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Experience, Paradigms, and Generalship in Rolling Thunder: Implications for Today

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Prominent airpower scholars have argued that United States Air Force (USAF) leaders misapplied World War II experience and the airpower doctrine derived from it when devising and executing Vietnam War air strategy. This paper will challenge that view by arguing that the USAF generals who conducted the Rolling Thunder campaign against North Vietnam were not mere captives of their World War II experience or doctrine. Those commanders understood that North Vietnam was a very different enemy than World War II Germany or Japan, and realized that a different air strategy was needed. They used World War II as a point of reference, but were not confined to that war's airpower employment paradigm. Similarly, today's Air Force leaders are not locked into a single airpower paradigm based on past own experiences or present doctrine.

American involvement in Vietnam lasted many years; but that war's first sustained bombing campaign is a good place to seek evidence of how World War II experience influenced Vietnam War air strategy. The Rolling Thunder campaign of 1965 - 1968 was primarily an aerial interdiction effort mixed with strategic attacks. According to a contemporary USAF report, "The overall objective of the air campaign was to reduce, to the maximum extent feasible, NVN's [North Vietnam's] capability to support and direct the insurgency in SEA [Southeast Asia]." ¹ Specific components of the overall air objective were, "To apply steadily increasing pressure against North Vietnam to cause Hanoi to cease its aggression in South Vietnam" and to "[m]ake continued support of the Viet Cong insurgency as difficult and costly as possible." ² While pursuing these objectives, President Lyndon Johnson and Secretary of Defense Robert McNamara maintained tight control over the campaign and mandated a "graduated" strategy of slowly escalating air attacks. Air Force generals thought that World War II experiences showed that an abrupt, overwhelming bombing effort would be more effective than a graduated strategy, but they followed the Johnson Administration's instructions. Some scholars contend that USAF leaders inappropriately tried to apply doctrinal concepts optimized for total war against advanced, industrialized nations to a limited war against a primitive, non-industrialized North Vietnam.

Criticisms of USAF Vietnam War Generalship

Dr. Earl Tilford, a retired USAF officer who served in Southeast Asia, has criticized the way the USAF applied World War II experience to Vietnam. After noting that most senior USAF officers in 1965 had served during World War II, Tilford wrote, “air power enthusiasts clung to their notions of the decisive impact of strategic bombing and advocated its use on North Vietnam.”³ Tilford thought that USAF doctrine’s traditional emphasis on strategic bombing had, “led Air Force leaders to believe that North Vietnam, a preindustrial, agricultural nation, could be subdued by the same kind of bombing that helped defeat industrialized nations like Nazi Germany and Imperial Japan. . . . Instead of operating within parameters of a limited war, air power leaders sought to refight World War II – a conflict for which the doctrine of strategic bombardment was better suited.”⁴

Dr. Mark Clodfelter, another retired USAF officer, has written that Vietnam War air commanders “relied on experience to guide Vietnam planning. In fashioning an offensive against North Vietnam, they turned to the perceived lessons of World War II strategic bombing.”⁵ Clodfelter added, “Foremost among the military limitations [on Rolling Thunder’s effectiveness] was Air Force strategic bombing doctrine. As a result of Air Corps Tactical School instruction, World War II experience, and postwar planning, that doctrine stressed destroying an enemy’s capability to fight through attacks on its economic vital centers. . . . The major belligerents in World War II had relied extensively on their industrial might to wage war.” Clodfelter explained that US air leaders “realized that the North [Vietnam] possessed a meager industrial base,” but the commanders still “designed a campaign to wreck North Vietnam’s industrial capacity.”⁶

Many people accept the Tilford and Clodfelter critiques, but demonstrating how USAF generals applied World War II experience to Vietnam War campaigns like Rolling Thunder is a complex undertaking. Aerial operations in those two wars involved different enemies, political goals, and technologies, but World War II experience presumably influenced senior officers’ ideas to some degree. However, that influence might manifest itself in various ways, some of which would be hard to prove. When the USAF was established in 1947, the service accepted World War II as a model or “paradigm” of how strategic bombing and interdiction should be used during war. Air Force members were subsequently trained to view that war as a valid example of how to apply airpower to achieve military goals. Previous experience and training influence a military leader’s response to new problems, but the influence can be either helpful or harmful depending on how the leader adapts them to new situations. Prevailing attitudes within an organization also affect the way leaders interpret experience. Air Force doctrine in the mid 1960s reflected the service’s experience, training, and attitudes. The challenge is to explain how these intangible factors influenced the service’s approach to Rolling Thunder.

Three USAF Generals Discuss World War II and Rolling Thunder

One way to gain insight into the issue is to study USAF generals involved in the campaign. Some men who had served as relatively junior officers in World War II later became USAF generals during Rolling Thunder. To illustrate the way these officers related their World War II backgrounds to the Vietnam War, this paper will draw evidence from contemporary comments three USAF generals made about the relationship between those wars. The three generals are USAF Chief of Staff General John P. McConnell, 7th Air Force Commander General William W. Momyer, and 7th Air Force Vice Commander Major General Gilbert L. Meyers. All three were

World War II veterans who held positions of authority during Rolling Thunder and presumably represented the views of senior USAF officers of that time.⁷

Airpower contributed significantly to American victory in World War II, but successfully applying airpower experience from that war to subsequent limited wars required USAF leaders like Generals McConnell, Momyer, and Meyers to use careful judgment. Virtually unrestricted strategic bombing and aerial interdiction against industrial and transportation facilities were important American airpower roles during World War II. The military effectiveness of World War II strategic bombing campaigns such as the Combined Bomber Offensive against Germany and aerial interdiction campaigns such as Operation Strangle in Italy remains controversial even today, but most contemporary air leaders deemed them to have been successful. Strategic bombing and interdiction also figured prominently in American air operations during the Korean War, but political limitations imposed on airpower – especially strategic bombing – complicated USAF attempts to judge airpower effectiveness in that war. Korean War experiences did not displace the Air Force's consensus view that World War II had demonstrated bombing's potential. When called upon to apply airpower in another limited war against North Vietnam, USAF generals drew upon a mixture of experience, training, and doctrine.

The criticisms Drs. Tilford and Clodfelter made about USAF air strategy in Vietnam revolve around the way military leaders integrate experience and doctrine when responding to new situations. Two generalizations emerge from these scholars' comments. First, both scholars correctly emphasized the importance of strategic bombing in Vietnam War era USAF doctrine, but understated the service's actual interest in aerial interdiction. Strategic bombing of an enemy nation's industrial system was popular in the USAF partly because the service could perform it independently of the Army or Navy. Such a potentially decisive independent function helped to justify an independent air force. However, strategic bombing did not monopolize initial USAF thinking about North Vietnam. Rolling Thunder was primarily an interdiction effort. In 1964, as the US military contemplated war against the North, the Joint Chiefs of Staff (JCS) drew up a list of 94 key targets to be struck in a rapid air campaign. The 94-target list included North Vietnam's few traditional industrial targets, but placed heavy emphasis on aerial interdiction. Most interdiction was to be conducted by flying armed reconnaissance missions that attacked enemy vehicles seen traveling along North Vietnamese transportation routes. The list included 8 industrial facilities, but 32 transportation nodes. Another 30 targets related to fuel, ammunition, and military supplies were also arguably related to interdiction.⁸ The USAF helped create the JCS list and advocated attacking all listed targets during Rolling Thunder, but President Johnson and Secretary McNamara rejected that advice in favor of their graduated strategy.

Second, Tilford and Clodfelter perceived a linkage between experience, doctrine, and strategy, but overemphasized the importance of doctrine. They noted that strategic bombing doctrine predated World War II, but contended that the USAF thought World War II had validated a doctrine that then adversely affected Vietnam War air strategy. The World War II experience Tilford and Clodfelter were talking about was a collective Air Force memory and interpretation of aerial operations, not just the personal experiences of specific officers. Previous experience does influence doctrine, which in turn influences strategy, but doctrine is only one potential medium through which experience shapes strategy. Doctrine manuals are codified written documents, but commanders did not necessarily follow or even read them. Traditionally, the Air

Force has not emphasized doctrine as heavily as other services such as the Army. Tilford lamented a “decreased intellectual acumen” among USAF leaders.⁹ If those leaders were not intellectually inclined, they may not have spent much time reading or thinking about doctrine manuals.

Published doctrine, with its strategic bombing focus, did influence USAF commanders during Rolling Thunder, but unwritten personal experiences and consensus views fellow airmen held about how to conduct aerial warfare were also influential. World War II established a paradigm for US airmen. Official doctrine reflected that paradigm in part, but the paradigm operated at a deeper level than doctrine. Definitively separating the influences of experience, doctrine, and paradigms is probably impossible, but Generals McConnell, Momyer, and Meyers did make comments that reflected their thoughts. Their comments suggest that they used their own personal judgment – shaped by the tension between prevailing airpower beliefs and the operational restrictions President Johnson imposed on air operations - when deciding how best to apply airpower against North Vietnam.

General John McConnell, Air Force Chief of Staff from 1965 to 1969, was the Air Force’s senior ranking officer throughout Rolling Thunder. As a member of the Joint Chiefs of Staff, he viewed Vietnam events from a broad perspective. A 1932 West Point graduate, he was highly experienced, yet once remarked during US Senate testimony, “My experience is limited to World War II and the Korean War.”¹⁰ Most of his World War II experience was in air training units, but he also served in various capacities with the Third Tactical Air Force in India, Ceylon, and China. He served in Europe and at Strategic Air Command Headquarters during the Korean War.¹¹

McConnell accepted World War II as a proper model for conducting warfare, but saw fundamental differences between that war and the events in Vietnam. He recognized the limited nature of American war aims in Southeast Asia and did not advocate World War II – style strategic bombing. During Rolling Thunder, a Senate subcommittee called McConnell to testify. When Senator Stuart Symington of Missouri, the first Secretary of the Air Force, asked him to compare Vietnam War air strategy to that used for other wars, McConnell replied, “Our objectives [in Vietnam] are different. We had no inhibitions at all in destroying Germany.”¹² During a 1970 official interview, he drew an even sharper distinction between World War II and Vietnam when he said, “Well, any war, if you’re fighting a war, should be fought like it was in World War II...But this [Vietnam] is not a war. This is a sort of political action.”¹³

General McConnell also commented about Rolling Thunder interdiction operations. When asked in 1967 about aerial interdiction’s ability to cut North Vietnamese war material imports through railroads and seaports, he told the US Senate, “I think it is possible for us to very greatly reduce them. I don’t think it is possible for us to stop them entirely, because we have demonstrated that you can’t do that. It wasn’t possible to interdict completely the enemy lines of communication during World War II when we didn’t have any restrictions at all.”¹⁴

McConnell’s remarks show a clear understanding that strategic bombing and interdiction would not achieve American goals in Vietnam just because airpower had performed those roles

successfully in World War II. In fact, he was cognizant both of airpower's inherent limitations and of Rolling Thunder's limited nature.

General William Momyer, 7th AF commander in South Vietnam from July 1966 to August 1968, supervised USAF operations in Southeast Asia during most of Rolling Thunder. A World War II veteran who had served as a fighter group commander in North Africa and Italy from 1942 to 1944, Momyer spent the rest of that war as Chief of the Army Air Forces Board for Combined Operations. He served as an Air War College faculty member during the Korean War.¹⁵

Like Gen. McConnell, Gen. Momyer simultaneously viewed World War II as a prime example of airpower application and recognized that North Vietnam required a different air strategy. Momyer noted that he "didn't participate in the combined bomber offensive against Germany or the B-29 offensive against Japan."¹⁶ Possibly reflecting his World War II experience, he said more about interdiction than strategic bombing when he did discuss Vietnam in relation to World War II. For example, during Senate testimony while Rolling Thunder was in progress, he noted that aerial interdiction in Vietnam was difficult because, "It is not like it was in Germany when the war resources were being fabricated in the country. ...you don't have the kind of formalized engagements in South Vietnam as you had in Italy, or in Europe, or even as you had in Korea."¹⁷ The World War II strategic bombing emphasized in USAF doctrine was supposed to curtail "war resources...being fabricated in the country," but Momyer concentrated on interdicting the movement of North Vietnamese war resources to South Vietnam. He did not seem troubled by Rolling Thunder's modest strategic bombing content. When asked during Senate testimony about the North Vietnamese targets approved for attack in 1967, he told the Senate, "I have heard no dissatisfaction with the target system that the pilots are currently hitting."¹⁸

General Momyer understood how the limited nature of Rolling Thunder operations affected interdiction effectiveness. When Senator Howard Cannon of Nevada asked him how the Johnson Administration's operational restrictions affected the campaign, Momyer explained that armed reconnaissance was only moderately effective because, "you cannot exploit your [armed] Recce to the same extent you could in World War II and Korea."¹⁹ Referring to the 1966 air situation, Momyer later wrote, "...other senior airmen and I believed that airpower was beginning to affect the enemy's [North Vietnam's] logistical system as it had in Korea. We did not believe, however, that our airpower could be as effective as it had been in World War II unless we were authorized to strike the full range of interdiction targets."²⁰ Evidently, Momyer deemed interdiction an appropriate part of Rolling Thunder, but acknowledged that limitations imposed on its conduct would limit the results attained.

Major General Gilbert L. Meyers, the final officer to be discussed, served as 7th Air Force deputy commander during the first year and a half of Rolling Thunder from April 1965 to August 1966.²¹ He served as General Momyer's deputy for about one month. Like Momyer, Meyers had more prior experience with fighters than bombers. During World War II, he had served in Europe as a fighter group commander and then as IX Tactical Air Command director of operations. During the Korean War, he had served as 5th Air Force Director of Operations for about two years.²²

Like General McConnell, General Meyers doubted air operations against North Vietnam even qualified as a war. When Senator Symington remarked to him, “General Meyers, the truth, is that from the standpoint of any military application of real airpower as you knew it say in World War II, we have, in effect been ‘playing house’ out there in North Vietnam, haven’t we?” Meyers replied, “Yes, sir, that’s my feeling.”²³

A believer in aerial interdiction, Meyers seemed to think interdiction in North Vietnam could achieve strategic results. In 1967, he told the Senate, “Interdiction of course is a very vital and very necessary part of any ground campaign. It was used very effectively in World War II and again in Korea.”²⁴ He specifically urged closing North Vietnam’s Haiphong harbor since, “This port represents to North Vietnam what the industrial capacity of Germany and Japan represented to them during the World War II time period.”²⁵ President Johnson resisted recommendations to close Haiphong. Far from advocating strategic bombing against North Vietnamese industry, Meyers’ remark implied that interdiction might properly take the place of World War II – style strategic bombing of key economic facilities.

Like McConnell and Momyer, Meyers clearly distinguished between World War II and Rolling Thunder air operations. Meyers told a Senate subcommittee in 1967 that, “I don’t think it is fair to compare tonnages of bombs [dropped on North Vietnam]...in comparison to other wars that we have fought, because the target complex and the environment in which we are operating is entirely different, and they are not comparable in any way.”²⁶ Reflecting his interdiction focus, he said during a 1970 interview,

Now the concept of an interdiction...was really created in World War II, and it was done on a definite time limitation basis only. You didn’t really try to interdict a country for an indefinite period of time because it can’t be done. For example, at the time of the invasion of Normandy, they picked bridges along the Seine and Loire river[s], and we knocked them down. In other words, we were going to try to isolate that section of France so that the Germans couldn’t bring reinforcements in until we were firmly established ashore. ...[Interdiction] is predicated on over-running the territory, taking it after some determinate period of time. You couldn’t run an interdiction program...from England and keep all the Germans out of Normandy...indefinitely because no interdiction program is that effective. ...So that the concept of interdiction as it was applied in Vietnam was really not a valid *military* concept to start with because there was no limit – we never intended to take the territory.²⁷

Meyers did not say Rolling Thunder should emulate the World War model of airpower application. Instead, he consistently contrasted the two wars.

Generals McConnell, Momyer, and Meyers all made comments suggesting they shared a common airpower vision, but it was not the doctrine-oriented strategic bombing vision Tilford and Clodfelter have articulated. Presumably, the generals made comments relating published USAF doctrine to World War II and Rolling Thunder, but the author has not found them. Judging from the known references those men made to World War II, the generals demonstrated a flexible application of experience to the situation they faced in North Vietnam. Air Force

doctrine may have emphasized strategic bombing, but the generals proved quite willing to draw upon a broader spectrum of World War II experience – particularly in terms of aerial interdiction. They consistently cited World War II as a prime example of an air war, but they did not exclusively advocate World War II – style strategic bombing as the way to achieve limited US war aims against North Vietnam. Some explanation beyond doctrine is needed to account for the generals' remarks.

Paradigms and Rolling Thunder Generalship

This paper has already postulated the existence of a USAF paradigm, based on World War II airpower experience, which served as a model of how to conduct air warfare. Tilford and Clodfelter blamed the USAF's Rolling Thunder failings on official doctrine that had been based on World War II strategic bombing experience. Doctrine might reflect an underlying paradigm, but the two concepts are not identical. The existence of a paradigm could *partially* explain how Generals McConnell, Momyer, and Meyers applied World War II experience to Rolling Thunder. However, those men were not captives of a paradigm any more than they were captives of doctrine.

The paradigm concept is associated with the work of Thomas Kuhn. When he wrote *The Structure of Scientific Revolutions*, Kuhn was thinking about scientific paradigms, not military ones, but his thoughts about paradigms guiding the way groups of people think have gained wide circulation. Kuhn defined scientific paradigms as “universally recognized scientific achievements that for a time provide model problems and solutions to a community of practitioners,”²⁸ and he listed Newtonian physics and Copernican astronomy as examples. If paradigms also guide military thinking, then perhaps they can help explain how USAF generals conceptualized Rolling Thunder.

Air Force generals are usually not scientists, but some of Kuhn's key points are applicable to military thought. Adopting Kuhn's parlance, one could say that World War II was a universally recognized military achievement that served as a model demonstrating that strategic bombing and interdiction were two components of a viable solution to military problems, and that Air Force professionals constituted a “community of practitioners.”

Kuhn's ideas need adjustment to adapt them to the military context. In place of scientific theories, the USAF had air power theory and doctrine. The theory and doctrine that emerged from World War II held that strategic bombing of an enemy nation's vital centers, supplemented by ancillary air power roles such as aerial interdiction and close air support, was a potent method of winning wars. Successful bombing would be recognized by physical destruction of enemy transportation infrastructure and industrial plants, which would lead to economic disruption and military paralysis as bombing disorganized the enemy nation's internal functions. Unrestricted bombing would ultimately induce enemy surrender, but less intense applications would yield proportionally lesser political results. Among air power practitioners, the most zealous believed that bombing could win wars independently of land or sea forces (especially if nuclear bombs were used), but others granted the Army and Navy a larger role. Strategic bombing theory and doctrine reflected an underlying paradigm, the validity of which the Air Force trusted.

The USAF paradigm was based on World War II because most senior officers had fought during that war and the war had been a clear victory. General Meyers was also a Korean War veteran and drew analogies from that experience, but Korea seemed more an aberration than a model problem or solution. World War II filled the need for a successful example of what relatively unfettered strategic bombing and interdiction could achieve, and served as a model for developing solutions to other military problems.

Based on their professional experience, Air Force generals during Rolling Thunder believed bombing was a quick and efficient way to achieve military objectives, but doubted the Johnson Administration's unproven graduated bombing policy was a valid alternative model. Just after retiring in 1969, Chief of Staff Gen. McConnell told an interviewer, "I don't think Mr. McNamara understood air power or its application very well. ...In fact, I don't think that there was at that time anybody in the Office of the Secretary of Defense who understood the application of tactical and strategic air power. At least, not the way I understood it."²⁹ McConnell may have regarded McNamara as an uninitiated interloper who failed to appreciate the air power paradigm.

McConnell's comment also hinted that rational analysis of past wars was not the only reason why Air Force leaders adhered to their existing airpower ideas. Kuhn explained how new paradigms gain support only if they "appeal to the individual's sense of the appropriate or the aesthetic – the new theory is said to be 'neater,' 'more suitable,' or 'simpler' than the old."³⁰ Bombing in the World War II style seemed neater, more suitable, and simpler than the Johnson Administration's bombing ideas. Commanders acquiesced in administration strategy, but doubted its validity.

Other theoretical factors contributed to the Air Force's generals' doubts about the Johnson Administration's Rolling Thunder strategy. Kuhn thought that when practitioners encounter anomalous situations, they first try to explain them in terms of the prevailing paradigm. A crisis can develop when the old paradigm proves unable to solve new problems, but Kuhn thought that communities of practitioners would not easily relinquish existing paradigms because "once it has achieved the status of paradigm, a scientific theory is declared invalid only if an alternate candidate is available to take its place." He pointed out that practitioners who do switch to a new paradigm must "have faith that the new paradigm will succeed with the many large problems that confront it, knowing only that the older paradigm has failed with a few. A decision of this kind can only be made on faith." Such a paradigm switch constitutes a scientific revolution. He extended his analysis to encompass political revolutions, but not drastic changes in military worldviews.³¹

Rolling Thunder seemed strange to USAF professionals, but the campaign did not meet Kuhn's definition of an anomaly capable of challenging an established paradigm. When the generals applied their paradigm to Rolling Thunder, the campaign's mediocre results did not seem anomalous to them, but instead seemed perfectly consistent with the accepted idea that strategic bombing and interdiction were effective air war ingredients provided they were conducted vigorously instead of being artificially restricted. The existing paradigm neither broke down under stress from anomalous events nor did anyone propose an alternative the community of practitioners deemed viable. The existing paradigm derived from World War II demanded a

nearly unrestricted and overwhelming bombing campaign. The Johnson Administration's refusal to sanction such strong measures prompted the generals to deny the Vietnam War was really a war or that Rolling Thunder was a valid test of their paradigm.

Kuhn's paradigm concept does not fully explain Air Force generals' application of World War II experience to Rolling Thunder, but the concept has some applicability. World War II experience influenced how Generals McConnell, Momyer, and Meyers approached Rolling Thunder, but those generals were neither refighting World War II, nor shackled to USAF doctrine. All three regarded World War II as a paradigm that illustrated the proper way to apply combat airpower, yet they were cognizant of the differences between World War II and the Vietnam War. Despite strategic bombing's pervasiveness in USAF doctrine, the generals proved willing to devote considerable attention to interdiction operations more suited to Rolling Thunder's purpose. When viewed in Kuhnian terms, USAF leaders appear no more unreasonable or stubborn than research scientists who are dedicated to an unbiased search for the truth.

Of course, this paper has confined itself to comments made by three key generals. Conclusions drawn from such a narrow evidence base cannot claim to be comprehensive, but they do cast doubt on the contention that USAF generals misapplied World War II experience and doctrinal beliefs about strategic bombing when they devised and implemented the Rolling Thunder campaign.

Implications for Today

Like their Vietnam forebears, today's USAF leaders must decide how best to apply past experiences to new situations. Much as senior USAF leaders during the Vietnam War started their careers during World War II, some of today's leaders - including Chief of Staff Gen. John Jumper - began theirs during Vietnam. Desert Storm, a significant experience for all of today's generals, illustrated airpower's potential in a dramatically successful way in 1991. NATO's Operation Allied Force was another powerful demonstration of airpower capabilities, leading British historian John Keegan to remark, "There are certain dates in history of warfare that mark real turning points...Now there is a new date to fix on the calendar: June 3, 1999, when the capitulation of President Milosevic proved that a war can be won by airpower alone."³² The combination of stealth technology, defense suppression, and precision guided weapons proved so potent that these conflicts may even have defined a new airpower paradigm. World War II and the ongoing War on Terror clearly differ from Korea and Vietnam, which occurred against a Cold War backdrop where miscalculation risked nuclear war. Absent that Cold War backdrop, airpower could be applied very differently in World War II and even Desert Storm. It is certainly being used differently in the current War on Terror. How skillfully, then, are today's USAF leaders applying their past experiences?

A thorough answer is beyond the scope of this discussion, but a few preliminary comments are in order. Like their predecessors, today's leaders recognize that each war differs in its strategic, operational, and tactical context and requires flexible adaptation of existing experience, doctrine, and paradigms. A desire not to repeat Rolling Thunder is obvious,³³ but USAF leaders have shown considerable flexibility in adapting strategies from one conflict to the next. Despite the successful example of Desert Storm's six weeks of preliminary air attacks prior to commencing

ground operations, Operation Iraqi Freedom ground operations and air attacks commenced almost simultaneously in 2003. On the other hand, USAF leaders proved capable of prosecuting Rolling Thunder – style campaigns in the Balkans during Operations Deliberate Force in 1995 and Allied Force in 1999. Interestingly, those generally successful Balkan campaigns happened between Desert Storm and Iraqi Freedom. Furthermore, today’s leaders have proven willing to introduce a variety of innovative doctrinal techniques based on emerging technologies such as unmanned aerial vehicles (UAVs) and Global Positioning System (GPS) - guided Joint Direct Attack Munitions (JDAM). When facing new challenges, USAF generals from Rolling Thunder to today have applied their own experiences and existing doctrine, but have not been blinkered by paradigms based on the Second World War or any other successful war or conflict.

Notes

1. Headquarters PACAF, Directorate, Tactical Evaluation, CHECO Division, “Rolling Thunder, July 1965 - December 1966,” p. 24. (Cited hereafter as “CHECO Report” followed by title)
2. CHECO Report, “Rolling Thunder, January 1967 - November 1968,” p. 1.
3. Earl H. Tilford, *Setup: What the Air Force Did in Vietnam and Why*, (Maxwell AFB, AL: Air Univ. Press, 1991), p. 95.
4. Tilford, pp. 286-287.
5. Mark Clodfelter, *The Limits of Airpower: The American Bombing of North Vietnam*, (New York: The Free Press, 1989), p. 73.
6. Clodfelter, pp. 125-126.
7. A thorough study of senior officers’ views is beyond the scope of this work. Other potential candidates for this study included Gen. Hunter Harris, CINC Pacific Air Forces from 1964 – 1967, and Gen. John D. Ryan, who succeeded Harris in that job. The USAF Historical Research Agency contains materials on both generals, but the author found no comments in which those generals related Rolling Thunder to World War II.
8. Charles T. Kamps, “The JCS 94-Target List: A Vietnam Myth that Still Distorts Military Thought,” *Aerospace Power Journal*, Vol. XV, No. 1, Spring 2001, p. 76.
9. Tilford, pp. 286-287,
10. Gen. John P. McConnell, testimony to U.S. Congress, Senate, Committee on Armed Services, *Air War Against North Vietnam*, Hearings before the Preparedness Investigating Subcommittee, 90th Cong., 1st Sess., Part 3, Aug. 22, 1967, p. 213.
11. Gen. John P. McConnell, biographical sketch, US Congress, Senate, Committee on Armed Services, *U.S. Air Force Tactical Air Operations and Readiness*, Hearing before the Preparedness Investigating Subcommittee, 89th Congress, 2nd Sess., May 9, 1966, p. 2.

12. McConnell, testimony to Senate Preparedness Subcommittee, Aug. 22, 1967, p. 223.
13. Gen. John P. McConnell, Oral History Interview transcript, 4 Nov. 70, K239.0512-371, in USAF Collection, AFHRA, p. 2.
14. McConnell, testimony to Senate Preparedness Subcommittee, Aug. 22, 1967, p. 231.
15. Gen. William W. Momyer, *Air Power in Three Wars*, (Washington, DC: Department of the Air Force), 1978, p. iv.
16. Momyer, *Air Power in Three Wars*, p. iii.
17. Gen. William W. Momyer, testimony to U.S. Congress, Senate, Committee on Armed Services, *Air War Against North Vietnam*, Hearings before the Preparedness Investigating Subcommittee, 90th Cong., 1st Sess., Part 2, Aug. 16, 1967, p.143.
18. Momyer, testimony to Senate Preparedness Subcommittee, Aug. 16, 1967, p. 169.
19. Momyer, testimony to Senate Preparedness Subcommittee, Aug. 16, 1967, p. 169.
20. Momyer, *Air Power in Three Wars*, p. 23.
21. On 1 April 1966, 2nd Air Division was redesignated 7th Air Force. For simplicity, this paper will refer to both entities as 7th Air Force.
22. Maj. Gen. Gilbert L. Meyers, testimony to U.S. Congress, Senate, Committee on Armed Services, *Air War Against North Vietnam*, Hearings before the Preparedness Investigating Subcommittee, 90th Cong., 1st Sess., Part 5, Aug. 29, 1967, p. 473.
23. Meyers, testimony to Senate Preparedness Subcommittee, p. 509
24. Meyers, testimony to Senate Preparedness Subcommittee, p. 494.
25. Meyers, testimony to Senate Preparedness Subcommittee, p. 475.
26. Meyers, testimony to Senate Preparedness Subcommittee, p. 509.
27. Maj. Gen. Gilbert L. Meyers, Oral History Interview transcript, 27 May 1970, K239.0512-282, in USAF Collection, AFHRA, pp. 118-119. (Underlining in original)
28. Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 2nd ed., (Chicago: The Univ. of Chicago Press), 1970, p. viii.
29. McConnell, Oral History Interview transcript, Aug. 28, 1969, p. 39.
30. Kuhn, p. 155.

31. Kuhn, pp. 77, 158, and 92-93.

32. John Keegan, "Please, Mr Blair, never take such a risk again" *Telegraph*, Sunday, 6 June 1999, Issue 1472,
<http://www.portal.telegraph.co.uk/htmlContent.jhtml?html=%2Farchive%2F1999%2F06%2F06%2Fwkee06.html>.

33. For example, Desert Storm's Instant Thunder plan was intentionally named to contrast with Rolling Thunder. See Michael R. Gordon and Bernard E. Trainor, *The Generals' War*, (Boston: Little, Brown and Co.), 1995, pp. 80 and 83. The "shock and awe" aspect of Operation Iraqi Freedom also stands in clear contrast with Rolling Thunder's "graduated" bombing strategy.

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