Red China's "Capitalist Bomb": Inside the Chinese Neutron Bomb Program

Jonathan Ray

Research Associate

Defense Group Inc.

The Puzzles

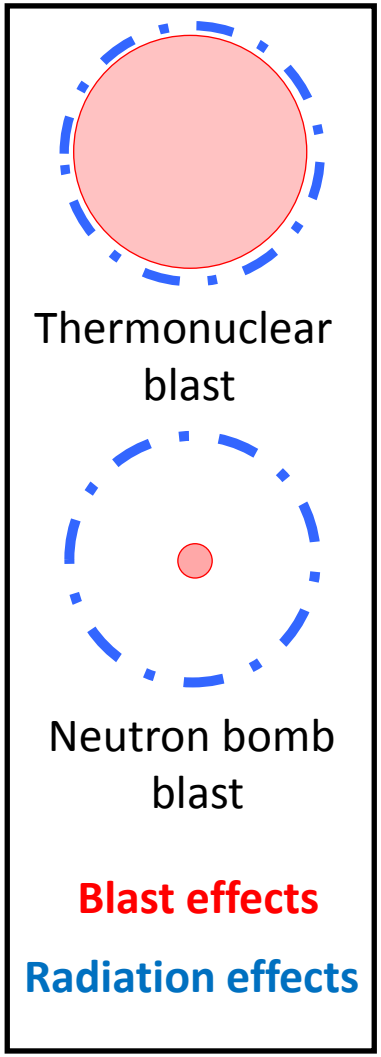
Puzzle: Why did China develop a neutron bomb but not deploy it?

- 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)

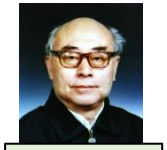
Zhang Aiping
(张爱萍)

Key Personnel

Zhu Guangya
(朱光亚)

Zhou Guangzhao
(周光召)

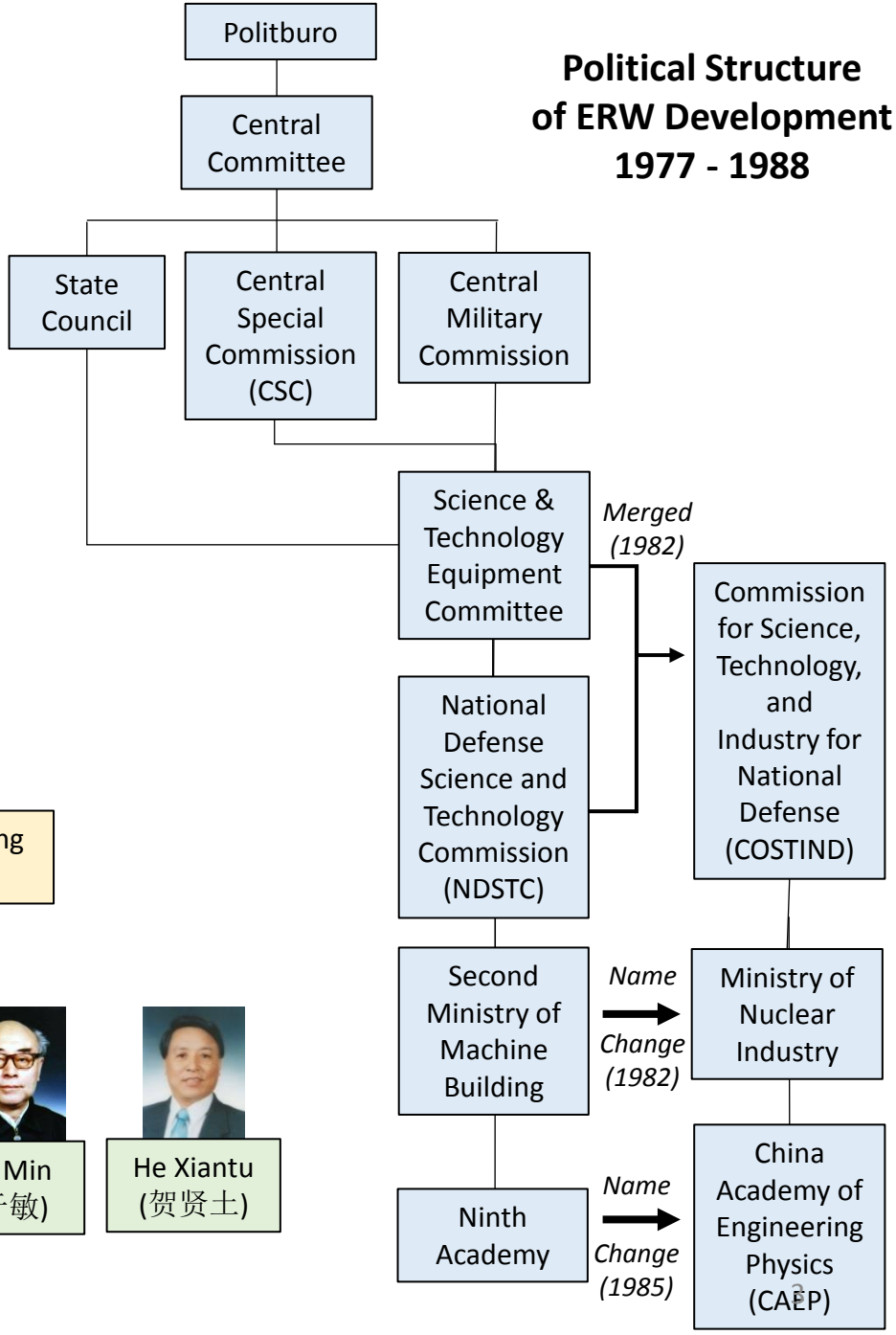
Deng Jiaxian
(邓稼先)



Yu Min
(于敏)

He Xiantu
(贺贤土)

Political Structure of ERW Development 1977 - 1988



Case Study & Analytical Framework

1977-1980:	1980-1984:	1985-1988:	1989-1996:
Decision & Initial Research	Developing & Testing	Reevaluation before Completion	Last Round of Modernization

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

Decision and Initial Research:

"What others have already done, we also must do." – Deng Xiaoping

1977 – 1979

- 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

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

Development and Testing:

"The second generation of light boats has passed the bridge"

1980 – 1984

- 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

Reevaluation before Completion:

"Does China need the neutron bomb?"

1985 – 1988

- Deng Xiaoping's more relaxed strategic outlook
  - Improved Sino-Soviet relations and reduced military spending
  - New retirement policy neutralizes ERW proponents
  - Soviet-U.S. moratorium on nuclear testing
- Weaponeers without a patron or mission
  - Deng Jiaxian and other weaponeers warn of test ban treaty constraining China's nuclear force modernization
  - Tests on June 5, 1987 (DF-5 warhead?) and on September 29, 1988 for the neutron bomb
- Adding the neutron bomb to "technology reserve"

Last Round of Modernization:

"Climbing the precipice"

1989 – 1996

- 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?

	1977 – 1979	1980 – 1984	1985 – 1988
Strategic Environment of PRC	Very tense	Very tense	Relaxed
Strategic value of the ERW	Debated	High	Low
Normative value of the ERW	Very positive	Positive but debated	Negative
Resource Demands	High and disruptive	Lowered by synergy with miniaturization program	Low demands to complete design, but high for production
Technological Feasibility	Very difficult	Feasible to master principles	Feasible to complete design
ERW Coalition Status	Strong	Very strong	None

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
  - Driver(s): China's stance "evolved" from criticism to developing countermeasures to developing its own systems
  - Considerations: BMD on slow development path, but susceptible to changes in technology & security environment
- Anti-Satellite Weapons
  - Driver(s): U.S. reliance on space assets; A2/AD strategies
  - Considerations: Norms, and alternative "soft-kill" technologies.
- Hypersonic Weapons
  - Driver(s): Matching U.S. capabilities; prestige for new system
  - 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!

Jonathan Ray
jonathan.ray@defensegp.com
@whereisjray

Toward a Model: Chinese Decision-making on Weapons Development

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