult</td>
<td>Feasible to master principles</td>
<td>Feasible to complete design</td>
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<tr>
<td><strong>ERW Coalition Status</strong></td>
<td>Strong</td>
<td>Very strong</td>
<td>None</td>
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PRC’s Current Systems under Development

How does the analytical framework support help today’s analyses? Is the “technology reserve” model applicable?

• Ballistic Missile Defense
  o Driver(s): China’s stance “evolved” from criticism to developing countermeasures to developing its own systems
  o Considerations: BMD on slow development path, but susceptible to changes in technology & security environment

• Anti-Satellite Weapons
  o Driver(s): U.S. reliance on space assets; A2/AD strategies
  o Considerations: Norms, and alternative “soft-kill” technologies.

• Hypersonic Weapons
  o Driver(s): Matching U.S. capabilities; prestige for new system
  o Considerations: Technological feasibility and media coverage
Key Takeaways:

• Hard to prove a negative, but sound methodology and analysis can increase confidence in assessments.
• The “technology reserve” model and this analytical framework can contribute to assessments of weapons programs and decision-making.
• Need updated discussions on open-source and online research techniques for Chinese defense and security issues.
Thank you for your time & feedback!

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Toward a Model: Chinese Decision-making on Weapons Development

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<th>BMD</th>
<th>ASAT</th>
<th>HGV</th>
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<tr>
<td><strong>Strategic Environment</strong></td>
<td>Small nuclear arsenal</td>
<td>A2/AD strategy</td>
<td>Tactical and strategic value</td>
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<tr>
<td><strong>Strategic Value</strong></td>
<td>From penetration aids to making own system</td>
<td>High</td>
<td>High but question of substitutes</td>
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<tr>
<td><strong>Normative Value</strong></td>
<td>Increased in 1980s</td>
<td>Question of debris</td>
<td>Potentially high—transition to proactive stance</td>
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<tr>
<td><strong>Resource Demands/ Tech Feasibility</strong></td>
<td>Moderate funding</td>
<td>Low – easy to use BMD technology</td>
<td>Potentially high</td>
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<tr>
<td><strong>Coalition?</strong></td>
<td>Research needed</td>
<td>Research needed</td>
<td>Research needed</td>
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<tr>
<td><strong>Tech reserve?</strong></td>
<td>Possible</td>
<td>Unknown</td>
<td>Unlikely</td>
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