

Zero at Munda airfield
on New Georgia.



Airpower in the Pacific

A Case Study in Innovation

By THOMAS E. GRIFFITH, JR.

Being ready for future wars depends on understanding two aspects of innovation. One is common and often considered: the impact of changes in doctrine, organization, and technology on innovation during peacetime. Equally important, however, is an awareness of the adaptations commanders must make once combat begins and equipment or tactics do not work as planned. As Sir Michael

Howard observed, "I am tempted to say, indeed to declare dogmatically, that whatever doctrine the armed forces are working on now, they have got it wrong." The objective, he added, is not being too badly wrong and having the flexibility to adapt quickly as the shooting starts.¹

Inculcating flexibility is difficult. Contrary to the belief that innovation is easier to advance during actual operations, the inherent uncertainty of war makes it hard to discover what works and why. Moreover, commanders and combatants may not understand affinities among tactics, training, and equipment. Even if commanders identify areas of failure, change may be

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B-17 on sortie over
Solomons.



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difficult. Institutional resistance doesn't vanish in war, and with lives at stake it can grow.

Greater technological sophistication makes it more important to grasp the challenges of adaptation and how to meet them. Success begins by knowing that military organizations have many moving parts. As one analyst remarked, "We are dealing with a system when a set of units or elements are interconnected so that changes in some elements or their relations produce changes in other parts. . . . In a system the chains of consequences extend over time and many areas: the effects of actions are always multiple."² Although this is easy to visualize in the case of weapons platforms, even soldiers can be regarded as systems requiring training, equipment, and synchronization with other individuals, units, and systems.

Conceiving of forces as systems underscores subtle connections that account for successful innovation. By and large, the more connections are appreciated, the greater the chance of success. The case of General George Kenney during World War II offers insight into how commanders can deal with innovation and how a system must be changed to accommodate it.

Defining the Problem

As the newly named commander of the Allied Air Forces in the Southwest Pacific, Kenney arrived in Australia in late July 1942, only six months after the Japanese attack on Pearl Harbor. In the interim Japan had conquered large parts of the Western Pacific. Control of this region rested on the ability of the Japanese to employ land, sea, and air forces from relatively small areas to attack Allied positions and lines of communication. Some of these areas were true islands, like Truk. The jungle terrain and inaccessible interiors of

large land masses such as New Guinea fixed forces into relatively isolated garrisons, effectively turning them into islands as well.

Although victory in this theater demanded a mastery of joint operations, airpower was ideal for setting the stage for success because it could gain control of the skies, then cut off supplies and reinforcements to isolated enemy units. Kenney planned to weaken outposts, then attack men and equipment directly, and finally cover and assist Allied naval and ground units. After occupying new territory, the Allies could build airfields to launch the next advance.

All these tasks required changes from established procedures, but sinking enemy shipping proved particularly difficult. Surprisingly, the predicament airmen faced did not result from a lack of peacetime planning. In fact, coastal defense had been the most critical mission for the Army Air Corps before World War II. Airmen concluded that the best way to prevent an invasion was to sink ships using horizontal bombing at high altitude before an enemy could land. They reasoned that the right equipment would afford great accuracy and avoid antiaircraft fire from the sea.

Wartime experience quickly revealed problems in pre-war thinking. One failing involved the number of aircraft needed to sink ships. Planners based peacetime predictions on formations of at least nine bombers, which they thought was the minimum requirement to hit a moving ship. The small number of aircraft sent to the theater, combined with a lack of spare parts and other supplies, meant Kenney could rarely assemble the needed formation.

Even if Kenney had been able to organize such a formation, the prevailing assumption was that aircraft would aim at the target independently but release their bombs nearly simultaneously. These techniques proved impractical given the weather: tropical thunderstorms and heavy clouds at 1,000 to 2,000 feet often made it impossible for nine aircraft to fly in formation, let alone locate and simultaneously bomb a moving target.

More importantly, the established techniques did not take the friction of war into account. Airmen used the accuracy attained against small stationary targets in training to make predictions on hitting evasive moving targets in combat. Because capital ships were five to six times larger than the normal 100-foot bombing circle, it was assumed that hitting large moving targets was not much harder than hitting fixed targets. The realities of combat demolished that premise.

Enemy actions also decreased accuracy. As one bombardier said, "When I'm bending over that bombsight trying to get lined up on one of those Jap ships and the bullets start coming through the windows in front of me, they take my mind off my work."³ Moreover, bombsights did not work, bombs did not release properly, and various human errors occurred. The difficulties did not reduce accuracy in a linear or additive fashion but actually created problems at an exponential rate out of proportion to inputs.

The first change, producing an innovation to stop enemy movement by sea, was the shift to night bombing. Night was less desirable than day because of the difficulty of locating and hitting targets, but such setbacks were balanced by other factors. "At night," according to Kenney, "you don't have Zeros shooting through the bombardier's window and taking his mind off his work; a moving vessel does not see the bombs leave the plane . . . nor have time to dodge."⁴

The inaccuracy of night bombing, however, meant that it wasn't a viable long-run solution, and Kenney turned to low altitude attacks for daytime missions, proposing that such tactics would combine greater surprise with less interference from fighters. Thus he decided on skip bombing, so-called because pilots would fly low and release bombs from 350 to 200 feet from their targets, skipping them over the water like rocks until they hit vessels or exploded beneath them. Although Kenney sometimes took credit for this tactic, low altitude bombing had been tried often. Like other successful innovators, he would champion alternative methods whatever their source.

The Payoff

Success was not long in coming. In March 1943, some 6,000 Japanese soldiers from the 51st Division prepared to land near Lae in New Guinea, a key outpost in the defensive perimeter. Their leaders had high hopes for the convoy, which brought soldiers from Rabaul in New Britain. A defensive stand in New Guinea would not only stall General Douglas MacArthur in making his drive through the Southwest Pacific, but a drawn-out campaign with heavy casualties might lead the United States to consider a negotiated settlement.

Despite the operational and strategic importance of intercepting the convoy, MacArthur had limited options. His troops were few and worn

out from fighting in eastern New Guinea. What is more, he lacked naval forces to intercept the convoy. The only way to prevent the Japanese from consolidating their position in New Guinea was hitting them before they could land.

Allied intelligence and enemy preparations made stopping the convoy immeasurably easier. A month earlier, a Japanese float plane was spotted 25 miles east of New Britain while new aircraft were spotted near Lae. Intelligence officers saw these events as indicators of an imminent attempt to reinforce by sea. Reconnaissance flights over Rabaul confirmed that estimate. Photos taken in late February revealed a record concentration of merchant ships (299,000 tons) in Rabaul Harbor. Intercepted messages provided information on when the convoy would depart, but not its route.

With intelligence on convoy routes gathered during the previous four months, lessons from Allied attacks on shipping, knowledge of enemy options, and weather forecasts, Kenney's deputy, Major General Ennis Whitehead, predicted that the convoy would sail along the northern coast of New Britain, beyond range of attack for as long as possible, and then race to its destination.

Despite the information, finding and destroying the convoy required three days of intense effort. Allied aircraft first spotted the eight destroyers and eight merchant vessels on the afternoon of March 1, but the ships hid under low cloud cover for two days. The Allies, perhaps assisted by intercepted transmissions, tracked the convoy and made small but repeated attacks.

The strikes were only the preliminary bouts before the main event. On March 3 the attack force rendezvoused over Cape Ward Hunt, a reference point on the north shore of New Guinea, and received a radio message with the convoy position from a Royal Australian Air Force (RAAF) reconnaissance plane that had harassed the ships overnight. At about the same time, other aircraft bombed the airfield at Lae, reducing a possibility of fighter interference. The concentrated attacks began shortly before 1000 hours. B-17s were in the lead, bombing from 8,000 feet and escorted by P-38s. This group was followed by B-25s flying at 5,000 feet, and immediately behind them came low altitude attackers—13 RAAF Beaufighters, 12 B-25s, and 12 A-20s.

As the low altitude crews spotted the convoy, they peeled off to attack individually. During the ensuing melee, pilots dodged anti-aircraft fire and twisted furiously to avoid hitting one another. Enemy ships violently maneuvered against the aircraft as their crews frantically battled explosions. One participant remembered, "They would come in on you at low altitude, and they'd skip bombs across the water like you'd throw a

the inaccuracy of night bombing meant that it wasn't a viable long-run solution



Seabees constructing airfield, Bougainville.

New Zealand P-40 taking off from Toronika.



U.S. Army

stone . . . the transports were enveloped in flames. Their masts tumbled down, their bridges flew to pieces, the ammunition they were carrying was hit, and whole ships blew up."⁵

The contest was over in moments. Kenney's airmen left every transport on fire or sinking and three destroyers sinking or badly damaged. An attack that afternoon disposed of the remaining stranded vessels. In all, every transport went to the bottom along with four destroyers.

While Japanese planners predicted heavy losses, destruction of the convoy staggered them.

The Lae transport operation was their last attempt to send significant reinforcements or supplies to eastern New Guinea, forcing the abandonment of forward outposts and any possibility of defense. The enemy commander of Eighth Fleet at Rabaul believed that the engagement opened the door for an American advance on the Philippines and was the final undoing of South Pacific operations.

Several factors contributed to the victory in the Bismarck Sea. Intelligence officers deserve credit for revealing enemy moves, but this information would have had little value without changes in bombing methods. Success was the product of innovative decisions made many months before and weeks of training, all capped off by thorough planning and brave execution.

Implementing Innovation

Understanding the Battle of the Bismarck Sea is vital to appreciating how commanders adapt in combat and the complexity of changing a system. Kenney made some of the innovations himself, but not all. His role was inspiring people by supporting their ideas. "I encourage personnel who have any ideas to go right ahead with them," he remarked. "It makes no difference what the man's

Kenney and MacArthur in Australia, 1944.



U.S. Air Force History Office

Kenney acknowledged good ideas regardless of their source

rank or his previous experience. If he has an idea that sounds feasible he is told to go ahead and he is given every assistance."⁶ Kenney acknowledged good ideas regardless of their source, praising Australia for innovative efforts. He singled out individuals, on one occasion decorating a sergeant for improvising. Mechanics learned to use anything on hand for repairs, including sixpence coins in engine magnetos and Kotex for air filters. "Any time I can't think of something screwy enough," the general observed, "I have a flock of people out here to help me."⁷ His command was not alone when it came to enterprising individuals adapted to local conditions, but without his support many ideas would never have seen the light of day. In short, he created the organizational environment that not only encouraged but demanded innovation.

Not every innovation worked, forcing Kenney at times to defend his emphasis on change. When larger ammunition boxes were proposed to increase the firing burst of machine guns, they

burned out the gun barrels. Kenney accepted such failures as part of doing business.

Since modifications usually meant removing aircraft from flying status, Kenney's deputy in charge of flying operations sometimes complained that the changes had not been adequately studied or took too long. At one point he protested, "I am convinced that there is too much experimental work being done and not enough thought given to production." Later he told his boss, "We do not want . . . an installation which causes us a lot of grief later on."⁸ Kenney could have agreed, but he knew that innovation would not succeed unless leaders defended the innovation process. "We have given ourselves lots of headaches, but we have also gotten some fine results."⁹

Kenney furthered the innovative atmosphere by ruthlessly eliminating officers who did not conform to his notion of taking risk. "The cry that the Army is full of red tape is a cry against the people in the Army who just don't seem to get results, who can't make decisions," he commented.

"The mediocre man does not get ships sunk or planes shot down and unfortunately neither does he get air crews and ground crews trained on time nor supplies forwarded to the proper place on time. His depot does not produce results. Even as a staff man he bottlenecks studies and decisions that are vital to the operating forces."¹⁰

It is not possible to simply change one aspect or part of a system; the entire system must be revised. Kenney's work highlighted this dilemma. For example, the vision of straight and level bombing at high altitude prior to World War II introduced a system that had to be modified for new tactics to succeed. Low altitude attacks required forward-firing guns to destroy ground targets and counter gunfire from ground defenses. Because such armament had not been needed for standard bombing it was not installed at the factory. Adding forward firepower required innovation in the field; four fifty-caliber guns placed in B-25s turned them into so-called commerce destroyers.

Low altitude bombing also meant modifying fuzes. Firing pins developed for release from higher altitudes bent when bombs hit water at low altitude, disabling them before they hit the target. Kenney tapped armament experts in the command who reduced the length of the housing so the fuzes would not bend or break.

Aiming bombs with new methods demanded a significant change. Developing an aiming device for level, horizontal bombing resulted in the Norden bombsight, virtually useless for skip bombing. One commander worked out a technique by dropping bombs on a sand bar and a wrecked ship near Port Moresby to determine the optimum altitude and airspeed for skipping bombs.

Though this effort defined basic parameters for bombing runs, pilots had to estimate range from the target without a mechanical aiming reference like the Norden bombsight, rendering their training largely irrelevant. Pilots did not have good results at low altitude until they learned new techniques. In the weeks prior to the Battle of the Bismarck Sea, air crews perfected their skills on a sunken boat. By the time of the battle many pilots had dropped 30 to 40 bombs on the wrecked vessel from low altitude. While the training resulted in the loss of one aircraft and damage to two others, the realistic target gave pilots critical experience in the aiming parameters that, in addition to other changes, paid dividends in the Bismarck Sea.

Like other institutions, the Armed Forces face the enduring challenge of recognizing when established methods need to be modified because of new conditions. Making changes in wartime demands rigorous testing and analysis

of procedures and equipment before combat. But even strenuous efforts in the laboratory or on the training range do not guarantee that forecasts will match conditions. Despite the belief that shortcomings can easily be identified in the midst of operations, the friction and uncertainty of war combine with enemy deception to make innovation difficult to accomplish.

The dominant lesson of Kenney's experience is that innovation rarely succeeds on its own, but rather flourishes when the nature of the system is understood. Being able to grasp the linkages among doctrine, organization, and technology is essential in this process. **JFQ**

NOTES

¹ Michael Howard, "Military Science in the Age of Peace," *Journal of the Royal United Services Institute for Defence Studies*, vol. 119 (March 1974), p. 7.

² Robert Jervis, "Complexity and the Analysis of Political and Social Life," *Political Science Quarterly*, vol. 112, no. 4 (Winter 1997-98), p. 570.

³ George C. Kenney, *General Kenney Reports* (Washington: Office of Air Force History, 1987), p. 66.

⁴ Letter, Kenney to Fairchild, December 8, 1942, George C. Kenney Papers, Center for Air Force History, Bolling Air Force Base, Washington.

⁵ Haruko Taya Cook and Theodore F. Cook, *Japan at War: An Oral History* (New York: The New Press, 1992), p. 301.

⁶ George C. Kenney, "Air Power in the Southwest Pacific," *Air Force*, vol. 27, no. 6 (June 1944), p. 59.

⁷ Letter, Kenney to Fairchild, December 8, 1942, George C. Kenney Papers.

⁸ Letter, Whitehead to Kenney, May 19, 1943, Ennis C. Whitehead Papers, Air Force Historical Research Agency, Maxwell Air Force Base, Ala.

⁹ Kenney, "Air Power," pp. 59-60.

¹⁰ Letter, Kenney to General Henry H. Arnold, May 1, 1943, George C. Kenney Papers.