

REFLECTIONS ON MILITARY USE OF OVERHEAD IMAGERY

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ABSTRACT

Military use of overhead imagery developed with fits and starts after its use by Union forces at the siege of Richmond, VA in 1862. Although aerial photographs had been proven useful during World War I, many commanders did not trust this source of information, considering the photographs “playthings.” The implications of the rapid development of the aerial photography industry after that war was not ignored by everyone in the military, and Baron Werner von Fritsch, Chief of the German Armed Forces from 1935-1938, stated, “The military organization with the best aerial reconnaissance will win the next war.” Few British and American military leaders appreciated this potential until necessity forced them to rely on overhead imagery as almost the only source of information about enemy held territory. Despite this, every major battle during World War II furnishes examples of both effective and ineffective use of this tool. This trend continued through the Cold War, the Korean and Viet Nam campaigns, the Cuban Missile Crisis, and several operations in the Middle East.

Key words: military, history, Vietnam, errors, successes

INTRODUCTION

The view from above has been an important part of intelligence gathering since the birth of man. The view from on high -- whether a hilltop, an airborne platform, or a satellite -- provides valuable information on the location and movement of potential targets.

SOME EARLY HISTORY

The convergence of photography and hot-air balloons provided the earliest opportunity to obtain images of the overhead view. A brief summary of some of the results of this convergence, including use by Union forces during the siege of Richmond, Virginia, in 1862, is included in the first chapter of Constance Babington Smith's book, *Air Spy*. The nature of the photographic process in the 1860s largely negated widespread use of hot-air balloons as a photographic platform. Improvements in photographic techniques and development of airplanes came together prior to World War I and there were many successes of air-photo reconnaissance during that conflict. Despite this, air photos were not universally accepted. In recounting some of the Allied experiences with aerial photographs during that conflict, D. M. Reeves wrote: “..... a certain commanding officer of the ‘old school.’ Shortly before the Armistice he returned a quantity of aerial photographs to the Air Service still in their original envelopes, with the remark, ‘Very pretty pictures, but there is a war on and I have no time for playthings.’ We will encounter similar resistance again, during World War II. But first, let's look at the period between the wars.

Between the Wars

After the Armistice in 1918, large numbers of pilots returned to civilian life with new skills and an awareness of aerial photography. The experiences of one of them, Talbert Abrams provides an example. Ted tried a number of things, including being an air mail pilot, but decided to offer people rides in his airplane for a fee. He soon discovered those people would rather pay him to take a picture of their farm, or home, than to ride with him. This led to the formation of Abrams Aerial Survey. Ted was also responsible for the first aircraft designed specifically for aerial photography. Similar stories could be told about many others, and the growing number of aerial survey

companies resulted in the formation of the American Society of Photogrammetry. The formation of the Tennessee Valley Authority (TVA) in 1933 should not be overlooked. TVA had a large mandate but little information about the terrain it was to manage. Turning to aerial photography as the basis for mapping this terrain put TVA in the forefront of photogrammetric development in the U.S. We were not alone. Developments in Europe were many. The military potential of aerial photography was recognized by the Commander in Chief of the German Armed Forces, Baron Werner von Fritsch, who predicted: "The military organization with the best aerial reconnaissance will win the next war." The Baron was not a supporter of Hitler and was removed as Commander in Chief in 1938. In the last Chapter of *Air Spy*, C. B. Smith indicates that the Germans had excellent aerial photographs, but their interpreters were trained to use single prints (no stereo), did no comparative interpretation, and all but the officer in charge were enlisted personnel.

WORLD WAR II

World War II revealed that we had little information about the areas where the fighting was taking place, and the military turned to TVA for assistance. Many of the maps used by U.S. forces in Europe, were made at TVA. In my series of interviews with TVA personnel, earlier this year, I heard a lot about the experiences of some of those pioneers, but an earlier conversation with a colleague in Illinois, is more pertinent to the issue at hand. Bob had been the Officer in Charge of the Signal Company assigned to locate and repair a German, buried telephone system in France in June 1944. He told me that the P.I. report was so good that they never missed the cable by as much as a foot whenever they dug a hole. A post war review of all of the information prepared for the Normandy invasion revealed that the P.I. reports accurately predicted the effect that the French hedge rows would have on Allied tanks, but this information was ignored. We weren't alone in misuse of our data. One of the reasons for General Rommel's absence from Normandy on June 6th, 1944, was that his P.I. reports indicated that General George Patton's tanks showed no signs of moving to an embarkation point. He considered Patton our best commander, believed that we wouldn't move without him, and didn't know that his "tanks" were mostly rubber balloons. Post-war analyses revealed successes and failures of photo intelligence in almost every major battle in Europe.

Similar events occurred in the Pacific. The late Bob Colwell, a Navy P.I. for the invasion of Guadalcanal and later the Rear Admiral who served as the first Director of the Naval Reserve Intelligence Program, shared some of his memories with me and told me the following:

"Early in 1942 the commander of a large U.S. Navy Task Force in the Pacific belligerently refused to use aerial photos. In fact, he frequently stated that none of 'his' aircraft would ever be allowed to use a 100-pound aerial camera during attacks on the enemy when it could carry another 100-pound bomb instead." and

"By the end of WWII, Admiral F. J. Turner wrote in his official report: 'Aerial reconnaissance has been our primary source of information throughout World War II here in the Pacific Ocean Area. Its importance cannot be overemphasized.'"

An analysis of events preceding the Battle of the Bulge revealed that a number of units had detected significant amounts of unusual German activity, but that these reports had not been collected into a coherent story. This review recommended some significant changes in how such data should be handled, but the report was filed quietly away (Smith, 1957).

THE "POST WAR ERA"

The disparity in attitude of senior commanders has been and continues to be a major factor in the underutilization of our overhead intelligence collection assets. The term "senior commanders" needs to be interpreted carefully, as the following excerpt from one of my TVA interviews suggests. Armand Hitchcock had gone to work for TVA in 1942, earning \$1260 per year. He didn't stay there very long because he was drafted, assigned to a Combat Engineering unit and spent much of the war mapping islands in the Pacific. He didn't return to TVA until 1951, when they were making hydrographic charts for the Navy. Information was being sent to them to add to one chart, but they didn't believe the information was correct. Armand put it this way: "There was one piece of material that didn't fit right. I kept calling....the guy in Washington that I was dealing with about this source map. I said, It's not right. He says, 'We can't take it back. I got all that information from the CIA. They know its right, and it has to be right,....' I was reluctant to put that in knowing that it was wrong, but I was ordered to do it. Of course, when the Navy got it back, as soon as they got into that area they found it was wrong."

My own active duty began in 1953. From 1954 to 1956, I was assigned to the U.S. Navy Photographic Interpretation Center in Anacostia, Maryland, primarily as an instructor of Radar Targeting and Oblique Photo Metrics. Our classes included both officer and enlisted students, with officers outnumbering enlisted by about three to one. As an instructor, I began collecting anecdotes to enliven my presentations. One of my colleagues told me of this experience when he was the P.I. attached to a Navy attack squadron operating over Korea. Their missions were primarily directed at bridges, a bridge was usually in a valley, and this limited their direction of attack. Just prior to one mission his Commanding Officer asked to see the new photos of the target. He laid them in front of him and pointed out the locations of the camouflaged anti-aircraft guns on the ridge tops. His C.O. turned, looked at him and said: "I had my flight physical yesterday. I have 20-20 vision in each eye, and if I can't see it it's not there." He didn't return from that mission.

In February 1962 I completed my Reserve Active Duty stint at the Fleet Intelligence Center at Pearl Harbor. My assignment was to prepare the Inland Waterways Section of a special intelligence report on Laos. While looking for photos to illustrate the nature of the terrain along the Mekong's tributaries, I found a brand new set of photographs of a bridge with one end in the water. In trying to find the photo with the best illustration of terrain conditions, I discovered that the photos, while all labeled with the same coordinates, were actually of different bridges and that at least one bridge along every major road leading to Vientiane had been cut in a three day period. When I reported this to my Section Head, I was told, "That's not our concern."

Vietnam

After leaving active service in 1956, I remained in the Naval Reserve Intelligence Program as a "Selected Reservist" for another thirty years. During this period I was also teaching Image Interpretation and Remote Sensing at the University of Illinois and then the University of Michigan. At Michigan I held a joint appointment including the Infrared Physics Laboratory in the Institute of Science and Technology. When thermal sensors were not performing as expected in Viet Nam, we were asked to help find out why. This led to deployment to Thailand where we set up a series of tests designed to mimic conditions in Viet Nam. Our data was good enough that I could tell if a human being was standing, kneeling or prone, and if a weapon had been recently fired. When we were asked to brief General Westmoreland at MACV Headquarters, I volunteered and was part of the University of Michigan briefing party. While in Saigon in July 1965, I was asked, by the DARPA folks, to visit as many image interpretation facilities as possible and identify improvements that might be made. Our first visit was to the Mohawk squadron providing thermal data for the Army. When we entered the trailer, the interpreter was calling in a flash report from the morning mission, and we were given permission to look at the imagery that was on the light table. We found an outline that matched about half of the plan of a Communist Terrorist camp discovered in Thailand. We all agreed it was real and manmade, but the interpreter said, "I can't report it. I'm under orders to report only obvious hot targets." When we asked what happened to the imagery, he told us, "It goes immediately from here to silver-recovery." Thus the imagery we had looked at could not be used in comparative or sequential analyses, and it is very unlikely that anyone was keeping an eye on that "camp."

Visits to other image interpretation facilities revealed that only the ARVANS, limited to B&W Pan photography, were doing any comparative or sequential analyses. We also noticed that almost all of the imagery we saw was of very high contrast, and were told that this was necessary to get an image through a FAX machine to Washington with enough detail to be used in briefing the President. Several years later, I saw a copy of the manual that had guided image processing in Viet Nam in 1965 and read that original negatives "shall be processed to a Gama of 1.5, or higher." That might provide good images of buildings on bare earth, but would result in such high contrast that virtually no differentiable detail would be provided for vegetated areas.

As a result of our visit to Saigon, the Air Force proposed sending one of its RB-57s to Bangkok to fly our test sites. During the visit, one of our technicians asked if he could look at the operator's console. He found key controls taped in place with masking tape and was told they had been taped down by the Tech Reps when they were training in West Texas. Since thermal sensors are humidity sensitive, the optimum settings for West Texas are not the right ones for the humid tropics.

One of my University of Michigan students enlisted in the Marine Corps. His first assignment after finishing OCS was into Da Nang during the siege. He soon learned that the tall vegetation in front of his position was honey-combed with trails that could be used by attacking forces. When he asked for some air photos of the terrain in front of his position to help plan his defense, his request was denied because, "You don't have the need to know," and no one bothered to supply him with a map of the trails.

Despite some missteps, overhead imaging capabilities were a valuable resource throughout the Viet Nam conflict. So much so, that one of the first demands made by North Vietnam during the May 1968 peace talks in Paris was the cessation of reconnaissance flights over North Vietnam (Infield, 1970).

Cuban Missile Crisis

Monitoring of Cuban missile positions continued for some time after the declaration by President John F. Kennedy in 1962. During a two-week assignment to the Atlantic Intelligence Center at Norfolk, Virginia, I had the opportunity to review a number of photographs taken over an eight month period that had been seen in the monthly Atlantic Intelligence Digest that originated at AIC. The review confirmed what I had suspected: all illustrations showed the same anti-aircraft missile battery, the missile was always in exactly the same position flat on its launcher, there was no sign of track activity at the site, and vegetation could be seen gradually spreading over the revetment. Other interpreters at AIC agreed that this was probably an inactive site, but I was told they couldn't report it because monitoring those batteries was someone else's responsibility.

Defense Meteorological Satellite Program (DMSP)

In 1979 I was sent to the Naval Environmental Prediction Research Facility at Monterey, California, to assist in finding ways to accelerate adoption of new technology in the fleet, with some emphasis on the DMSP. As part of that assignment I visited the Navy's downlink facility at NAS Coronado, where the person on duty told me about his prior assignment on an attack carrier. The DMSP receiving console was located in the Intelligence Spaces and the intelligence officers hated it. Why? Because the CO kept running into the Intelligence Spaces to find clouds to hide under. Putting a monitor on the bridge could have cured that problem. While visiting the facility at Coronado, we looked at some real-time images of some desert areas with sand storms clearly visible. When a similar dust storm was a major factor in the failure of the Iranian Hostage Rescue Mission, less than a year later, it was hard not to wonder if the DMSP data had been ignored.

REFLECTIONS ON WHAT SHOULD HAVE BEEN LEARNED

It is highly unlikely that we will ever be able to remove political machinations from the intelligence process. Too many folks have been trained to think only of their own personal bottom-line.

Relatively few senior officers trust new fangled gadgets and rely more on the experiences that got them to the positions they are in. My interviews with Emeritus Members of ASPRS provide many examples of this, only a few of which have been mentioned. How to continue the training of senior officers is a problem, but it's not the biggest.

At a time when my Naval Reserve Mobilization Billet was as Deputy-Director of the Armed Forces Air Intelligence Training Center at Lowry Air Force Base, Colorado, I discussed image interpreter training needs with RADM Robert Colwell. Bob pointed out that, during World War II, the most successful photo interpreters tended to be those with significant field experience, such as foresters, geologists, agronomists, and sometimes engineers. These were usually officers; but we agreed that we both knew a lot of very competent enlisted image interpreters. On reflection, most of these were senior Chief Petty Officers with many years of experience. We discussed problems in finding good interpreters that intensified after Secretary of Defense Robert McNamara let it be known that officers should be managers and the enlisted folks the doers. Few new recruits, however secured, have had extensive field experience. Having been a Boy Scout or Girl Scout helps, but is seldom enough. To obtain anything useful from them in their first enlistment, training time must be relatively short. We tend to train them to use the equipment we expect them to use during their first tour of duty. The best ones may reenlist and obtain more schooling, again tailored to their expected assignments. Then, we take the best of those folks and assign them as instructors, and they tend to teach that subset of what they learned that they actually used. This tends to inbreed incompetence.

Today, as our whole industry is turning more and more to computers for image processing, the emphasis is on developing good computer skills. Accuracy of computer interpretations seems to be peaking at about 80 to 85 percent (Olson, 2008). Since human programmers design their programs to identify what they want, or expect, to find, few are able to handle the unexpected. As Kass Green pointed out in a recent address, these programs do an excellent job of handling routine analyses, leaving time for experienced interpreters to address the unusual and unexpected. Given today's emphasis on computer skills, where are these experienced interpreters?

Another problem lies in excessive compartmentation that makes it difficult for information developed by one unit to be transmitted effectively to others. While security requires some compartmentation, those requirements should not prevent a unit discovering unusual activity from communicating that information to another unit more directly involved. In many cases the restriction is only in the minds of officers who are reluctant to overstep their bounds and "don't want to get involved."

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