



Grupo de Investigación
Historia Militar

SATS and Chu Lai:
The Marine Corps' Expeditionary Airfield of 1965
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Today, the settlement of Chu Lai in Núi Thành District, Quảng Nam Province, Vietnam is home to an open economic zone featuring an industrial park serviced by a seaport and the Chu Lai International Airport. The latter offers direct flights to Hanoi and Ho Chi Minh City. The area is home to the largest automotive manufacturing and assembly plants in Vietnam, with production lines for Kia, Mazda, and Peugeot vehicles, in addition to semi-trailers, and buses for markets in Thailand, Myanmar, the Philippines, Japan, and the United States. As the manufacturing and industrial investment continue to grow in Vietnam, the Chu Lai Economic Zone is poised to grow in national importance.

All of these are notable attributes considering that Chu Lai, prior to 1965, did not formally exist on any map. The name and the airport entered the history of Vietnam and the United States in the first half of 1965, when Marines of the 3rd Marine Expeditionary Brigade (3rd MEB) and the Seabees of Naval Mobile Construction Battalion (NMCB) 10 arrived and turned the coastal area into a major military installation. From May 7 to July 3, 1965, the Seabees known as the “Men of Ten” overcame numerous obstacles at seemingly every turn to construct an 8,000-foot expeditionary airfield. The construction of this field at Chu Lai came during the pivotal period of America’s involvement in the military conflict in the Republic of Vietnam (South Vietnam), which would end in July with American forces engaged in offensive ground operations against elements of the National Liberation Front (NLF) and People’s Liberation Army of Vietnam (PAVN).

To place the deployment of NMCB 10 to Chu Lai in proper perspective, a brief overview of the political and military situation is necessary. Suffice to say other panelists have covered

some of these points in depth already. Following his overwhelming electoral victory in the 1964 presidential election, President Lyndon B. Johnson turned his attention in early 1965 to the military situation in South Vietnam. With political instability in Saigon and South Vietnamese military forces suffering defeat in the field against members of the NLF, Johnson and his advisors authorized a series of gradually escalating, retaliatory air strikes in February 1965. Through a strategy of limited war with progressively applied force, Operation ROLLING THUNDER's air campaign committed the Johnson administration to increasing levels of pressure to force the North Vietnamese to change its policies. This strategy, however, only served to increase rather than limit the U.S. military effort. By month's end, Johnson authorized the deployment of two Marine battalions from the 9th Marine Expeditionary Brigade (MEB) to Da Nang to defend the American air base.

When the military and diplomatic situation failed to improve by March, General William Westmoreland, commander of Military Assistance Command, Vietnam (MACV) requested more ground forces for offensive operations. Johnson, fearful of domestic blowback from deploying additional soldiers and marines while committed to his limited war of gradual escalation, chose to implement a compromise. On April 20 at a meeting in Honolulu, senior military officials agreed to an "enclave strategy," whereby American forces would establish bases around key coastal areas with authorization to assist the Army of the Republic of Vietnam (ARVN) military up to 50 miles from the base perimeters in combating NLF forces. This compromise strategy, brainchild of Ambassador Maxwell Taylor, was not supported by either the Joint Chiefs of Staff or Westmoreland, but Johnson hoped it would stabilize the military situation in South Vietnam long enough for the air campaign to produce the desired shift in Communist policy. At the same

meeting, the participants agreed that the Marines would establish an enclave at Chu Lai with an expeditionary airfield, 57 miles southeast of Da Nang.

Lieutenant General Victor H. Krulak, commanding general of Fleet Marine Force, Pacific, had advocated for construction of an expeditionary airfield south of Da Nang for several months. Krulak had previously inspected the location for the airfield in 1964. An aide accompanying the general remarked the location was not marked on any map. Krulak replied the location was “Chu Lai,” representing the Mandarin Chinese characters for his name. The expeditionary airfield itself represented a new capability for Marine Corps aviation. In the previous conflicts in the Pacific during World War II and in Korea, Seabees constructed temporary fields with crushed coral and Marston matting, otherwise known as pierced steel planking (PSP). These fields could handle tactical propeller-driven aircraft but lacked launching or arresting equipment, reliant on length alone to offer the necessary margins of safety in flight operations.

Beginning in 1956, General Randolph M. Pate, Commandant of the Marine Corps, appointed a study board to study the existing Fleet Marine Force (FMF). The board’s tasks included providing recommendations for the optimum organization, composition, and equipment of the FMF to best perform its mission. Among the challenges to address was how to provide all-weather tactical aviation support early in amphibious operations. The older Marston mat airfields took too long to construct, especially in early landing operations, and were impractical for the higher speeds and weights of tactical jet aircraft. Research had commenced in 1954 to find a solution to the problem of constructing an expeditionary airfield during the initial stages of landing operations able to land, refuel, and launch jet aircraft. Two years later, Pate’s office updated the airfield requirements. The field now needed to accommodate at least one squadron

of aircraft, with a runway 1,000 feet in length and 100 feet wide, ready for use within three to five days of an amphibious assault. The field would then need to be usable for at least 30 days to support the landing force in tactical shore operations.

The length requirement, essentially equivalent to the Forrestal and Kitty Hawk-class aircraft carriers, necessitated the use of arresting gear and some means to launch aircraft, either via jet-assisted take-off (JATO) rockets or a catapult. But the length proved too short for heavier jet aircraft, and in 1958 the Commandant approved an extension to 2,000 feet, albeit with a width reduction to 72 feet. Formal test evaluation of the concept and equipment commenced that year with at the Marine Corps Development Center. The first experimental test of the concept occurred from October-November that year at Marine Corps Auxiliary Air Station Beaufort, SC when Marines constructed a strip measuring 528 by 75 feet at the end of an existing runway. From December 1959-January 1960, Marines laid down a similar runway extension at Marine Corps Air Facility, Iwakuni, Japan to prepare for amphibious exercise, Operation Blue Star, held in the Republic of China. During the actual exercise, SATS component came ashore on the island aboard amphibious shipping. Marines managed to assemble a field 3,400 feet long by 60 feet wide within five days and successfully recovered and launched an array of tactical Marine aircraft.

In 1963, the Marine Corps formally adopted the Short Airfield for Tactical Support (SATS). The finished SATS essentially represented a carrier flight deck on land, centered around the runway itself, the arresting gear, and a catapult. The SATS field used AM-2 aluminum slab matting to form the runway. Each panel of extruded aluminum measured 1.5 inches (3.81 cm) thick, measuring 12-feet by 2-feet (3.65 m by .61 m), and weighed 144 pounds (65 kg). The top of the panel had a coating of nonskid material. In testing, the AM-2 mat proved able to handle

the stresses of wheel and hook impact, aircraft weight, and erosion of the surface by jet blast. The M-21 mobile arresting gear cable (MOREST) system used a nylon tape unwinding from rotary drums, retarded by hydraulically actuated dry-friction brakes, to absorb landing impact. The initial option for the catapult involved the use of JATO bottles. The addition of the CE-2 catapult offered an improvement. The system used nylon tape on capstan-style reels, together with the power of two J-79 turbojet engines, to “slingshot” an aircraft on a wheeled dolly connected to the tape to at speeds of over 160 knots. These three major components in turn married with a carrier lighting system, expeditionary control tower, and a fuel dispensing system. Once completed, the SATS allowed Douglas A-4 Skyhawks to utilize the field just as they would a carrier at sea.

On March 30, 1965, Secretary of Defense Robert S. McNamara tentatively approved installation of the field in South Vietnam which would relieve the overcrowded conditions at Da Nang. Prior to any final decision, however, a thorough reconnaissance of the site would be necessary to ascertain the feasibility of building at Chu Lai. Thus began the start of NMCB 10’s involvement with SATS. While the battalion prepared to deploy from Port Hueneme, CA to Okinawa as the Pacific Alert Battalion, the battalion Operations Officer Lieutenant Frank M. Newcomb, joined a party of three officers of the First Marine Air Wing (1st MAW), Major Frank P. Costello, Jr. who had worked with SATS early in its development, Brigadier General Marion E. Carl, commanding the 1st Marine Brigade, and 1st MAW engineering officer, Lieutenant Colonel Charles L. Goode, for an inspection of the proposed location at Chu Lai. Arriving by helicopter on the morning of April 3, the team found the proposed construction site to be a plateau of firm, fine sand, sparsely covered with grass adjacent to a wide lowland area. Soil samples were not taken. Looking away from the potential construction site, the team spied a low

hill of laterite material (soil high in iron and aluminum) which they believed could be used to stabilize the sands. With reports of active Viet Cong forces in the area, the ground reconnaissance lasted less than two hours, restricted to what essentially became the southern half of the runway. In his report on the reconnaissance, Newcomb requested soil samples of the sand and laterite, but Costello and Goode, who would develop and finalize the airfield plans, assumed the survey area represented the whole of the construction site and in the haste to meet deadlines the samples were forgotten.

Newcomb returned to Okinawa to share his findings with the recently arrived NMCB 10, while Goode and Costello put the finishing touches on the blueprints for the expeditionary airfield. The initial design for the Chu Lai SATS measured 3,000-feet long, 72-feet wide (914 m long by 22 m wide), but the field would continue to increase in size to support more aircraft for a longer period of operations. The final iteration of the runway measured 8,000-feet long by 102-feet wide (2,438 m long by 31 m wide), with accompanying matted taxiways measuring 7,912-feet long by 36-feet wide (2,412 m long by 11 m wide), with four 300-by-36-foot (91 m by 11 m) cross taxiways. Once completed, the entire airfield could support and maintain three tactical squadrons. The Marines and Seabees factiously dubbed this the LATS, or “Long Airfield for Tactical Support.”

A final decision on the field came days after the conference of April 20. In briefing before McNamara, U.S. Pacific Air Forces representatives reported that a concrete airfield would require 11 months to construct. Krulak countered by detailing the SATS concept, and he told the defense secretary it could be constructed in 25 days. On April 25, President Johnson approved construction of the field and NMCB 10 left Okinawa four days later destined for Chu Lai, confident in its ability to meet the timetable and overcome the unknowns of the construction site.

With an amphibious landing of the entire construction battalion scheduled in May, NMCB 10 requested more detailed plans of the airfield. Despite expressing concerns about the construction schedule, they only received rough details of the plan from the Marines, forcing the Seabees to make educated assumptions on the allocation requirements in equipment for construction.

In the morning hours of May 7 – 11 years to the day the French garrison surrendered at Dien Bien Phu – the 3d Marine Expeditionary Brigade (MEB) came ashore at Chu Lai. On pontoon causeways manned by a detachment of Amphibious Construction Battalion (ACB) One, the 600 “Men of Ten” led by Commander John M. Bannister, CEC, USN, followed the Marines ashore. When the Marines and Seabees attempted to unload the LSTs, LCMs, and LCUs, the beach sands immediately proved a nightmare. The first attempt to move 68 tons of AM-2 matting on flatbed trailers took five and half hours of slow movement through the sands. Without adequate shore party support, the Seabees offloaded most of their equipment themselves. Thankfully, the tractors were first off the pontoon causeways and made it ashore without issue, but the trucks’ tires sank heavily into the fine, soft sand. Working in temperatures over 100 degrees F (38 C) with 100 percent humidity, the Seabees lightened the trucks, reduced the tire pressures, and laid matting to form roads to their camp area. Throughout the night, teams labored to locate and deliver all the battalion’s equipment to the camp.

While some companies from NMCB 10 commenced construction of the battalion base at Camp Bannister, the remainder of the Seabees began to prepare the airfield site. After numerous delays, NMCB 10 had received the final coordinates of the centerline of the airfield while at sea on May 5. When the survey party located the coordinates on May 8, however, they discovered the location aligned with a range marker from the 3 April survey. After Bannister and Newcomb examined the location with Goode and Lieutenant Colonel Alexander Wilson, commanding

Marine Air Base Squadron 12, Goode recognized the site as unsuitable for construction of the taxiways, parking apron, and maintenance area. These areas as currently planned would be located on lowland areas prone to flooding in the monsoon season. With limited time and options, General Carl, Bannister, Goode, and Wilson agreed to shift the centerline coordinates 500 yards to minimize the amount of grading and earthmoving, or so they estimated.

With the coordinates issue resolved, excavation and grading of the site began on May 9. To fulfill the requirements of the airfield, Seabees moved approximately 183,000 cubic yards (139,914 cubic meters) of sand to construct the runway and taxiways, 46,000 cubic yards (35,170 cubic meters) for the squadron and base operations areas, and a further 180,000 cubic yards (137,620 cubic meters) of sand to provide adequate drainage and remove obstructions for aircraft navigation. In the extreme temperatures, high humidity, and constant sands, NMCB 10's equipment operators sitting in open cabs found the conditions hellish. The wheeled tractors intended to pull the scrapers bogged down in the sand and had to be pushed through all phases of operation. The fine white, almost perfectly spherical grains of sand worked its way into the bearings, brake linings, and clutches of the tractors and trucks, reducing the battalion's equipment to a daily average of four TD18 tractors, one 10-yard scraper, and two D8H tractors. Eventually the 3d Marine Engineer Battalion at Da Nang sent NMCB 10 all its heavy equipment aside from a lone dozer. The extreme climate in conjunction with the heat of the engine exhaust forced the Seabees to alternate crews every 30 minutes. Throughout May to July, recorded temperatures at Chu Lai reached between 102 to 104 F (39 to 40 C). C-rations could be heated by simply placing the cans in the sand. Heat aside, the work continued 24 hours a day and the outline of an airfield soon became obvious to aerial observers.

The sands of Chu Lai, however, would not be easily surmounted. During planning stages, engineers assumed that a six-to-eight-inch (15-to-20 centimeter) layer of compacted laterite, a soil rich in iron oxide and aluminum spread over the graded surface would contain the sand and serve as a sub-base for the AM-2 matting. Prior to embarking from Okinawa, NMCB 10 learned that the laterite observed during the April 3 survey was clayey and unsuitable for stabilization purposes. As an alternative, the Seabees attempted to use a sand-asphalt mix, but when Civil Engineer Corps officers tested this method at Chu Lai the sand and asphalt would not mix properly. Attempts at applying the asphalt directly to the wetted sands barely penetrated beneath the surface. With a strict timetable to meet, the Seabees returned to using the laterite, which had at least proven itself useful in stabilizing the roads around Camp Bannister and the construction site. Commencing on May 15, excavators began chewing up a hill 1.5 miles from the airfield, eventually moving 64,500 cubic yards to stabilize the sands for the runway and taxiway areas with a six-inch (15 cm) layer of laterite.

Mat laying commenced on May 16. Temperatures on the surface of the runway reached 125 F (52 C) and noon temperatures averaged over 110 F under a tent (43 C). Due to a limited amount of AM-2 matting, the Seabees resorted to using older, heavier (165 pounds per panel) M8A1 and M8A2 matting for the taxiway, parking aprons, and maintenance areas. The different panels did not seamlessly integrate, but with careful planning and rotation of crews mat laying proceeded at a daily rate of 500 feet; by May 22 approximately 2,300 feet of AM-2 runway matting was emplaced. At month's end, the runway neared 4,000 feet in length with 1,000 feet of taxiway matting emplaced.

On June 1 in the clear Chu Lai morning, Colonel John D. Noble, commander of Marine Air Group 12, led a four-man formation of A-4s which touched down at the field at 0810 hours.

Another flight of four A-4s from VMA-225 and VMA-311 touched down shortly thereafter. At 1315 hours, four aircraft of VMA-225 led by its commander, Lieutenant Colonel Robert W. Baker, took off to conduct air strikes six miles north of the field in support of ARVN forces. Despite the extreme heat and aggravating sands, “Can Do” had prevailed again, proving the SATS concept worked in the most difficult of circumstances.

A few days before Noble brought the first A-4s to Chu Lai, the monsoon rains began to fall. It rained continuously from May 29 – 31. After only two days of flight operations, by June 3 the center of the runway had settled two inches. The once perfectly smooth, bump free field had become a slippery roller coaster, pock marked with holes and areas on the mats where the red mud squirted out during landings. Once more, the foundation of sand beneath the runway remained a source of ceaseless headaches. Having completed the runway, the only solution would be to remove and stabilize the ground beneath the first half of the runway while installing the second half.

Assessing the situation, the Seabees dug two ditches three to four feet deep paralleling the runway and taxiway and filled them with laterite. Removing the AM-2 mat at set intervals, Seabees soaked the graded sand between the trenches with salt water pumped up from the beach and puddled by vibratory compaction. Spreaders next layered ten inches of laterite over the sand, followed by two sealing coats of asphalt finished off with a blotter of sand. Finally, Seabees installed a thin plastic membrane over the surface to prevent the rain from settling into the runway surface. Once complete, mat laying proceeded unabated. By mid-June, the Seabees had lifted and re-laid over 4,600 feet (1,402 meters) of matting having also stabilized over 5,600 feet (1,707 meters) of runway using the new sealing method. Mat crews of NMCB 10 locked the last piece of AM-2 into place on July 3, completing the 8,000-foot (2,438-meter) runway and

accompanying taxiways. Brigadier General Keith B. McCutcheon, commander of the 1st MAW, expressed his appreciation for NMCB 10's work with a hearty "well done," adding that "Never wavering, never hesitating, NMCB 10 rose to meet each new problem . . . and licked them all to their everlasting credit."

With the Seabee contribution on the runway complete, airfield operations turned over to MABS-12 with NMCB 10 focusing on additional projects. In the first week of July, the Seabees of the Airfield Lighting Crew from Bravo Company installed and maintained lighting for the SATS field, working day and night during flight operations and consuming every roll of electrical tape in Chu Lai. Other members of the battalion hammered and sawed away while assembling 900 strongback tents, bunkers, and a 1,600-man mess hall. Further joining the runway, the Men of Ten assembled a heliport of two 600-by-900-foot (183-by-274 meter) helicopter pads, graded and paved 12 miles (19 kilometers) of all-weather roads, plumbing and water purification systems, sewer lines, and all the other necessities for operation of a permanent air base.

After two months of construction at Chu Lai, however, the situation in South Vietnam had significantly changed. In May and June, battles at Ba Gia and Dong Xoai, where Construction Mechanic Third Class Marvin G. Shields would fall, demonstrated the weakness of the defensive-minded enclave strategy. In both battles, American forces were available but not deployed to reinforce the South Vietnamese forces. Following Dong Xoai, Westmoreland requested and received authority from Johnson for the deployment of additional ground forces to conduct offensive operations in South Vietnam, thereby signaling the end of the enclave strategy in favor of "search and destroy." As NMCB 10 continued to build Marine Corps facilities at Chu Lai, the die for a long-term American involvement in Vietnam had been cast. With the

expeditionary airfield fully operational, construction of a permanent 10,000-foot concrete runway commenced, completed in October 1966. The SATS field remained operational at Chu Lai throughout the war, although as a secondary field to the concrete runway. On September 10, 1965, NMCB 10 renamed Camp Banister at Chu Lai as Camp Shields, in honor of the fallen hero and Medal of Honor recipient of Dong Xoai.

The Seabee accomplishment at Chu Lai would be the first of many notable construction projects in South Vietnam. Perhaps the most powerful lesson to emerge from Chu Lai was a need to carefully evaluate and survey the geological and climatological conditions for any future construction site. Chu Lai's sands and high temperatures delayed construction, but as with so many issues, careful planning and Seabee resourcefulness made the impossible possible. In the years to come, the Chu Lai experience constructing the first deployed SATS airfield would be disseminated and incorporated into the projects of the 26,000 Seabees who followed the "Men of Ten" across the span of South Vietnam.