B-25 Gunships in the Pacific:

Lessons in Innovation, Risk, and Failure

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14. ABSTRACT

The B-25J gunship's evolution to a highly effective low-level strafer and bomber highlights the culture of innovation, risk, and learning from failure in the 5th Air Force during World War II. Like many other platforms during the war, the bomber was co-opted for duties other than what it was designed. The developmental speed and successes of the B-25 strafers are notable because the ingredients needed were in the right place at the right time, either serendipitously or intentionally.

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INTRODUCTION

Lieutenant Peppy Blount started his B-25 gunship into a steep, diving turn to the left. Dropping to 300 feet above the South China Sea, he pressed the aircraft's throttles forward to increase airspeed to 285 miles per hour. Imperial Japanese Navy escort destroyer number 134 was under attack from B-25s of the 501st Bomb Squadron, 345th Bomb Group *Air Apaches*, 5th Air Force. Lt Blount was leading the second element attacking the evading destroyer. Rolling in on his attack run, he swung his target from his left window to dead ahead and watched as it was strafed and bombed by his friends in the two aircraft just ahead. He descended the bomber even more, down to 30 feet. The waves blurred past his canopy—this was a "mast height" bomb run. Half a mile away from his target and with only six seconds left before he would converge on the destroyer, Lt Blount pressed the trigger on his yoke. His aircraft breathed fire from the muzzles of four .50 caliber machine guns mounted in the nose. Four more fuselage-mounted machine guns fired simultaneously from his left and right sides. On cue from the pilot's firing, the top turret gunner opened fire with his two machine guns. The B-25 was firing 7,500 rounds per minute from ten Browning M2 machine guns as the Japanese ship turned to port to evade. Over a continuous five-second burst, 1,250 of the heavy .50 caliber rounds from Lt Blount and his wingman would sweep the destroyer's deck, suppressing its anti-aircraft defenses. Over 600 of the rounds were armor-piercing; another 300 were incendiary and began to melt the steel they impacted.[1]

As Lt Blount used firm rudder inputs to rake the destroyer's deck from stem to stern, his copilot simultaneously opened the bomb bay doors and turned on a remote camera in the aircraft's tail to record the carnage. Only seconds away from colliding with the destroyer at mast height, Lt Blount ceased firing his machine guns and rippled two 500-pound bombs set with

[1] R. E. Peppy Blount, *We Band of Brothers* (Austin, TX: Eakin Press, 1984), 125.

four-second delay fuzes. Hurled at the target at just under 300 miles per hour, the munitions hit the water at the destroyer's edge.[2] The bombs were released so close to the target it was difficult to miss. Lt Blount quickly pulled back on his controls to avoid hitting the destroyer. Then, just as quickly, he pushed the gunship's controls forward to descend and evade the anti-aircraft fire aimed at him from a second destroyer in the convoy.[3]

It was April 6th, 1945, and the 345 Bomb Group would sink three Japanese destroyers. The destroyers were devastated by the attack so quickly that the mortal damage was done before the last half of the group had even begun their runs; the full bomb group attack of four squadrons only needed two. Two years prior, dreams of such an efficient and effective attack were only starting to take shape.

The Battle of the Bismarck Sea (2-4 March 1943) was a lopsided victory with America's first organized low-level strafing and bombing of Japanese shipping. However, just over a year before the Bismarck Sea, American airpower had been caught completely flat-footed by the Japanese, suffering heavy losses while inflicting minimal damage. In the months that followed Pearl Harbor, medium- and high-altitude bombing attacks on the Imperial Japanese Navy proved ineffective.[4] From the doldrums in the winter of 1941-1942, American land-based airpower rapidly and effectively changed how it would attack the Imperial Japanese Navy. The apex was reached by the end of 1944 when 20-year-old Lt Peppy Blount would take his specifically trained crew and mass-produced B-25 gunship into combat.[5] Nevertheless, it took more than

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[2] Matthew K. Rodman, *A War of Their Own: Bombers Over the Southwest Pacific* (Maxwell AFB, AL: Air University Press, 2005), 68.
[3] Blount, *We Band of Brothers*, 229, 270.
[4] George C. Kenney, *General Kenney Reports: A Personal History of the Pacific War* (New York: Duell, Sloan and Pearce, 1949), 63-64; Brian J. Smith, "Mitchells Over the Pacific: The Dynamics of B-25 Innovation" (M.S. thesis, Air University, 2013), 43.
[5] During the Battle of the Bismarck Sea in March 1943, Peppy Blount was a high school senior in Texas. Less than 18 months after graduating high school, he would be one of the Pacific's youngest pilots. Even more impressive, he was an aircraft commander in a combat unit that saw heavy action. The entire flight and maintenance crew he led were older than him.

one man and one idea to create the *Air Apaches'* devasting firepower. A culture of innovation, risk-taking, and learning from failure made the low-level strafing and bombing B-25s a highly effective wartime innovation.

BACKGROUND

On the American entry into World War II, the B-25 Mitchell was in production by North American Aviation, which was starting work on its third model, the B-25C. The B-25 was designed as a medium bomber, capable of carrying 3,200 pounds of bombs and flying up to 300 miles per hour. With the air war in Europe becoming highly lethal, the B-25C upgraded the aircraft's defensive armament to four .50 caliber machine guns for use against intercepting enemy fighters. Other small improvements tweaked the aircraft's design, but it was still intended to be utilized as a medium-altitude bomber. A crew of five (pilot, copilot, bombardier, navigator/radio operator, and gunner) could fly 1,300 miles to a target and strike during daylight.[6] Less than 200 B-25s had been built by the end of 1941, but North American Aviation was quickly ramping up production. The company had recently opened a new assembly line in Kansas City that would produce almost 7,000 B-25s during the war, in addition to the 3,000 that would be built at North American's Inglewood, CA plant.[7]

While North American was increasing Mitchell production during 1942, the Army Air Forces in the Pacific began employing them in a doctrinally prescribed way—and failing. Leading up to World War II, the Army Air Corps had written about, organized, and trained for high-level strategic bombing. Ground support, attack, and pursuit were secondary to bombardment.[8] With the onset of the war, the Pacific theater's geography and geometry, among many other factors, prevented the Army Air Forces from accomplishing any useful bombing

[6] David Doyle, *B-25 Mitchell in Action* (Carrolton, TX: Squadron/Signal Publications, 2013), 10.
[7] Richard Macias, "We All Had a Cause: Kansas City's Bomber Plant, 1941-1945," *Kansas History: A Journal of the High Plains* 28 (Winter 2005-2006): 250.
[8] Rodman, *A War of Their Own,* 1-11.

raids against Japanese targets. Defeated and in disarray, surviving squadrons made a tattered retreat to Australia. General MacArthur was not impressed with his air force, and the nadir was the relief of Lt Gen George Brett, his senior airman in the theater.[9] It was not until mid-1942 and Maj Gen George Kenney's arrival that American airpower began to coalesce into something productive.

In September 1942, the 5th Air Force was created from the conglomeration of air units in the Pacific, and Maj Gen Kenney's leadership began to show. As Air Force bombers began to attack Japanese ships, it did not take long to recognize that the high- and medium-altitude tactics were not effective. There were less than 100 B-25s and B-26s in the southwest Pacific, and they dropped 859 bombs in September and August of 1942. Only 28 bombs found a target (a 3.3% probability of a hit) and sunk just three cargo ships.[10] Meanwhile, A-20 attack aircraft (not designed to be used as bombers) were beginning to strafe Japanese targets with effect, and the idea of low-level skip bombing was growing in Maj Gen Kenney's head. In fact, on his way from San Francisco to assume command of the 5th Air Force in July 1942, Maj Gen Kenney and his aide, Major William Benn, borrowed a B-26 in Fiji and skipped bombed the coral reef to see the tactic's feasibility.[11] (Maj Benn would soon be commanding the 63d Bomb Squadron with B-17s and be the first unit to skip bomb the Japanese.)[12]

It was in this context that B-25s in the Pacific would rise as legendary commerce destroyers. Born of defeat, at the end of a long and thin logistical trail, and up against experienced Japanese who gave no quarter, airmen in the southwest Pacific relied on innovation

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[9] Kenney, *General Kenney Reports,* 9-10.
[10] Timothy D. Gann, "Fifth Air Force Light and Medium Bomber Operations During 1942 and 1943: Building Doctrine and Forces that Triumphed in the Battle of the Bismarck Sea and the Wewak Raid" (M.S. thesis, Air University, 1992), 5.
[11] Kenney, *General Kenney Reports,* 22. The British were using low-level bombing attacks against shipping, and this led Gen Hap Arnold to have skip bombing tests conducted at Eglin Field during most of 1942. The official Army Air Force testing was still ongoing when Maj Gen Kenney and Maj Benn were skipping bombs in Fiji and at Japanese targets later in 1942.
[12] Rodman, *A War of Their Own,* 39.

to build what they needed. Their highest leadership, Maj Gen Kenney, was risk accepting, if not supportive, and failures were used as a tool to learn from, not experiences to avoid. The innovation, risk-taking, and failures from eighty years ago still have implications today.

INNOVATION

Maj Gen Kenney knew the Army Air Forces in the Pacific needed change—that was why he was assigned there in July 1942. Nevertheless, it became even more evident that innovation needed to occur as doctrinal practices used against the Japanese in the first six months of the war failed. Minimal losses were being inflicted on the Japanese, and it was wasting scarce resources in a theater that was not prioritized to get much more. However, Maj Gen Kenney was not starting from scratch. He had spent years professionally thinking about more than just strategic bombardment and was ready to implement low-level bombing and strafe as more effective tactics. His leadership created a culture fostering change. With the help of airmen like Lt Colonel Paul "Pappy" Gunn, B-25s in the Pacific would come to define innovation.

In an Army Air Force divided into bombardment, attack, and pursuit camps, Maj Gen Kenney could be described as the "champion of American attack aviation."[13] While teaching at the Air Corps Tactical School (the Air Corps school for future thinking and doctrine development during the 1920s and 1930s), Captain Kenney had written the course on attack aviation. He experimented with smaller anti-personnel bombs and even played with skip bombing (on land, not overwater). He was also part of a three-member board that wrote the developmental requirements for attack aircraft (ultimately leading to the Douglas A-20).[14] Maj Gen Kenney was an outlier in an Air Force dominated by a bomber clan wanting to strategically strike the enemy's vital centers instead of a fielded (and diversionary) army. In

[13] Rodman, *A War of Their Own,* 9.
[14] Rodman, *A War of Their Own,* 6.

contrast to bombardment, attack aviation focused on directly supporting ground troops over the battlefield or indirectly supporting them by interdicting less defended and more vulnerable forces before they reached the battlefield. In this regard, the southwest Pacific theater was ideal for Maj Gen Kenney's operational approach.

The Army Air Force did not yet have a strategic bomber that could reach Japan's vital centers, so striking supply lines and fielded forces was the only option. Additionally, aviation technology (and to a degree, training) had not yet produced a platform accurate enough to conduct high-level bombing on mobile targets effectively. With these two significant limitations, low-level attacks on Imperial Japanese Army and Naval forces became the easy choice for Maj Gen Kenney. For General MacArthur, who was ignorant to airpower, Maj Gen Kenney's ideas to support the army must have sounded golden—it is no wonder MacArthur was so fond of Kenney.[15]

Maj Gen Kenney needed to move fast to convert his force from impotent bombers to ferocious attackers. Nascent strafing and bombing tactics would need to be perfected. Aircraft would need to be modified to accomplish their new missions. To do this, he could not rely on industry, logistics, or worst of all, time. He needed to get the job done with what he had, as fast as he could. Just as necessity is the mother of invention, failure breeds innovation. With a dismal combat record and only the force at hand, something had to change. A spark was needed. Surreptitiously, one of the best innovators the Air Force has ever known was assigned to the 5th Air Force and he had been in the Pacific since the first day of the war.

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[15] Kenney, *General Kenney Reports,* 464-5. Maj Gen Kenney recalls a conversation with Gen MacArthur shortly after he returned to the Philippines in 1944:

> "George," he said, "I've been reading about a remarkable coincidence. When Stonewall Jackson was dying, the last words he said were, 'Tell A. P. Hill to bring up his infantry.' Years later when Lee died, his last words were, 'Hill, bring up the infantry.'" He paused, lit his pipe, took a few puffs, and continued, "If I should die today, or tomorrow or any time, if you listen to my last words you'll hear me say, 'George, bring up the Fifth Air Force.'"

Months before his 17th birthday, Paul Gunn enlisted in the Navy in 1917. He had the flying bug since he was a boy and was truly gifted with machines. The Navy capitalized on his evident mechanical aptitude, and he was reportedly the most sought-after aviation mechanic at the naval airbase in Pensacola. Within five years, Machinist's Mate Gunn had purchased a derelict surplus seaplane, fixed it himself, and learned to fly. In 1924 he re-enlisted in the Navy and went to pilot training—a unique opportunity for an enlisted sailor. After 20 years of service flying and fixing everything in the Navy, Chief Petty Officer Gunn retired in 1937 and moved to the Philippines to help start an airline.[16]

The day the war started (December 8th, 1941, in Manilla), Paul Gunn was sworn into the Army Air Force as a Captain. He was immediately called "Pappy" since he was decades older than his fellow pilots. He spent the first half of 1942 single-handedly saving American airpower in the Pacific. He led squadrons on long-range, overwater navigation flights that otherwise could not have been accomplished. He shuttled aircraft, pilots, and parts between bases and created new hidden bases in the jungle with his local knowledge. He finished the assembly of aircraft that had been shipped with incomplete parts, most notably modifying the nose of A-20s to mount .50 caliber machine guns after the attack aircraft arrived without any armament or bomb racks. His aviation and mechanical exploits fill books. Now promoted to major, Pappy Gunn was quickly introduced to Maj Gen Kenney on August 5th, 1942, in Queensland, Australia, where he was modifying A-20s into up-armed strafers.[17]

Maj Gen Kenney immediately identified Maj Gunn as the type of catalyst he needed to springboard the 5th Air Force into a relevant combat organization. Maj Gen Kenney took

[16] George C. Kenney, *The Saga of Pappy Gunn* (New York: Duell, Sloan and Pearce, 1959), 12-13, 17-27.
[17] Kenney, *The Saga of Pappy Gunn,* 28-39.

Maj Gunn out of the 3d Attack Group and made him his special projects officer. His first job was to remedy the lack of fighter aircraft in the southwest Pacific—there were only 75 fighters in front-line combat squadrons. However, there were 170 wrecked fighters piled up for salvage in Brisbane. Pappy Gunn's incredible skills returned more than 100 to service.[18]

By November 1942, Maj Benn's B-17s from the 63d Bomb Squadron had proven the worth of low-level skip bombing. The A-20 had also proven a capable strafer. Maj Gen Kenney decided he wanted to remodel his fleet of B-25 bombers into "commerce destroyers." He directed Maj Gunn to pull the bombsight and bombardier out of the nose and "fill the place full of as many 50-caliber guns as he could squeeze in there."[19] Within a week, Major Gunn was test-flying a B-25 gunship with four .50s in the nose. There were issues to solve, like popping rivets, blown-in panels, and a poor center of gravity, but the new B-25 gunship was looking to be a devastating strafer. With Pappy Gunn, innovation was on steroids and occurring as fast as Maj Gen Kenney needed it; the 5th Air Force Commander wanted to engage a Japanese convoy as soon as possible. Maj Gunn tweaked the initial commerce destroyer design by December 1942, and B-25s began field modifications to turn the medium bomber into a low-level attack aircraft.

The Battle of the Bismarck Sea in March 1943 was only a few weeks after Major Gunn's team had completed modifications and crews had familiarized themselves with the new tactic. Maj Gen Kenney wrote the battle "was opened by twelve of Pappy Gunn's modified B-25 bombers" in their initial combat mission.[20] Two destroyers and four cargo ships were sunk in 15 minutes; no B-25s were lost. Innovative thought had come to the 5th Air Force, and it succeeded. Maj Gen Kenney had begun to transform his force of doctrine-based bombers into

[18] Kenney, *The Saga of Pappy Gunn,* 43.
[19] Kenney, *The Saga of Pappy Gunn,* 45.
[20] Kenney, *The Saga of Pappy Gunn,* 49.

low-level attack aircraft. His commanders established and continue to develop skip and mast-height bombing. His technicians converted medium bombers into strafers. However, this all came at a cost. Maj Gen Kenney had taken many risks to get the 5th Air Force where he wanted it to go.

RISK

Maj Gen Kenney could not direct all the innovative ideas within the 5th Air Force. He had to trust his airmen to come up with insightful and creative solutions to the problems of the war in the Pacific. Maj Gunn's mechanical genius solved many technical problems, and commanders like Maj Gen Kenney's former aide Maj Benn adopted new tactics like B-17s flying 200 feet above the water to skip bombs into ships. However, Pappy Gunn was not a mechanical engineer—he had a farm-school education stopping when he was 16 years old. Moreover, Maj Benn was undoubtedly a leader, but his crews had minimal training flying their big airplanes in ways they were not designed.

Death and loss were everywhere in World War II, particularly in aviation. Ten airmen died per day in training accidents in the United States alone, not counting overseas accidents or combat losses.[21] With these sobering numbers, any risk analysis must be put into the period's context, where expediency and growth were prioritized over safety and precaution. If a B-25 gunship crashed on take-off because the inexperienced pilot mishandled the field-modified (and nose-heavy) aircraft, was it different than a C-47 that ground rolled and crashed on a hastily built, rutted, and muddy runway? High risk was seemingly baked into everything the combat forces were doing.

[21] "Army Air Forces Statistical Digest – World War II: Table 214, Airplane Accidents in Continental US: 1942 to 1945," accessed February 12th, 2021, http://www.taphilo.com/history/WWII/Loss-Figures-Aircraft-USA-Training.shtml

However, even in a contemporary context, Maj Gen Kenney took significant risks with the field modifications to his force. In January 1943, the 5th Air Force made blueprints of Maj Gunn's new B-25 gunship modifications. Maj Gen Kenney was looking to get North American Aviation to start producing B-25 strafers from the factory instead of the 5th Air Force having to make the field modifications "out-of-hide."

Immediately after the Battle of the Bismarck Sea in March 1943, Maj Gen Kenney left on a trip to Washington, D.C. While there, he met with the Chief of the Army Air Force, Gen Hap Arnold. In Gen Arnold's office were engineers from Wright Field who had received the B-25 gunship modification blueprints. They informed Gen Arnold that the modifications were impracticable and "that the balance would be all messed up, the airplane would be too heavy, would not fly properly, and so on."[22] When Maj Gen Kenney had heard enough, he responded that twelve of the modified B-25s had played a vital role in the recent victory in the Bismarck Sea, where every transport and troop ship in the convoy was sunk. Furthermore, 60 additional B-25s were already being modified to gunship configuration in Australia. Gen Arnold "practically ran [the engineers] out of his office." He told Maj Gen Kenney to get Maj Gunn to California to show North American Aviation how the modifications were done.[23]

By April 1943, Maj Gunn had visited the engineers at Wright Field and had been on the factory floor at North American Aviation almost nonstop for three weeks. The team at North American ran with the design and, to Maj Gunn's delight, had managed to place not four but six .50 caliber guns in the nose. Engineers also redesigned the aircraft's riveting so it would stop popping out when the guns were fired.[24] While the risks of an under-engineered, field-modified gunship were now lessened, a new operational risk was being born: the 75-millimeter cannon.

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[22] Kenney, *General Kenney Reports,* 214.
[23] Kenney, *The Saga of Pappy Gunn,* 50.
[24] Kenney, *The Saga of Pappy Gunn,* 53.

The Air Corps tried installing a 75-millimeter tank gun in an aircraft in 1938, with the Douglas B-18, but the project was abandoned.[25] However, when Gen Hap Arnold called for more guns to be mounted in 5th Air Force bombers, the engineers gave them all the guns they could handle. The late-1930s airborne 75-millimeter cannon project never entirely died, and two types of cannon for aircraft use languished in testing. In the summer of 1943, engineers at North American Aviation were devising 75-millimeter gun mounts for the B-25. Nearly simultaneously, Gen Arnold pushed a cannon to the Pacific for field installation and testing. Recently promoted Lt Colonel Gunn landed the job, of course, and "fell in love with it [the cannon] at first sight."[26] He quickly had the cannon ready for testing and personally flew the first test/combat flight on July 28th, 1943. While the cannon was successfully installed and utilized, its lackluster effects should have been seen as an operational testing failure. Instead, the innovator Pappy Gunn's influential words brought the 75-millimeter cannon to life in the risk-accepting culture of the 5th Air Force.

FAILURE

With the ever risk-accepting 5th Air Force, the 75-millimeter cannon test flight was not conducted on a target hulk that pilots used for practice. Instead, Lt Colonel Gunn led a formation of B-25 gunships on a strike against two recently located Japanese destroyers. In the lead aircraft, Lt Colonel Gunn hit a destroyer with all seven of the 75-millimeter rounds he fired—to no effect. The 75-millimeter rounds could not significantly damage the warship. His two wingmen dropped 1,000-pound bombs on each of two destroyers, sinking both of them. Dejected, Lt Colonel Gunn broke off from the formation and strafed a Japanese airfield on his return to base, "disintegrating" a Japanese transport aircraft that had just landed with his two

[25] Doyle, *B-25 Mitchell in Action,* 54. The B-18 was the Army Air Force's most numerous forward-deployed bomber at the beginning of the war. It was already obsolete in 1941 and withdrawn from frontline service when the war began. It played no significant combat role and was modified into continental anti-submarine duty.
[26] Kenney, *General Kenney Reports,* 272.

remaining 75-millimeter rounds.[27] Lt Colonel Gunn reported back his great test results to Lt Gen Kenney.

The M4 75-millimeter gun (and later M5) was quickly put into production at the North American Aviation plants by the summer of 1943. The B-25G and B-25H had strafer noses that mounted .50 caliber machine guns and had a large opening for the cannon's muzzle. On the surface, it can be understood why the M4/M5 cannon was installed on over one thousand B-25s. If strafing with M2 machine guns was effective, then surely the much larger M4 cannon would be useful too. Furthermore, what better way to take out a determined and dug-in enemy than with the largest cannon yet employed from an aircraft? However, the 75-millimeter cannon was a tactical failure.

Lt Colonel Gunn's test flight immediately showed it was not a ship killer—bombs were still needed for that. An average B-25 could fire only three to four cannon rounds at a target in a 30-second attack run, as the navigator manually loaded the rounds. This placed 54 pounds of steel with 6 pounds of TNT on the target.[28] However, on a similar attack run, a five-second burst of fourteen M2 machine guns placed almost 1,000 rounds on the target—twice as much steel as a cannon attack and devastating a much larger area. It was obvious to the pilots: a .50 caliber strafe was incredibly violent and more destructive. Lt Peppy Blount remarked, "I never heard a B-25H pilot express regret at having that cannon taken from between his legs… Replacing the 75-mm cannon with 12 forward-firing .50 caliber machine guns was the most destructive firepower that I saw in World War II. It could be matched, in intensity, by the collective firepower of a warship of the destroyer or larger class."[29]

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[27] Kenney, *General Kenney Reports,* 272.
[28] Lorrin Rexford Bird and Robert D. Livingston, *WWII Ballistics: Armor and Gunnery* (Albany, NY: Overmatch Press, 2001), 62–63.
[29] Blount, *We Band of Brothers*, 293. Lt Blount was either referencing a six-gun configured nose (vice eight) or not factoring in the two top turret guns, which bring 14 machine guns to bear.

Innovation had gone too far with the 75-millimeter. The big cannon, while viable, was not the best weapon of choice. Maj Gen Kenney trusted his innovators, particularly Pappy Gunn, but now American industry was mass-producing a plane with the wrong armament and configuration. Worse yet, the copilot and his station were deleted to accommodate the heavy cannon in the nose. North American Aviation was rolling hundreds of single-pilot, 75-millimeter equipped B-25s off its assembly lines a month. Furthermore, the Army Air Force was training thousands of air and ground crews in a weapon that needed to go away. Lt Blount and his crew trained in South Carolina on a B-25H that had accommodations for only one pilot. By the time he arrived in the Pacific, his new squadron had removed the cannons in favor of more machine guns. Lt Blount flew a B-25 with a copilot for the first time after he arrived in the Pacific.

Risk had been actualized. Maj Gen Kenney's innovation and risk-taking culture created the cannon-equipped B-25G/H gunship, but it missed the mark. The aircraft themselves cannot be classified as failures, as they were undoubtedly practical attack aircraft, but there is a reason the most produced B-25 variant is the B-25J, which lacked a 75-millimeter cannon.

Just as quickly as the 5th Air Force learned to innovate, it learned to fail. In the case of the B-25 gunship, leaders did not dwell upon the operational failure of the 75-millimeter cannon. Most likely because the right answer was simple: more guns were needed, not a bigger gun. With this feedback, North American Aviation engineers yet again reconfigured the gunship nose and this time threaded eight guns, ammo cans, and feed chutes into the front of the aircraft. Fourteen forward-firing .50 caliber machine guns would devastate targets. In addition, North American Aviation also redesigned the nose of the B-25J to have either a plexiglass bombardier's compartment or a strafer kit that could be installed at depots or in the field.

Learning from the failure of the 75-millimeter cannon, the B-25J gunship was the most heavily armed strafer of World War II.[30]

CONCLUSION

The B-25J gunship's evolution to a highly effective low-level strafer and bomber highlights the culture of innovation, risk, and learning from failure in the 5th Air Force during World War II. Like many other platforms during the war, the bomber was co-opted for duties other than what it was designed. The developmental speed and successes of the B-25 strafers are notable because the ingredients needed were in the right place at the right time, either serendipitously or intentionally. Gen MacArthur brought Maj Gen Kenney to the Pacific because a new way of thinking was required. Lt Col Gunn's charisma and mechanical genius made him unforgettable to all that met him and enabled his quick ascension into positions of innovative influence. Under the strong leadership of James "Dutch" Kindelberger, North American Aviation had strategically placed its production on the right path before the United States entered the war. In mere weeks, the company could change and update its manufacturing to meet the Army Air Force's changing requirements. These considerable factors provided the synergy needed not just to modify a bomber into a strafer, but to have it professionally engineered into kit form, have crews tactically trained in the United States, and have combat units apply innovative tactics with great success in the face of an experienced enemy. Attacking by 'flying down the gun barrels' of their Japanese enemy, the B-25 strafer crews of the Pacific personified American innovation, risk-taking, and learning from failure.

[30] Stephan Wilkinson, "How the B-25 Became the Ultimate Strafer of World War II," *Aviation History,* May 2020.