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# *Journal of the* Air Force Historical Foundation

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know the past

.....*Shape the Future*

# Journal of the Air Force Historical Foundation

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Features	The Aviation Art of Rick Herter	7
	Joint Task Force Proven Force and the Gulf War (Part 6) <i>Theo van Geffen</i>	21
	Memoir of First Night <i>Joe Healy</i>	37
	Seventies' Incidents Impacting Weapon System Acquisitions used in Desert Storm <i>Ray Ortensie</i>	45
	Perception-vs-Reality: The True History of Weaponized Weather and Operation Popeye in Southeast Asia <i>David Reade</i>	65
	Some Technical Aspects of the Evolution of the Titan Weapon System <i>David K. Stumpf</i>	101
	The "Bloody Hundredth" and "Masters of the Air" <i>Mark Clodfelter</i>	127
	Winged Victory: The American Air War Over Europe in World War II <i>Phillip S. Meilinger</i>	131
	Missile Development 1945-1960: A Winding Path <i>Robert V. Gates</i>	139

Book Reviews	<i>My Darling Boys, A Family at War, 1941-1947</i> By Fred H. Alison	Review by Peter B. Mersky	146
	<i>The Nature of World War I Aircraft: Collected Essays by Javier Arango</i> By Javier Arango	Review by Carl J. Bobrow	146
	<i>The "Blue Squadrons": The Spanish in the Luftwaffe, 1941-1944</i> By Juan Arráez Cerdá and Eduardo Manuel Gil Martínez	Review by Gary Connor	147
	<i>Russian Bombers</i> By David Baker	Review by Frank Willingham	147
	<i>Pigs, Missiles and the CIA Volume One: Havana, Miami, Washington and the Bay of Pigs, 1959-1961 &amp; Volume Two: Kennedy, Khrushchev, Castro and the Cuban Missile Crisis</i> By Linda Rios Bromley	Review by John Cirafici	148
	<i>A6M2/3 Zero-sen; New Guinea and the Solomons 1942 &amp; Operation RO-GO 1943; Japanese Air Power Tackles the Bougainville Landings</i> By Michael John Claringbould	Review by Gary Connor	149
	<i>Pacific Profiles Volume 11 Allied Fighters: USAAF P-40 Warhawk Series South and Southwest Pacific 1942-1945</i> By Michael John Claringbould	Review by David S. Brown, Jr.	150
	<i>Clean Sweep: VIII Fighter Command Against the Luftwaffe, 1942-1945</i> By Thomas McKelvey Cleaver	Review by Daniel J. Simonsen	151
	<i>Only the Light Moves: Flying Covert Reconnaissance Missions in the Vietnam War</i> By Francis Doherty	Review by John Hladik	151

List of reviews continues on page 3

Departments	In Memoriam: Jack Neufeld	6
	Upcoming Events	158
	History Mystery	160



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# Perception-vs-Reality: The True History of Weaponized Weather and Operation Popeye in Southeast Asia

David Reade

Image of an actual tropical cloud seeded with Silver iodide, during the US Navy's Operation GROMET II (the Philippines 1969) as part of drought relief efforts. (Photo courtesy of Dr. Edwin X Berry.)

In certain instances, perceived history, as presented in the public domain as factual history, were in reality often misconstrued, with elements which were incorrect or not historically accurate, with the perception of the story teetering on the edge of representing modern mythology. (*The public domain referred to here is that historical information contained within current and archival newspapers, magazines, books and internet webpages and other media.*)

One public domain historical story, that surrounds the Vietnam Conflict (1955 – 1975), is the military utilization of weather modification as a weapon of war, as conducted under classified U.S. military efforts known as Project & Operation Popeye (1966-72). Popeye comprised the use of various cloud seeding technologies (and techniques) to principally extend the rainy monsoon season in Southeast Asia (SEA), to “muddy-up” the Ho Chi Minh Trail system—that winds its way through areas of North Vietnam, Laos, Cambodia and South Vietnam—to tactically support U.S. interdiction efforts to counter infiltration of North Vietnamese combatants and supplies flowing into areas of South Vietnam. (The Ho Chi Minh Trail was a complex network of jungle roads, routes, trails and footpaths used to covertly travel from the north to the south of Vietnam. Many parts of the Ho Chi Minh Trail still exist today, with various sections of the route having been paved as components of the newer Ho Chi Minh Highway.) It was thought that utilization of the ever-growing technology of weather modification (during the 1960s -70s) might provide a viable means to support the further prosecution of the war.

## Weather as a Weapon

Weather has always been of interest to the military and became of greater interest to them with the beginning of manned flight and subsequently more so with the era of Jet aviation. But as the Cold War era began and soon heated up, perceived threats from the Soviet Union had the U.S. military scrambling for new weapons. Weather control had been suggested as a potential new Cold War weapon which needed to be explored in greater detail. As a proposed new weapon, weather modification seemingly had the potential to release large amounts of energy to destroy an enemy force, deny his use of the battlefield, while causing costly economic hardships at home, or in some cases, improve the battlefield weather

\* **Author's Note:** Recently, in the pages of this publication, the concept of perceived history -vs- the reality of history was presented. (“Historical Perception vs Reality: the Story of Joseph B. Duckworth’s 1943 Hurricane Flights;” the *Journal of the Air Force Historical Foundation*, Vol.70, No.1; Spring 2023.)



North Vietnamese supply vehicles proceed along the Ho Chi Minh Trail.



Project Popeye WC-130A Hercules in 1968.

conditions (strategically) towards the advancement of one's own forces.

Proposed military applications for cloud seeding technology / weather control efforts comprised the release of violent weather against an enemy's territory, disrupt agricultural areas of a nation for strategic purposes (hindering a nation's commerce), influence weather (heavy rain or snow) to hinder an enemy's troop movements, rendering incapable the enemy's ability to logistically resupply itself or control weather precipitation as a means to deliver biological and or radiological agents.

Despite the perceived threat posed by Soviet climate change and cloud seeding experiments, it was the United States of America that has the distinction of being the first nation in the world to have implemented weather modification as a weapon in active conflicts.

The weather modification effort in question here, Popeye, came to fruition during the Vietnam Conflict, when clandestine cloud seeding aircraft flew over remote and steamy jungles of Southeast Asia to cause a near-steady state of monsoon rainfall in an effort to flood out key stretches of the infamous "Ho Chi Minh Trail" (HCMT) and stem the flow of logistical material transport and personnel along the trail network by Viet Cong guerrillas (VC) and

North Vietnamese Army (NVA) units. U.S. Department of Defense (DoD) estimates in 1966 suggested between 58,000 and 90,000 NVA troops (at least 5 full regiments) infiltrated into South Vietnam via routes that make up the Ho Chi Minh Trail system. At the time, U.S. intelligence reports further established that North Vietnamese forces were building drivable sections of road along the trail network from North Vietnam through to Laos and Cambodia. Thus, the interdiction of enemy movements along the trail was paramount and the implementation of cloud seeding / weather modification as a tactical weapon was employed.

### Project Popeye (1966)

As the Popeye story goes, on September 17, 1966, the secret weather modification project in SEA was initiated, as an experimental pilot program to test the feasibility of extending the rainy monsoon season in Southeast Asia. With the proposed goals to hamper or impede North Vietnamese traffic along the HCMT network, by muddying up the trail system, washout key intersections and way stations, while making new vehicle route sections impassable. This project, utilizing cloud seeding (weather modification) technology developed by military scientists, was to extend the regional monsoon season and increase normal rainfall to soften (muddy) up road surfaces, create landslides along the roadways, washout river crossing and generally maintained soft soil conditions beyond the normal rainy season. The overall goal of the experimental project (Project Popeye) was to test the theories of extend the existing monsoon season by 30 to 45 days to muddy up sections of the trail system and (if possible) increase the annual monsoon rainfall averages by upwards of 20-30 percent.

As presented in the public domain, Project Popeye (and its follow-on Operation Popeye) cloud seeding program was a project carried out by the DoD / U.S. Air Force and flown by specially modified USAF C-130 Hercules transport aircraft and Air Force tactical reconnaissance jets flown solely from the Royal Thai Air Force Base, Udorn, in Thailand.

Most of what is perceived in the public domain about this tactical rainmaking program in SEA is attributed to a

*David Reade is a retired international aerospace consultant, aviation journalist and once leading authority on maritime patrol and scientific research aircraft. As P-3 Publications, Reade continues to write authoritative historical articles associated with little known aspects of aviation history and a book on the unrealized history of hurricane hunting aircraft, since before WWII to present. It is in this area, backed up by considerable (deep) archival research, that has led Reade to reinterpret our understanding of the history of hurricane hunting, the aircraft utilized and the people involved, to correct the perceptions of history and present the unrealized reality of it. The article presented here, is but a small example of the overall history of Hurricane Hunting and the perceptions -vs- the reality of that history.*

subsequent top secret (classified) DoD briefing on the subject provided to U.S. Senator Claiborne Pell (D. Rhode Island) and his subcommittee on Oceans and International Environment (a component of the Senate's Foreign Relations Committee) in March 1974, newspaper reporting at the time, as well as aviation based internet webpages and articles detailing the USAF Air Weather Service's 54th Weather Reconnaissance Squadron participation in the Popeye cloud seeding flights\*.

*It's interesting to note;* that a transcript of the March 1974 classified DoD briefing regarding rainmaking in SEA, provided to Senator Pell's committee, was arbitrarily released to the public (approximately 8-weeks later) in May 1974 by Senator Pell into the congressional record as a declassifying disclosure effort to bring the program's specific information on the secret SEA rainmaking to the immediate attention of the American People.

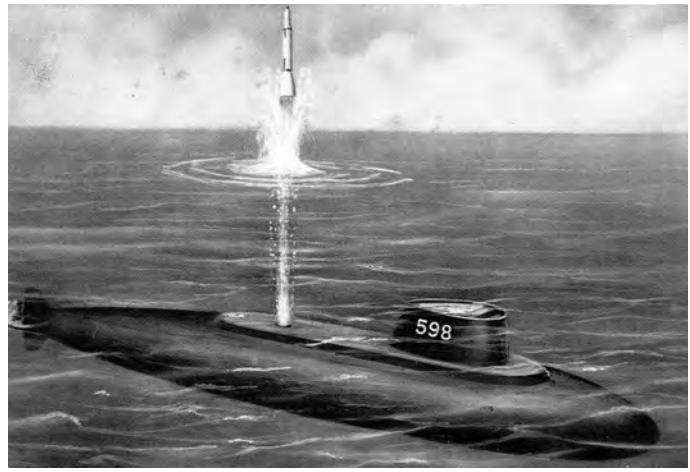
Under public domain perceptions of Project [and Operation] Popeye histories, it has been suggested that Popeye was the first, or single, or only weaponized weather modification project conducted during the Vietnam Conflict, and more importantly during the decades of the 1960s-70s. And further, that Popeye was a weaponized weather modification program of the DoD and or the U.S. Air Force during this period.

The reality of weather modification history, and specifically that of weaponized weather, is much more comprehensive and equally convoluted than that presented by the public domain. The unrealized history of weaponized weather encompasses the fact that Popeye was just one in a long series of weaponized weather "*applications*" utilized in SEA and elsewhere in the greater extent of the Cold War. And that Popeye (*i.e. weaponized weather*) was actually conceived, pioneered and conducted by the U.S. Navy !

## The Reality of Weaponized Weather

During the Cold War with the Soviet Union (1945-1991), there was a point within the U.S. Military establishment where both the U.S. Air Force and the U.S. Navy competed for the position of being the primary United States' strategic (nuclear) force. The USAF's Strategic Air Command (SAC) with its state-of-the-art Jet Bombers carrying the latest versions of nuclear bombs, versus the U.S. Navy with its brand-new fleet of nuclear ballistic sub-

\* There are other perceived public domain weather modification history references mentioning Popeye and the weaponized weather modification flights in SEA, that are subject to misconstrued (historical) information as well as biases beliefs and concepts associated with specific weather modification conspiracy theories at the core of contemporary fringe weather control conspiracies - like those regarding the current Chemtrail weather control conspiracy. In this specific case, misconstrued interpretations of weather modification history are presented within the public domain as "smoking-gun" evidence to justify their conspiracy theories.



Concept image of the Navy's nuclear-powered submarine fleet and their sub-launched "Polaris" missile system.

marines outfitted with the Navy's newly developed and sophisticated (nuclear tipped) Polaris Missiles.

Unfortunately for the two services, the newly elected Kennedy Administration (1961) had essentially established a policy of co-existing with the Soviet Union, with diplomatic efforts made to relax strained relations between the two Superpowers - derailing any U.S. military concepts (or plans) towards a first-strike nuclear attack on the Soviet Union. Thus, relegating the U.S. strategic nuclear arsenal to that of a deterrent capability. They were basically being told that they were not going to be allowed to arbitrarily "Nuke" Russia.

The U.S. Navy in particular, having just spent hundreds of millions of dollars (billions in today's dollars) on its fleet of nuclear submarines with ballistic missiles (foregoing new modern Aircraft Carriers and other combatant ships until the 1970s) was not pleased. But in retrospect of this White House decision, the Navy continued to believe in an eventual confrontation with the Soviet Union. Presented with this situation, the Navy began exploring concepts for the development of a new, non-nuclear, super weapon that would have the (equivalent) power of an atomic blast to destroy the Soviets outright in any confrontation that might emerge.

Ultimately, through a series of coincidences and timing, the Navy settled on the potential of "weather" as a weapon and began to fund development of cloud-seeding technologies to create weapons of war.

As originally established in the online article; "*The Unrealized History of the Military's Utilization of Weather as a Weapon, the 'Real' Father of Weaponized Weather and the Secret Hurricane Modification Program Nobody Has Ever Heard Of*" by David Reade; P-3 Publications (January 2015), the basic story begins at The Naval Ordnance Test Station (NOTS; later the Naval Weapons Center or NWC), China Lake, California. Back in 1958-59, China Lake was asked to revise or redevelop a new survival smoke (signal) marker for Navy aircrews and jet pilots downed at sea. Although the existing Navy survival smoke markers worked well enough on land, it was difficult to see from a long distance during seaborne search and rescue missions. The



Aerial photo of China Lake.

China Lake chemists and technicians eventually developed a smoke marker in 1960 that produced huge amounts of smoke, given its relatively small package. These smoke markers were made up of a pyrotechnic compound comprised of Silver iodide.

As established by renown atmospheric chemist Dr. Bernard Vonnegut, (pure) Silver iodide catalyzes supercooled water, within convective storms, to freeze into ice. A cloud seeding catalyst must not dissolve before the supercooled liquid has a chance to freeze. Silver iodide is relatively insoluble in water and has a particular structure similar to that of ice crystals. Thus, this chemical reaction / process induces clouds to produce rain or snow. Silver iodide was therefore the perfect chemical to be used for any cloud seeding project.

At China Lake, this Silver iodide (smoke) pyrotechnic compound was quickly recognized as being of potential interest to weathermen in weather modification projects and operations being conducted or contemplated within the United States. China Lake quickly became the center-of-excellence for the production of cloud seeding compounds, development of cloud seeding generators and different cloud seeding techniques for countless public civilian, joint civilian and military operations, and or just military cloud seeding projects and programs across the United States and the world.

It was in this capacity that China Lake additionally became the originator of a secret weather modification program for the Navy itself, that saw the development of weather as a weapon beginning in 1960-61. Supported by the Special Projects office of the U.S. Navy's Bureau of Weapons (i.e. Bureau of Naval Weapons), later by the meteorological section of the Office Of Naval Research (ONR) and later still the Navy Weather Research Facility, between 1960-1966, China Lake entered an experimental phase for the development of cloud seeding processes and procedures as well as the testing and implantation of strategic and tactical "applications" of weaponized weather – some covertly conducted using on-going public civilian or joint cloud seeding experiments as cover.

China Lake's development of weaponized weather began with the establishment of the "Atmospheric Control Experiment" (or ACE). ACE was a Research, Test, Development & Evaluation (RTD&E) program to develop the hardware, materials, procedures and techniques (and technologies) specifically needed to develop weather modifica-

tion capabilities that could be used to establish tactical and strategic (as well as economic and political) applications of weaponized weather. ACE also comprised the development of associated scientific activities, such as atmospheric physics, cloud physics and weather research capabilities, at China Lake (and elsewhere), that would aid in the establishment of weather control programs.

It's seemingly apparent, that ACE was an over-arching program towards the development of weaponized weather projects and the "first" application of weaponized weather to be developed just happened to be the exploitation of hurricanes as a weapon starting in 1961.

Again, as introduced in "*The Unrealized History of the Military's Utilization of Weather as a Weapon, ...*" See previous page), China Lake secretly conducted experimental cloud seeding operations into Atlantic hurricanes between 1961-1966. The hurricane seeding flights were flown by various Navy aircraft (and USAF AWS Aircraft) within the open ocean areas of southwestern North Atlantic, the Western Caribbean Sea and the Gulf of Mexico, with little or no restrictions placed on the China Lake personnel involved in management of the experimental seeding flights. Unlike the subsequent public Project Stormfury\* hurricane seeding operations of the U.S. Weather Bureau (jointly with the Navy), that conducted weather modification operations [to weaken hurricanes] out of Puerto Rico into a small, boxed seeding area approximately 100 miles (161 kms) x 150 miles (241 kms) – bound by rigid restrictions.

While Stormfury only seeded about three or four hurricanes in its 21-year existence, the Navy's (China Lake) secret hurricane program seeded dozens of hurricanes between 1961-66 alone. Under this secret effort, hurricanes were intensified and steered towards Cuba to wrought destruction on the island-nation from the power of these tropical giants.

\* Some public domain references suggest that Project Stormfury "was" itself a malevolent covert hurricane seeding program of the U.S. Government / U.S. Military conducted to weaponize hurricanes instead of the publicly stated goals of this hurricane research project to weaken the storms. The reality of the situation is that Stormfury was not exploiting hurricanes towards the development as weapons. However, the U.S. Weather Bureau jointly conducted Stormfury with the U.S. Navy (i.e. the Navy Weather Research Facility via ONR funding). The NWRF in turn subcontracted (if you will) their side of Stormfury to the weather modification experts at China Lake. The same group conducting covert hurricane seeding efforts to weaponize hurricanes. According to China lake archival records and published materials, it seems pretty evident that China Lake "utilized" their participation in Project Stormfury to provide cover for their secret hurricane seeding operation's funding and logistical activities. They also used Stormfury as a cover, additionally when countries such as Cuba and Mexico complained about perceived manipulation of hurricanes that struck their territories. (as presented in newspaper stories at the time.)



Project Stormfury aircraft.

Later, between 1966-75, a more operational phase of the Navy's weaponized hurricane modification effort took place (sponsored by the same folks that ran rainmaking operations in SEA) whereby the Navy (China Lake) created, intensified, and steered hurricanes towards Cuba to wreak havoc on the Cuban economy - in an overall effort to destabilize the island nation's agricultural industries, including sugar (cane), tobacco, coffee and bananas for export. This weaponized hurricane seeding operation was additionally offset by another covert cloud seeding/weaponized weather modification application, designed to strategically cause severe "droughts" in Cuba, again to destabilize their agricultural exports and cause a cascading economic collapse of the Cuban economy.

However, within the confines of this specific historical treatise; one of the most documented weaponized weather modification applications conducted by the Navy (China Lake) was its establishment of a tactical rainmaking operations in SEA, to support the ongoing U.S. military efforts to stem the flow of enemy infiltration into the south via the Ho Chi Minh Trail (i.e. the HCMT).

### **The Real Project Popeye (1966)**

As presented in the public domain, Popeye was tasked to reduce the "trafficability" along the main logistical resupply and infiltration routes from the north to the south, by softening road surfaces, saturating the soil to encourage landslides and generally cause wide-spread flooding to wash out roads and river crossings along the HCMT. Project Popeye was the secret experimental phase of this weaponized weather modification program to test the feasibility of extending the rainy monsoon season in Southeast Asia.

*It's interesting to note;* that many of the public domain references for the Popeye story like to mention a side-story suggesting that the CIA had first utilized cloud seeding in SEA back in 1963 via its proprietary air service "Air America". As the story goes, Air America utilized a Beechcraft Model 18 Twin Beech, configured for Silver iodide cloud seeding, as part of a CIA cloud seeding scheme to hamper

and suppress anti-Diem Government demonstrations by Buddhists Monks in the city of Hue and elsewhere in South Vietnam. However, according to Air America archival documents (kept at the University of Texas – Dallas, McDermott Library, Special Collections Dept, "CAT/Air America Collection") there is no actual evidence that this proposed cloud seeding event ever took place. Even if it had, it might have only warranted a footnote as the first "political" application of weather modification in military history. The reality is that the newspaper reporters, and or their sources for this story, confused this cloud seeding story with an actual Air America aircraft configured for a "herbicide spraying" effort conducted about the same time-frame (1963-64) in Laos – as part of the CIA's secret war in Laos between 1961-75\*.

### **SACSA**

There are a couple of different public domain versions of how Popeye was initiated and introduced into the Vietnam War. One public domain reference (interestingly generated from China Lake published materials – that is

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\* If one were hard pressed to present a potential "first" tactical application of weather modification as weapon in SEA, then you wouldn't have to look any further than the French Indochina (colonial) Government during the siege of Diem Bien Phu in 1954. With more than one hundred tons of supplies per day streaming into French Indochina (from southern China), supporting the communist Viet Minh insurgency and the siege of the French fortress at Diem Bien Phu, the French military turned to one of its chief meteorologists for help. Col. Robert Genty, suggested a cloud seeding concept to increase precipitation to hasten an early onset of seasonal monsoons and muddy up the Viet Minh's supply routes by which to stem the flow of supplies and support the ultimate breakup of the siege at Diem Bien Phu.

Genty eventually came up with and conducted a number of cloud seeding test flights with Silver Iodide, mixed with activated charcoal, dropped by parachutes into cumulus clouds from a modified French Air Force Sub-Quest SO-30P Bretagne cargo – transport aircraft, with significant results. The artificial rain making (test) project's first seeding flight created a torrential downpour as well as a hailstorm within minutes of the seeding operation over an area 25 miles (40 kms) across, near Diem Bien Phu, that lasted 2 hours. However, before this cloud seeding concept could be implemented operationally by Genty, the Communist insurgents overran Diem Bien Phu and forced the surrender of the French colonial forces. This action ultimately led to the complete withdrawal of French control over Indochina. It was later acknowledged, by General Giap commanding the Communist insurgents, that heavy rains associated with the normal monsoon season did severely disrupt his army's supply lines with several of the truck routes turned to quagmires, and supply trucks sunk up to their bumpers in deep mud.





Viet Minh trucks labor through the mud.

consistent with a subsequent declassified DoD briefing on the project) suggests that the DoD/U.S. Air Force approached China Lake to support Popeye. This reference further suggests that the approval chain for authorization came down from the President (Johnson), through the Secretary of Defense (McNamara), to Air Force Director, Defense Research and Engineering (Dr. Foster) down to China Lake. That Project Popeye was approved by McNamara on September 17, 1966. Unfortunately, this version of the Popeye story is not historically correct and further casts suspicions that China Lake (with the CIA) was deliberately trying to hide this weaponized weather project under the DoD and U.S. Air Force, presumably for them to take the blame if things went south.

Although a long and convoluted story, the reality of it is that China Lake actively marketed its weather modification capabilities to various potential DoD, CIA, and other U.S. National Security customers, that encompassed secure briefings including motion picture presentations of actual weather modification seeding operations. In July – August 1966, one of those potential customers contacted China Lake and Project Popeye was the end result.

The reality is that the public domain perceived “September 17, 1966” authorization for Project Popeye by Defense Secretary Robert McNamara, was “not” an authorization and further was “not” an authorization for Project Popeye. The September 17, 1966 so-called authorization (document) was a request from McNamara to the Naval Commander-in-Chief of the Pacific (C-in-C Pacific) and Military Assistance Command - Vietnam (MAC-V) to come up with an interdiction / anti-infiltration system, to stem the flow of North Vietnamese combatants and their resupply “Trafficability” from the north to the south along the Ho Chi Minh Trail; and have it operational by 1967\*.

\* The September 17, 1966 McNamara request document is actually the impetus of a subsequent interdiction / anti-infiltration system developed to help stem the flow of North Vietnamese combatants and their resupply efforts through the HCMT network, that was op-tested in 1967 and fully operational by August 1968. This interdiction program was known as *Igloo White*.

The actual Popeye project was independently requested, tasked and authorized over a month before this McNamara request document, by a little known and little understood (covert) organization secreted within the Pentagon; known as the office of the SACSA!

Popeye (and other applications of weaponized weather in SEA) was ultimately sanctioned by the office of the “Special Assistant for Counter – insurgency and Special Activities or SACSA” (an office embedded within the Pentagon somewhat) positioned under the Joint Staff Services of the Joint Chief of Staff (JCS) that was responsible for covert operations in Southeast Asia and (later) elsewhere in the world. At that time, only a small minority of Washington insiders knew that the SACSA office was effectively a covert CIA control office secretly embedded within the DoD.

*A word here about the CIA & SACSA:* we now know that SACSA was essentially a covert “secret team” of the CIA, embedded within the Pentagon. Its mission was to influence military and political policies as well as to provide the logistical support (and authorization) for covert operations throughout Southeast Asia and later around the world. Confirmation of and descriptions of the SACSA office is provided by one of its participants, USAF Col. L. Fletcher Prouty and recently by declassified CIA archival [CREST] documents.

Prouty had worked in this CIA secret team office in the Pentagon even before it was reorganized and designated SACSA in 1961. (the SACSA office was established from a component section of a previous entity known as the Office of Special Operations – positioned under a support organization of the Secretary of Defense) Later in a book he wrote “*The Secret Team: The CIA and Its Allies in Control of the United States and the World*”, Prouty outlines the inner workings of the SACSA office, its basic location within the Pentagon (office / room #1E962) and that it was manned by U.S. Military personnel working for the CIA, as well as CIA personnel posing as U.S. Military officers. In a bizarre twist of perceptions, subsequent DoD / Joint Chiefs of Staff personnel believed that the SACSA office was a support office (function) of the DoD / Pentagon, while the DoD / Pentagon believed this office to be a support element of the Joint Chiefs of Staff’s service staff. Although Prouty himself didn’t actually disclose the “name” of his secret team office in the Pentagon, (until much later in other writings) as being the office of the SACSA, recently declassified CIA archival [CREST] documents have now revealed the background, makeup and personnel assigned to SACSA in the 1960’s and 1970s. In these declassified CIA documents, Col. Fletcher Prouty is listed as a member of the SACSA office. Thus, verifying his book’s details about the secret team’s covert activities, as that of the SACSA office.

Some recent public domain references report the SACSA office was an openly (known) subordinate office of the DoD / Joint Chief’s of Staff, thus covert operations were those of the DoD. The reality is, however, that at this time of the 1960s and 1970s, the U.S. Military (DoD) “had no” covert counter – insurgency and special activities opera-

tions. Only the CIA did. All the special forces, covert and to some concern, Clandestine operations that were conducted within Southeast Asia (1963-75) were CIA operations utilizing U.S. Military resources and personnel under the cover of U.S. DoD operations. The SACSA office independently planned, authorized and logistically coordinated U.S. Military support to CIA clandestine service operations in SEA. SACSA was the CIA.

SACSA's area of responsibility (AOR), originally comprising covert operations in Southeast Asia through its in-country control elements under MAC-V, was suddenly expanded from Southeast Asia to all areas of the world in July 1965. This coincides with the U.S. Government's expansion of covert activities against Cuba, previously conducted by other divisions of the CIA at Langley. Later, the forementioned secret geophysical warfare campaign (weaponized hurricanes [1966 -75] and the drought seeding project [1969-75] run by China Lake) employed against Cuba, were also sanctioned by SACSA. According to recently declassified CIA archival [CREST] documents, the expansion of the SACSA's AOR was approved to specifically provide the means for the CIA to step-up its covert actions and operations against Cuba. At this time of its expanding AOR, SACSA's clandestine position within the DoD - JCS / Pentagon was somewhat legitimized via the office being quietly re-located into the support staff of a (non-descript) DoD Assistant to the Secretary of Defense position (as cover) – while still retaining its completely covert special operations mission and independent authorization. According to an article published in the "Joint Forces Quarterly", The journal of the National Defense University, entitled "the Great Divide: Strategy and Covert Action in Vietnam" (Autumn / Winter 1999-2000) by Richard H. Shultz Jr., SACSA routinely bypassed all normal bureaucratic (chain-of-command) procedures to approve and maintain tight controls over covert activities to keep them secret from even the DoD / Pentagon and Joint Chiefs if necessary.

## Kissinger

Some public domain references suggest that Secretary of State Henry Kissinger (along with the CIA) authorized and or ran the rainmaking operations in SEA. However, this is not specifically correct. Both Project Popeye and Operation Popeye were initiated long before Kissinger was ever appointed a Presidential National Security Advisor, to Nixon when he became president in January 1969. Again, SACSA, with its unique positioning within the Pentagon authorized and controlled the weaponized weather modification program, with the Navy (China Lake).

However, it can be said that Kissinger might have had knowledge of U.S. weaponized weather modification programs (in 1969) in his position of NSA Advisor and then more specifically with regards to those China Lake weaponized weather applications being conducted against Cuba. According to recently declassified CIA archival [CREST] documents, Kissinger (with Nixon's approval) was asked to be "read-into" all CIA covert operations, and



President Richard M. Nixon & National Security Advisor Henry Kissinger.

particularly those specifically against Cuba. Kissinger subsequently ordered another round of escalations in covert operations against Cuba in 1969, that saw additional geophysical warfare applications levied against Cuba, by China Lake.

So to recap, it's seemingly unlikely that more than a handful of U.S. Government officials ever really knew about weaponized weather modification operations being conducted by the SACSA (via the Navy) in SEA, against Cuba and or elsewhere. President Johnson only came to know about the rainmaking program in SEA, specifically Operation Popeye, via a (Literally Eyes Only) internal memo from White House Special Assistant for National Security Affairs, Walt W. Rostow on April 29, 1967 – after the operational phase of Popeye was already in progress. (the memo was an excerpt from one of the weather modification program's weekly reports, April 14-20, 1967, that contained intelligence information regarding U.S. troop contacts with the enemy – that seemingly contradicted other intelligence reports present to the President.) There was an additional May 23, 1967 memo to Rostow - for Johnson – from Donald F. Hornig, Special Assistant to the President for Science and Technology. This memo related to potential areas where the weather modification activities in SEA might be exposed visually and how that might translate to the secret weather modification project underway in India.\*

\* Not generally known, is that at this time in 1967 the Johnson Administration was trying to expand U.S. influence to other nations susceptible to Communist interventions. In an effort to open doors, the Johnson Administration offered U.S. Science and Technology (transfers) to normalize relations with other countries. India was in the midst of a severe drought and sought help from the U.S. via drought relief cloud seeding. Because of tensions between India and its neighbor East Pakistan, India wanted to have the rainmaking operations carried out in secret. Thus, the subsequent rainmaking operations were conducted via the CIA – subcontracted to China Lake. President Johnson only became aware of the rainmaking operations in SEA via the rainmaking (drought relief) project in India.



An actual secret hurricane seeding aircraft in the war against Cuba, circa 1963.

Nixon didn't find out about Popeye operations (and potentially the other SEA applications) until late 1972, when he and Kissinger were briefed on the weather modification operations as they related to potential U.S. -USSR treaty negotiations and subsequently requested for government approval associated with the Congressional Environmental Modification (ENMOD) ban, via the Senate approved resolution SR-71.

*It's interesting to note:* that Nixon, through Kissinger, requested specific information from the DoD / JCS for weaponized weather operations data to support decisions on Soviet Treaty talks and actually received resistance. Nixon / Kissinger then asked for a "study" associated with "...Military aspects of Environmental [and] or Geophysical modification activities...and capabilities..." According to a declassified Department of State copy of the so-called study - *Foreign Relations of the United States, 1969-1976, Volume E-14, Part 2, Documents on Arms Control and Proliferation, 1973-1976*, # 42. *Paper Prepared in the Department of Defense Washington, April 19, 1974; A Study of the Military Aspects of Environmental or Geophysical Modification Activity in Response to NSC Memorandum, (January 25, 1974).* In the DoD Report, under the sub-heading Current Capabilities: the DoD again states "...[that] at present, no capability exists to alter the environment in a controlled (militarily useful) manner through oceanographic, terrestrial, or ionospheric modification techniques. Accordingly, this section addresses weather modification activities in fog, precipitation, severe storms, and inadvertent weather modification. The conclusion is that even in the cases of the most advanced knowledge in weather modification technology (fog and precipitation), the state-of-the-art is minimal ...."

The study report goes on to suggest that current operational programs within the DoD encompasses "...only two DoD programs are operational, an Army warm fog dissipation using helicopters, and an Air Force cold fog dissipation using airborne dry ice and ground-based propane seeding ...." (i.e. there is no mention of the Geophysical warfare campaign still being waged, at the time of this reports writing, against Cuba involving the intensification of Atlantic hurricanes steered towards the island nation, and a cloud seeding project to cause severe droughts in Cuba

until early 1975). After reviewing this so-called Study, the Nixon administration issued National Security Decision Memoranda 165 (NSDM-165) that effectively decided to defer a decision on the matter of policy governing Military Aspects of Weather Modification as a weapon of war. NSDM-165 was signed by Kissinger.

### Project Popeye Authorization

SO, the actual authorization in 1966 for Popeye flowed down from SACSA, through the Chief of Naval Operations (CNO; Adm. D.L. McDonald), to the C-in-C Pacific (Adm. R.L. Johnson), with dotted lines to National Security Advisers (W. Rostow) in the White House, on to MAC-V (Gen. W.C. Westmoreland), who provided all logistical support authorizations for the program in-country. The day-to-day functional control of Popeye's seeding flight operations and technical support to the cloud seeding missions, in country, was commanded by NOTS / NWC China Lake personnel. China Lake additionally provided all participating personnel training, supervisory and leadership direction for the project as well as managed all of the scientific analysis and design, manufacture (fabrication) and distribution of all seeding dispensers, canisters and seeding agents used in SEA\*.

The Navy program lead for China Lake's secret geophysical warfare program, and the commander for weaponized weather applications in SEA was Mr. Pierre Saint-Amand. Despite what various public domain references suggest, Pierre Saint-Amand pioneered the development of military (tactical) weather modification, the weaponization of weather, at China Lake. In fact, he pioneered successful weather modification in general, with dozens of patents (shared and alone) and numerous technical papers that demonstrate the processes, techniques, equipment, and capabilities of cloud seeding that were used by the U.S. military and that are still being used by commercial cloud-seeding companies today.

Known as a geophysicist, Saint-Amand had a Ph.D in Geophysics and Geology and was widely known as an earthquake expert, when he joined NOTS China Lake in 1954. In 1960-61, Saint-Amand was assigned to the Astronomical Sciences Division of the NOTS's Research Department (later the Earth and Planetary Sciences Division of NWC) with the important task of developing the Navy's weather modification capabilities based initially upon NOTS-developed pyrotechnic silver iodide compounds as

\* Different public domain references suggest that Popeye operations had no physical or analytical data that was captured during the program, to provide definitive metrics as to the successfulness of the weather modification effort - casting doubt as to the effectiveness of the program. Despite this perception, specific China Lake personnel were on hand in-country to collect, analyze and document parameters of the program. Although some public domain references report (in some cases quoted by senior military personnel) that the program had marginal effectiveness at best, the reality is somewhat different.



China Lake personnel running Popeye operations, in Da Nang (circa 1966-68); (Admiral) Pierre Saint-Amand is second from left. The U.S. Naval Officer next to him is Cdr. Frances R. “Knobby” Walsh Jr., China Lake’s technical program officer for Popeye in-country at the time.

well as other cloud seeding solutions and materials. Subsequently promoted to head of the Earth and Planetary Sciences Division, Saint-Amand personally ran or oversaw all of China Lake’s numerous weather modification projects, often managing projects on the ground himself in such places as India, the Philippines, Southeast Asia, the Western Pacific (Midway and Okinawa), the Azores, and throughout the United States. He personally led China Lake’s technical contingents to Puerto Rico each year in support of Project Stormfury, conducted most of the pre-brief / cloud seeding training of military flight crews conducting drought relief cloud seeding operations in the far Indian Ocean, Western Pacific and Eastern Atlantic oceans. He was the man that pioneered the weaponization of weather beginning in 1961, that encompassed those “rainmaking” applications in Southeast Asia (1966-72).

For those with a keen-eye and a nose for proper military etiquette, it is evident that Saint-Amand was a civil-service civilian and should not have been permitted to command these Popeye operations in SEA. And yet, he did! In reality, there was a U.S. Naval Officer (from China Lake) who was the actual program / project manager of Popeye and the other weather modification operations in-country. This officer was the Navy uniform lead on the ground and was the officer in operational control of these programs. However, this officer clearly deferred his lead elements of command and control of the weather modification programs over to his civilian boss at China Lake, Pierre Saint-Amand, during the duration of their time in Southeast Asia. In fact, sometime within the 1967-1969 timeframe, Saint-Amand picked up the moniker of “the Admiral” and was arbitrary address as Admiral in any of his dealings with various regional commanders over any logistical support issues or regards to authorizations in country.

Project Popeye, under Saint-Amand’s direction, comprised the utilization of several in-country airborne assets from the U.S. Military, including various transport aircraft from the U.S. Air Force and jets from the U.S. Marine Corps to conduct flight operations to seed the clouds over Laos.

Although the public domain and internet suggests or infers that Project Popeye (1966) was based out of the Royal Thai Air Force Base at Udorn, Thailand, the reality is that the project was run out of Da Nang (South Vietnam) with support elements operating out of the RTAFB at “Ubon”, Thailand and the Pleiku Air Base, in Vietnam’s central highlands. (Ubon is approximately 300 miles [488 kms] northeast of Bangkok and specifically within 37 miles [60 kms] west of the southern Thai border with Laos.)

Under the experimental Project Popeye, the USAF provided two troop carrying (tactical airlift) C-130A transport aircraft, flown by individual transport flight crew elements of the 374th Airlift Wing (Okinawa) that were temporary



Pierre Saint-Amand (at left) in the Azores.



VMFA 115 F-4B Phantom Jet.

assigned to the Air Weather Service's 54th Weather Reconnaissance Squadron (based in Guam), while the U.S. Marine Corp's VMFA-115 squadron (out of Da Nang) furnished three F-4B Phantom jets flown by select flight crew elements of this Squadron.

As established in the online article "*The VMFA-115 Rainmakers of SEA: Now You Can Know the Rest of the Story*" by David Reade; P-3 Publications 2006, the VMFA-115 "Rainmakers of SEA" were based at Da Nang Air Base. Between August and October 1966, three of VMFA-115's F-4B Phantom jets were selected for used as the primary seeding aircraft for Project Popeye. The F-4Bs were flown by a small select group of three pilots and three Radar Intercept Officers (RIOs) from the squadron. The flight crews would fly the "rainmaking" missions, seeding the clouds and then standby on station to assess the reaction of the clouds to the cloud seeding runs.

For the project, the F-4B were equipped with a modified version of an A-6 photoflash ejector, coupled with Silver iodide seeding flares, dubbed "Wimpy" by China Lake personnel during the project - in keeping with the Popeye cartoon theme. Developed by China Lake, the so-called Wimpy system comprised 40mm aluminum photoflash - type cartridges made up of pyrotechnic Silver iodide seeding material. The cartridge dispensers were incorporated into a specially designed aerodynamic launching / dispensing canister developed specifically by China Lake for high-speed jets. Each mission ran about 4.5 to 5 hours in duration.

Most of the project's seeding flights were flown in the early afternoon from Da Nang, conducted under the guise of the Air - to - Air "Hot Pad" flight operations, that were maintained at Da Nang. Hot Pad flights were conducted like a 5 - minute "ready alert" scramble, where manned and ready flight crews stood-by armed and ready aircraft - to quickly takeoff on seemingly non-scheduled combat flights. The Hot Pad area was far away from squadron's normal flightline activities, further down the Da Nang flight line. Again, only a very small number of the Squadron's personnel knew about the Popeye rainmaking flights. The Squadron's air-to-air Hot Pad duty flights, con-



VMFA 115 F-4B Phantom Jets in roughly 1966.

ducted for other commands, were not maintained (documented) in the Squadron's regular operations reports, furthered helping to hide the squadron's cloud seeding / rainmaking flights. In fact, the Project Popeye missions are not even mentioned in the Squadron's official history, despite Popeye's declassification since 1974.

Most of the Project Popeye's cloud seeding flights were conducted over the Annamite Mountain range and a wide area of the Se Khong River Valley (*watershed*) east of the Bolaven Plateau, in the panhandle region of Laos. The experiment's targets were cold cumulus clouds at altitudes between 14,000 (4267m) and 19,000 feet (5791m) that were seeded with Silver iodide smoke. One of the first experimental seeding flights saw seeded clouds drift over the border into South Vietnam and dump heavy rains over a wide area. A U.S. Special Forces A-camp, located in the heart of VC territory along the border, recorded approximately 9-inches of rain over a 4-hour period.



The areas of Laos seeded under the experimental Project Popeye (1966).



Pierre Saint-Amand (right) with one of the Project Popeye C-130As equipped with Grumpers in SEA, circa 1966.

One of the two USAF C-130A transport Hercules that were utilized, flew as the command, reconnaissance and monitoring (control) aircraft during the seeding missions, and served as a back-up seeding aircraft when needed. The second Hercules aircraft, flown from Ubon, scouted for the clouds to be seeded and provided for a secondary (backup) seeding capability when required. This scout aircraft often served as a flight-test aircraft for the various seeding devices that were evaluated during this experimental rain-making project\*.

\* In fact; there were an additional 23 cloud seeding flights flown (not recorded in Project Popeye records), by both the Air Force C-130A and the Marine F-4B, over open ocean areas off the South Vietnamese coast, east of Da Nang, ostensibly for cloud seeding practice and or cloud seeding equipment / systems tests. During Project Popeye upwards of six experimental pyrotechnic Silver iodide smoke generators and seeding devices were tested and evaluated during these cloud seeding experimental flights. Besides the small hand-fired (AN/M-8 Very Pistol) flare called "Sweetpea", the Hercules aircraft were (test) equipped with a specially modified rocket -motor version of the China Lake's ALECTO seeding device called "BLUTO" as well as a seeding smoke generator dubbed the "Grumper". (the Grumper comprised a Silver iodide smoke generator based upon a modified JATO rocket housing filled with pyrotechnic Silver iodide seeding compound) Several Grumpers were fitted to the standardized JATO rocket assist racks mounted on the starboard and portside air deflector doors of the project's C-130A Hercules - and utilized the aircraft's existing JATO rocket fire-control panel in the cockpit to ignite the seeding generators. Additionally, modified versions of China Lake's Cyclops II and a standardized ALECTO flare ejector system (dubbed "Olive Oyl & Goon Girl" keeping with the Popeye cartoon theme) were also tested during the experiment project. But the two units were deemed too hazardous for operations and not suitable for the experiment as they burned too hot and could cause jungle fires if they made it all the way to the ground. They were subsequently only used for aircrew practice (training) cloud seeding flights flown over open ocean areas off the coast of Vietnam.



Project Popeye C-130A with Grumpers, circa 1966.

Another specific element of Project Popeye, that is little-known within the public domain, is the project's utilization of two Douglas A-1E Skyraider ground-attack aircraft, from the USAF's 1st Air Commando Squadron, based in Pleiku. The Skyraiders provided low-level observation and (ground) precipitation assessment reconnaissance, during their normal tactical missions along the Ho Chi Minh trail network.

Unfortunately, the Skyraiders had trouble visualizing the accumulated rainfall produced by the cloud seeding flights from the air. The subsequent fix was to have F-105 Strike (attack) aircraft (likely from the 432nd Tactical Reconnaissance Wing out of Udorn), sent out to bomb sections of the Ho Chi Minh trail in the areas that were to be seeded—once radioed by one of the C-130A scout planes. The heavy general-purpose bombs (approximately 500 pounds) would create large bomb craters, that would fill up with rainwater from the cloud seeding flights. The Skyraiders could then fly over the sections of the trail and see how filled the bomb craters were.

For this situation, China Lake had actually bombed areas of their test ranges back in California and ran water into the craters. The China Lake technicians then took photos of the craters with water at different levels. Measuring the amount of water at the various levels, allowed them to create a visual (photo) index of water filled craters



Douglas A-1E Skyraider ground-attack aircraft, from the USAF's 1st Air Commando Squadron, based in Pleiku.

that corresponded to specific measurements. Armed with the crater photo indexes, the Skyraider pilots could give rough estimates of rainfall amounts from several hundred feet up\*.

So as not to give away their cloud seeding missions, to the enemy or other U.S. Forces in-country, Project Popeye utilized a series of code-words and code-names, over the radios, to hide their operations, while coordinating their operational flights. The Air Force Hercules were codenamed Vulture 45, the Marine F-4Bs were Condole 100 & 101, while the A-1E Skyraiders used Hobo 1& 2 as call signs.

Under the experimental weather modification project, China Lake conducted 56 experimental cloud seeding flights, (33 flights flown by the Marine F-4Bs and 20 sorties flown by the Air Force C-130As) of which 48 of the mission sorties were deemed successful, equating to an 85.7% success rate of seeded clouds producing significant rainfall. (Under the project, the A-1Es flew 36 mission support sorties)

Project Popeye completed its experimental flight operations in early November 1966, with enough positive results that recommendations were forwarded back to Washington for the initiation of an operational phase of the tactical weather modification mission in Southeast Asia. Although Project Popeye had the in-country support of those knowledgeable regional commanders, including the U.S. Ambassador to Laos (William H. Sullivan), the Navy C-in-C Pacific and of course Navy headquarters, the project was not immediately approved.

*A word about the successfulness of Project Popeye;* In a U.S. State Department memo (sent by Deputy Under-Secretary of State [for Political Affairs] Foy D. Kohler, to Secretary of State Dean Rusk) it was stated that "... the experiments were undeniably successful ..... and in some cases too successful ...." However, a read of "Project Popeye; Final Report" the technical sections of the report, with much supportive scientific analysis of collected metrics / data during the seeding flights, indicates "less" than the stellar results than those offered by Kohler to Dean. In fact, the Final Report clearly expresses that the results from the project were inconclusive and could not be proven "absolute" in any basis of statistical treatment, having fallen short of those results expected.

In other sections of the report, the results of Project Popeye were categorized as "... that they were more than adequate ..... [that] artificial induced rainfall was [within] quantities to [achieve the results sought] at a relatively low cost. ....". Saint-Amand, who wrote a good portion of the re-

\* This process was cumbersome and required many revolving parts to work in coordination. That meant "reading" more people into the highly classified project that was Popeye, which provided increased opportunity for accidental disclosure. Ultimately, under Operation Popeye, the Skyraider & bombing aircraft process eventually went away and another process to capture more accurate rainfall accumulations was devised – as we will see later in the pages ahead.



Secretary of Defense Robert S. McNamara

port generally categorized the project as "can successfully produce tactically significant rainfall to extend the monsoons in Laos and Cambodia."

Again, with glowing recommendations of knowledgeable regional commanders and those from other political figures-in-the-know, including an urgent request from the DoD / JCS (SACSA) to start the next phase of Project Popeye before the onset of the southwest monsoon in early 1967, the operational phase of Popeye was not immediately approved. It was said that there were concerns about the program over at the U.S. State Department and with the Defense Secretary, Robert McNamara.

Despite what might be expected and established by the public domain, the reality of this situation is that its abundantly clear that McNamara had little or no knowledge of the rainmaking (weaponized weather modification) operations in SEA prior to early 1967, when the State Department and others brought the matter to his attention, according to declassified CIA archival [CREST] documents and those of the U.S. State Department archives. Just at the point SACSA was making preparations for the follow-on operational phase of Popeye, McNamara became aware of Project Popeye, and then subsequently Operation Popeye. Thus, it's evident (by his subsequent actions) that he had not previously approve the former rainmaking (experimental) program back in 1966 and was not aware of the follow-on operational program until after it was already in operation, disclosed to him in early 1967\*. In fact, some Mc-

\* Historical Note: according to declassified CIA archival [CREST] documents, archival documents of the U.S. State Department and information contained within different McNamara biographies and books, McNamara was despised by the War Hawks at the Pentagon (DoD & JCS) and CIA. It would be in keeping then, under normal procedures, for SACSA to exclude as much of the U.S. Government as possible from having visibility to their actions and operations. (According to a declassified CIA archival [CREST] document, the CIA adhered to a secrecy doctrine that was less about adversaries knowing about covert operations, than it was about the U.S. Government and the Public. ....

Namara biographies suggest he only found out about Op Popeye during a visit to Saigon and that he immediately moved to shut it down.

However, the events of 21 February 1967, brought into stark clarity the need to interdict the HCMT. On this date, a counter-offensive strike by NVA agents and VC insurgents (infiltrated into South Vietnam via routes and trails that made up the Ho Chi Minh Trail system) during Tet celebrations in Saigon and the surrounding area, disrupted the normal celebrations. This attack specifically targeted U.S. and South Vietnamese command and control centers. The North Vietnamese further sought to incite an uprising among the South Vietnamese people to topple the U.S. - backed Saigon Government and cast out the Americans invaders. No action taken by the enemy so apply demonstrated the need to disrupt the infiltration routes along the Ho Chi Minh Trail system†.

In the days after this Tet attack, SACSA had all the authority it needed to green-light the operational phase of its tactical weather modification program in SEA, despite any reservations from officials within the Administration. With the gloves off now, Operation Popeye and the tactical use of weaponized weather was about to enter the war unchecked and ready to destroy the enemy.

*It's interesting to note;* that the press itself reenforced this scenario, reporting that once McNamara found out about of Operation Popeye, he ordered the U.S. Air Force to shut it down, in late 1967, as reported by Seymour Hersh (*“McNamara Ordered to End Rainmaking in 1967 reported”*; *New York Times 4 July 1972*). In this article, Hersh speculates whether McNamara's orders were intentionally disobeyed, ignored or disregarded by the very military forces he was supposed to have directed. In retrospect, this incident demonstrates that McNamara, as Defense Secretary, had no knowledge of the Popeye, had not authorized it and when he learned about it, tried to shut it down. Unfortunately, asking the wrong branch of service to stop doing it. He apparently asked the “Air Force” to stop, while the U.S. Navy (via SACSA) continued the program unabated. This incident further speaks to the underlining polarization within the U.S. Government that surrounded the Vietnam War in the 1960s and 1970s.

## Operation Popeye (1967-72)

The operational phase of the weaponized weather application program in Southeast Asia, “Operation Popeye”,

The secrecy of covert operations also reduces the possibility of effective monitoring within the U.S. Government [itself ...] ) It was because of this adversarial relationship between the Secretary of Defense and his Defense Department (and a perceived stress-induced mental breakdown) that President Johnson asked McNamara to resign. He left his position as Secretary of Defense on 29 February 1968. In retrospect, it's abundantly clear that McNamara was not involved in approving or controlling Popeye operations in SEA and only became aware of these weaponized weather modification operations late in his tenure.



14th TRS RF-4C at Udorn.

commenced in March 1967. (at China Lake, this program was seen as an extension of the first, i.e. “Phase II of Project Popeye”, but as time progressed, they abandoned this mind-set and viewed “Operation” Popeye as a whole different stand-alone operation) The seeding flights were flown just before the onset of Southwest Monsoon season (between April and September) with an objective of increasing the normal amounts of rainfall during the monsoon season and then to extend the seasonal conditions further through October or about 30-45 more days. Special attention was paid to increasing rainfall to washout river crossings, saturating the soil to cause landslides and to make the trails and supply routes muddy and impassible.

The perceived technical success of the pilot project supported the authorization for the operational phase of the tactical weather modification program in SEA, albeit with a few changes. Under this revised weather mod program, the primary seeding missions were now flown by specialized C-130 Hercules transport aircraft manned by flight crew elements of the USAF's 54th Weather Reconnaissance Squadron (WRS), forward deployed to RTAFB Udorn, Thailand. The Herks were supported by photo-reconnaissance RF-4C Phantom jets from the USAF's 14th Tactical Reconnaissance Squadron (of the 432nd Tactical Reconnaissance Wing) also based at the Udorn. Udorn had been the home base airfield for the CIA's Air America since 1955 and was still something of a classified air base throughout the 1960s. Operations here were limited with many flight operations being conducted here given the tight confines for ramp space and personnel accommodations.

† The mention here of insurgent attacks in February 1967 during Tet celebrations in the south, sounds a lot like “the Tet Offensive” captured by the U.S. press and displayed on U.S. National Televisions in March 1968. Seemingly not well understood in the public domain is that the Tet Offensive of 1968 was just one of a number of insurgent attacks launched against U.S. and South Vietnamese commands during annual Tet celebrations (Tết Nguyên Đán, that celebrates the arrival of spring) during the Vietnam war. Although the March 1968 Tet Offensive is the most widely known, there were others, like that which occurred on 21 February 1967.





14th TRS RF-4C from Udorn.

The USAF 14th TRS committed a revolving two-jet detachment to fly project missions. The RF-4C Phantom jets were equipped with several wing and fuselage mounted Silver iodide flare dispensers (52 flares per unit) fitted on each aircraft. These RF-4Cs, when tasked, seeded clouds at 19,000 feet (5791m) as secondary seeding aircraft. The RF-4C additionally conducted routine photo-reconnaissance missions in conjunction with the seeding missions\*

*It's interesting to note;* that according to the Project Popeye, Final Report, Saint-Amand had a whole different vision of how "Operation" Popeye should have been carried out – aircraft wise. In his mind, Popeye should have been

\* Not fully understood within the public domain, and not constructively outlined in USAF historical and operational archival documents, is that the 14th TRS didn't actually arrive in-country (Thailand) at Udorn until 28 October 1967, at the moment that Operation Popeye seeding flights were ending for the year. Thus, the reality is that the 14th TRS did not actually participate in Operation Popeye in 1967. Given that public domain and general U.S. Government Popeye related document references suggest that during Operation Popeye "... some 591 rainmaking sorties (expending more than 6,570 cloud seeding flares) were flown by unarmed and unescorted WC-130 and RF-4C aircraft in 1967 ..." questions the veracity of these references -or- that "other" RF-4C jets flew for Popeye during 1967. Given that most of the existing references for Popeye all suggest that the 14th TRS flew weather modification (seeding) flights in 1967, (again) when they hadn't arrived in-country yet, a look around the base at Udorn for that time period reveals some interesting clues. Apparently, the 11th Tactical Reconnaissance Squadron, also assigned to the 432nd TR Wing, was based at Udorn between October 1966 to November 1970, flying RF-4C. An additional close examination of the 11th TRS's operational records establishes that during its time in Thailand, the squadron also flew "weather reconnaissance flights" (classified - speak for weather modification flights) over planned strike areas. Given the classified nature of Operation Popeye, this may be the best we get to proposing that the 11th TRS may have actually flown weaponized weather modification operations in 1967.



54th WRS WC-130E.

an "all Navy show" with the utilization of U.S. Navy Carrier Attack aircraft provided by 7th Fleet Aircraft Carriers off the Vietnamese coast. In this scenario Navy Carrier A-6A Intruders and A-4B (C or E) Phantom jet attack aircraft would be assigned to the seeding missions. With Carrier F-8E (RF-8A) Crusader and or A-3B (RA-3B) Skywarriors providing the aerial scout and reconnaissance tasks, while E-2A Hawkeye surveillance planes, provided the cloud seeding (director) control aircraft duties. But for reasons unknown, Operation Popeye's aircraft utilization tracked more like Project Popeye, encompassing aircraft already "in-country" instead.

Under Operation Popeye, the 54th WRS initially flew three of their WC-130E Hercules weather reconnaissance aircraft in the primary seeding role for most of the first season in 1967. Although most public domain references suggest that the 54th flew specially modified WC-130A aircraft in 1967, this is not specifically correct. In the rush to put the operational phase of weaponized weather modification into action, the three C-130A transport Herks acquired by program as seeding aircraft, had been required by the AWS to be converted to the "W" (i.e. Weather Bird) weather reconnaissance configuration first (by the USAF's Warner Robins Air Materiel Area or "WRAMA" at Robins AFB, Warner Robins, Georgia.) that encompassed weather reconnaissance capabilities and provisions to operate a newer variant of the China Lake developed Silver iodide flares ejectors, based on an early version of the Navy's (China Lakes) SUU-53/A Cold Cloud silver iodide seeder dispenser. The early Silver iodide smoke generator (flare) dispensers comprised a photoflash dispenser rack mounted to the existing aircraft's JATO rocket assist mounts on both sides of the aircraft, on the air deflector doors. The Silver iodide seeding flares burned for 36 seconds as they dropped down some 3,000 feet (914 m).

*Aircraft Background:* there is some public domain confusion over the C-130s Hercules used in Project Popeye (1966) and the WC-130A used in Operation Popeye (1967-72). The internet suggests the Hercules aircraft utilized in Project and Operation Popeye were to have been transport Hercules aircraft #s 56-519, 56-522 and 56-537 that were assigned to the 54th Weather Reconnaissance Squadron. However, this is not specifically the case. USAF archival



Operation Popeye WC-130A #519.

records indicate that the initial two C-130A transport aircraft used in Project Popeye (1966) were not among the three aircraft later used in Operation Popeye (1967-72) and were never assigned to the 54th WRS in Project Popeye. Project Popeye's two C-130As were more than likely aircraft #s 56-520 and 56-518 or 56-523 and were assigned to the 315th Air Division / Group out of Okinawa. The C-130A Hercules aircraft that were acquired, up-graded and modified into weather reconnaissance WC-130A were aircraft #s 56-519, 56-522 and 56-537. Due to the time it took to convert the aircraft, the WC-130A did not begin to filter into the first season of Operation Popeye until after June/July 1967. It was only then after these WC-130A were reconfigured and delivered to Guam did they officially become assigned to the Squadron. These Hercules aircraft were later phased out of Operation Popeye during June /July 1970 with the 54th squadron relegated to utilizing their own WC-130E weather reconnaissance / typhoon reconnaissance aircraft as seeding planes after July 1970. Additionally, some public domain and internet references suggest that after the retirement of the Squadron's WC-130As, the 54th WRS acquired WC-130Bs and flew them on Popeye rainmaking missions in SEA. This is also not specifically correct. In 1970-71, due to a lack of available aircraft (associated with Defense budget cuts, Depot maintenance and repairs during a peak in mission taskings for the AWS) the 54th WRS's typhoon reconnaissance mission was augmented by two WC-130B Hercules (and two flight crews) from the 53rd WRS from the US. There is no evidence in USAF AWS records of these two (53rd WRS) WC-130Bs having flown rainmaking flights in SEA. Later in 1970, the 45th was assigned three (new-ish) WC-130Bs, but these aircraft were immediately tasked with other AWS missions and borrowed by other AWS squadrons. Again, there is no evidence in the records of these newer B-model herks ever flying Popeye missions.

*It's interesting to note;* that one of the original Project Popeye C-130A transport Hercules (#56-0518) was later transferred to the South Vietnam Air Force (the Republic of Vietnam Air Force -or- RVNAF) in November 1972, at Tan Son Nhut AB, Saigon. Later during the fall of Saigon (29 April 1975), a South Vietnamese Air Force flight instructor pilot ( known only as Maj. Phuong) commandeered



Project Popeye C-130A (#56-0518), now a Gate Guard display aircraft at Little Rock AFB in Arkansas, USA.

this aircraft (one of the last aircraft at Tan Son Nhut, not already destroyed by NVA troops streaming into Saigon) and flew 450-plus refugees out of South Vietnam – landing hours later at RTAFB U-tapao, Thailand after getting lost. The aircraft at this point was reclaimed by the U.S. Air Force and continued to serve with the Air Force for many more years and is currently a gate guard (display aircraft) at Little Rock AFB in Arkansas, USA.

Under Operation Popeye, the Squadron's Hercules aircraft were the primary seeding aircraft, flying two seeding sorties per day, with one of the two Herks acting as a cloud scouting plane. This scout plane would go out and reconnoiter clouds in the target area to be seed and report back to the base for the other seeding aircraft to launch. The WC-130 would then direct the seeding aircraft to the cloud's position (coordinates) and provide the flight levels for the freezing layers by which to commence their seeding runs.

One 54th WRS aircraft and crew would rotate in and out of Udorn every 20 days, with no more than two WC-130s on the air base at any one time. Once arrived at Udorn, the flight crews and the aircraft were (temporary) administratively assigned to the AWS's 1st Weather Group. This facilitated the means to coordinate ramp spaces to park aircraft, logistics (meals and lodgings) for the aircrews as well as provide various aircraft maintenance and flight services while on the Thai Air Base. There was limited ramp space and logistical lodgings at this busy base, and specifically for Operation Popeye, no more than 50 personnel could be accommodated at any one time.

The operational Popeye seeding missions were conducted over Laos, Cambodia, parts of South Vietnam and North Vietnam. Although some public domain references like to focus on those seeding flights that were flown over North Vietnam, U.S. DoD and Congressional (Popeye) records show that seeding flights flown into areas of southwestern North Vietnam (just over the border) only occurred for a few short weeks in 1967 and a 5-6 week period between September and early November 1968. Other than these very short periods in 1967-68, there are no other archival records or evidence that indicates Popeye ever flew over North Vietnam again. The Popeye missions were focused specifically on those key areas of the HCMT, along the Viet Cong resupply and infiltration routes, as part of a much wider U.S. military counter – insurgency, trail interdiction program.

However, according to other U.S. Government archive documents, Operation Popeye flew a number of seeding missions off the coast of North Vietnam. Although unconfirmed and not proven in fact currently, is the possibility that these known seeding flights in North Vietnamese coastal areas were associated with alleged “storm” seeding flights conducted on tropical storms, remnant typhoons or convective thunderstorms. *This issue will be discussed later in the pages ahead.*

As the tactical weather modification operations continued, other issues arose that were not (*well*) reported within the public domain and are presented here probably for the first time. One issue comprised the fact that flying these cloud seeding missions, in a combat zone, were not without its hazards. Popeye seeding aircraft were shot at, damaged, and in one case, shot down during rainmaking operations.

### WC-130A Battle Damage

On June 11, 1970, while supposedly conducting an Operation Popeye cloud seeding mission, one of the 54th WRS's WC-130A (#56-0522) received “battle damage”. Back at AWS Headquarters (at Scott AFB, Illinois), during the commander's morning (reconnaissance) ops briefing, it was reported that a 54th WRS aircraft was damaged, a victim of combat action. A civilian Air Force Historian (John F. Fuller) who had been permitted to sit-in on the AWS's morning briefs, made a formal request of the organization's commanding officer to write-up a news release of the aircraft battle damage sustained in SEA. Mr. Fuller presented the case that this was the “first” instance of an AWS aircraft receiving combat battle damage in the Vietnam War and more importantly ever in AWS history. However, Fullers' request was denied. Given that the 54th WRS was known as a weather reconnaissance unit that (publicly) conducted typhoon reconnaissance flights in the Western Pacific, the Air Force would be hard pressed to explain why the aircraft received combat damage in the skies over Vietnam.

Unfortunately, not much more is known of this situation. Apparently, the squadron did not file an accident report on the aircraft. Potentially because the area of damage was confined and easily repairable, given that this particular aircraft was already scheduled to be retired from squadron soon, it might have been seen as a waste of time and money to fix the aircraft on the 54th's dime. Additionally, any official paperwork on this aircraft for battle damage repair might have opened up the covert program to disclosure and this was to be avoided at all times.

However, the circumstance of the battle damage is still in question. Popeye seeding flights occurred at approximately 18,000 - 19,000 feet (5486 -5791 m), which is well outside the range of small arms fire from the ground at about 3500 feet (1067 m). At normal operating altitudes, one might suspect a SAM missile strike against the WC-130A. But even a near-miss missile strike, would have produced potentially more damage than was reported.

Others might suggest that the battle damage occurred during the unit's weather reconnaissance flights, known



This photo of undamaged WC-130A (56-0522) was at Andersen AFB, Guam in 1970. [taken by Tom Robison]

(according to the public domain) to have been flown in SEA, conducted at lower altitudes – except for one specific and salient point. The 54th WRS “did not” fly weather reconnaissance flights in or over SEA (towards regional forecast and warnings) despite public domain references to the contrary.

It has been presented in the public domain (and referenced in some USAF historical summaries) that the 54th WRS flew weather reconnaissance flights in SEA, towards support of regional weather services' forecasts. However, this situation is not historically correct. The weather activities conducted in SEA are too comprehensive to express here, but suffice it to say, there were countless U.S. weather station detachments and smaller weather units in operation all around the SEA region.

This misunderstanding of the 54th WRS having conducted weather reconnaissance flights comes from a couple of different elements. One, in an effort to disguise the secret rainmaking operations in AWS headquarters internal comments and references, the Popeye operations were referenced as “special weather reconnaissance flights in SEA”, as a cover, later misinterpreted by public domain writers and historians. Another associated reference that appears in some public domain rainmaking documents and narratives about the 54th WRS flying weather reconnaissance flights deals with the dropping of dropsondes to capture weather data supporting regional forecasts. Again, this has been misconstrued. There are other public domain assumptions that the squadron conducted weather flights, suggesting that the squadron's WC-130s loitered over areas of Eastern Laos, the HCMT, and over areas of the Mekong Delta, off Da Nang and elsewhere. Although, the 54th did drop dropsondes during “specific” seeding operations and shared this dropsonde weather data with their AWS counterparts at the 1st Weather Group at Tan Son Nhut AFB, they “did not” fly dedicated weather reconnaissance flights in SEA.

In reality, the AWS, through the 1st Weather Group, placed experienced AWS weather officers onboard USAF EC-121 Big Look intelligence & reconnaissance aircraft (of the 552nd AEW&C Wing), supporting tactical strike aircraft operations, coordinating North Vietnamese Mig jet intercepts and communications control and relay missions. From here the weather data collected on the AEW&C EC-

121 aircraft, loitering over these various areas of SEA, found its way to the 1st Weather Group at Tan Son Nhut – that helped produce the regional weather forecasts and warnings. And finally, there are public domain references to the 54th flying weather reconnaissance flights out of Udorn over SEA and the Bay of Bengal (BoB) in the Indian Ocean supporting the weather picture for Vietnam War. In reality, again, the 54th did not fly weather reconnaissance flights over SEA. However, the 54th WRS was tasked to fly weather reconnaissance (and tropical cyclone reconnaissance flights) over the BoB and the Indian Ocean, beginning in October 1971. But not in support of the Vietnam War.

The 54th WRS's weather reconnaissance / TC reconnaissance flights were flown by squadron WC-130Es to support the deployment of the U.S. Navy's 7th Fleet, USS Enterprise carrier battle group [Task Force 74] into the Indian ocean – associated with escalated tensions in the on-going Indo-Pakistan War. The area weather reconnaissance flights and those reconnaissance flights flown into Indian Ocean (BoB) tropical cyclones were not associated with the war in SEA. So, the Hercules battle damage was not on a count of flying non-existing weather reconnaissance flights.

Although it's currently unclear specifically how this Popeye WC-130A Hercules received its battle damage, DoD archival documents (including Pacific Air Force Command "Contemporary Historical Evaluations of Combat Operations or CHECO" reports in SEA) establishes that as U.S. Government officials requested further increases in B-52 Bomb strikes along the HCMT areas of Laos between 1968-72, North Vietnam officials had no choice but to move new mobile SAM missile and (KS-19) 100mm anti-aircraft guns into areas adjacent to the HCMT in Laos.

Given the aircraft's normal cloud seeding attitudes, its possible to have had the explosion of a SAM missile in close proximity by which to have cause the minor damage to the cloud seeding Hercules. Additionally, the apparent battle damage may have been derived from the 100mm anti-aircraft artillery (AAA) guns. A civilian ex-China Lake employee, who worked on the Navy weaponized weather modification program in Udorn, reported the issues associated with the placement of SAM missiles and AAA guns along the HCMT. He reported, that every time they popped out of cloud they seeded, every person on the aircraft was looking for the plumes of fire along the ground indicative of a SAM missile launch or ground fire flashes of AAA guns. It was also suggested that flying at lower altitudes, 2000 feet (610 m) or so, somehow affected the targeting radars of the SAM missiles, but would then put the aircraft within range of the 100mm AAA guns and small arms fire. The cloud seeding Hercules were not the only Popeye aircraft affected by this situation of anti-air defenses integrated into the North Vietnam's defense of the HCMT.

This situation of flying in a hostile airspace further affected the Popeye RF-4C Jets used, leading to a little-known story of a cloud seeding jet that was shot down during a Popeye mission in Laos.



11th TRS RF-4C.

### Popeye RF-4C Loss

The genesis of this story of a RF-4C jet having been shot down during a Popeye mission comes down to us from the same civilian ex-China Lake employee that participated in Popeye operations at Udorn during the latter 1960s. It's his recollections, that a TRS RF-4C that he had been supporting, was shot down by a SAM missile during a cloud seeding mission towards the latter part of 1967.

As mentioned before, the 14th TRS did not arrive in Udorn until October 28, 1967, when Popeye ops were winding down for the year. Additionally, this squadron's first aircraft loses didn't occur until January 1968, and Popeye operations didn't start again until March 1968 of that year. As mentioned earlier, it's now believed that the 11th Tactical Reconnaissance Squadron (11th TRS) RF-4Cs based in Udorn, supported the Popeye weather modification flights during Popeye operations in 1967 and it's more than likely one of the 11th TRS's aircraft was shot down.

With this in mind, a vast review of USAF aircraft loss records for 1967 (demonstrating that approximately 97 F-4 Phantom IIs were lost in 1967; according to aircraft loss statistics), USAF aircraft crash / accident reports, other Air Force squadron and wing records for units & commands at the RTAFB Udorn, and other archival records and reports, identified three primary 11th TRS RF-4C losses in the latter part of 1967. Of the three, one 11th TRS RF-4C loss stands-out in terms of a Popeye mission location, the fact that it was shot down by SAM missile and other accident report items. Although there is an USAF (archival) after-action, accident report on this aircraft loss, it is wholly incomplete as accident reports go. Allot of the operational location, accident location, stated mission and physical loss information has been omitted from the report (lots of "unknowns") believed to be associated with the classified nature of the rainmaking mission. The accident report is conspicuous by its lack of reported information, as compared with other accident reports in the USAF database, given that both aircrewmembers survived and were rescued!

What little was gleaned from this accident report, subsequently proved to be important information that briefly indicated that both the pilot and the backseat Recon Nav-



A reconnaissance camera image of a 11th TRS RF-4C SAM strike over the Ho Chi Minh Trail.

igator (i.e. the Reconnaissance Systems Officer) survived this ordeal and were rescued – mentioning their names. A subsequent search of these officers' names revealed additional accident and mission details that were by-chance associated with citations and medals awards.

It now seems more than likely, that a 11th TRS (432nd Wing) RF-4C [#65-0839] on a Popeye cloud seeding / reconnaissance mission into southern Laos, along the HCMT network, was hit by a SA-2 SAM missile (and apparently also AAA artillery gun fire) that caused severe damage to the aircraft's right wing. With the attack located just a few miles northwest of the Vietnamese DMZ, over the border in Laos, the aircrew decided to stay with the damaged aircraft and push northwestward toward the Thai border with Laos. Whether to get as close to their home base as possible, at Udorn in Thailand, or because they had classified weather modification equipment attached to their aircraft, the aircrew pushed the limits of their damaged jet – only ejecting from the plane when it was evident they could go no farther and the jet was going to crash into the jungle below.

Both crewmembers survived their ejections and were rescued by a Sikorsky HH-3E Jolly Green Giant CSAR helicopter from Detachment 2, of the 37th Aerospace Rescue and Recovery Squadron based at Udorn.

Although still unacknowledged in the primary USAF records that this aircraft was part of Operation Popeye, the various “other” references found surrounding the loss of this aircraft suggest otherwise.

### ***Broader Applications***

During the original Project Popeye experiment in 1966, Saint-Amand looked around the region (or more likely the war itself) and envisioned broader applications for China Lake's weaponized weather capabilities. Given that Saint-Amand was always tweaking Popeye operations in the field, developing better seeding materials and seeding equipment to achieve greater efficiency, some of those improvements



Downed pilot rescued by Jolly Green Giant CSAR helicopter.

and or ideas became broader applications of the tactical weather modification effort that seemingly gained the interest of regional commanders. In fact, this concept of broader applications probably came to Saint-Amand from a seemingly competing project that also sought to interdict traffic along the Ho Chi Minh Trail network.

### **Commando Lava (1966-67)**

Identified as “Commando Lava”, in declassified Vietnam War CHECO reports, this experiment involved the test use of chemical soil destabilizing compounds (referred to as “Emulsifiers”) to make sections of the Ho Chi Minh Trail system impassible from mudslides and the creation of deep mud through chemical destabilization of the soil. This project involved the aerial dispersing of a chemical compound (trisodium nitrilotriacetic acid and sodium triphosphate, commonly found in most detergents and cleaning products produced by Dow Chemical Co.) to break down the molecular structure and or cohesion of the soil. The emulsifying agents when dispersed and combined with rainfall, destabilizes the soil, breaking down the chemical bonds that binds the soil together. The soil loses all consistency and creates a particularly soft and loose deep mud that is very sticky.

It was this project, not Operation Popeye, that inspired the now famous phrase; “Make Mud, Not War”, which was coined by U.S. Ambassador William H. Sullivan (Ambassador to Laos 1964–1969) in a State Department dispatch back to Washington in 1967.

Commando Lava was another trail interdiction operation authorized by SACSA, which like Project Popeye, utilized flight aircrew elements from active USAF squadrons in the regions. In the case of Commando Lava, aircrews of the 374th Troop Carrier Wing /41st Troop Carrier Squadron (home based in Naha, Okinawa under the 315th Air Division) were forward deployed to Ubon, Thailand and Cam Rahn Bay, South Vietnam, to fly the Commando Lava missions.

These mission flights encompassed the aerial spreading of the emulsifiers along various sections of the Ho Chi Minh trail network in the Laotian Panhandle and along



Takeoff of Commando Lava C-130 Hercules.

the trail's associated infiltration routes, to literally soap up the ground and make the trails, paths and tracks slippery to foot traffic and cause the soil to break down under the weight of trucks and other vehicles. Conducted during daylight hours and flown at an altitude no more than 200 ft m (61 m), test flights primarily targeted hillside roads and trails in southern Laos, to destabilize the soil, create mudslides and the deep loose mud. The first test flight was met with great success; the compound was dispensed along a hillside road, below the crest of a ridgeline. Later, with heavy rains, the whole road washed away and slid down the hill. The second test flight was less than successful. Although dispensed adequately, the follow-up rainfall never occurred and failed to achieve any results. (It was at this point that Saint-Amand was brought into this project. The operation folks want to know if it were possible to combine Commando Lava with Project Popeye to maintain a better control of when and where the rain would occur to activate the emulsifying agent and muddy up the roads and trails) The third test flight was suddenly aborted when one of the C-130As took heavy ground fire in the seeding area and later crash landed at Chu Lai.

Although area commanders wanted to go fully operational with the emulsifying project and expand its applications throughout the whole Ho Chi Minh Trail network and the infiltration routes, there was a problem. Apparently, there was no mechanical dispensing system for the spreading of the emulsifying material. During the early test flights, the compound was hand-shoveled out the back of an opened cargo door-ramp of the C-130A Hercules. Additionally, the aircraft had to fly at very low altitudes (200 ft / 61 m) to disperse the material properly. As previously mentioned, at least one aircraft came under fire over the seeding area. It was said that the Commanding Officer of the 41st TCS refused to fly anymore missions after one of his aircraft was effectively shot down.

Although this would seemingly have spelled the end of the project, a second version of the program got underway in July 1967. Called "Commando Lava II", this effort continued the dispensing of emulsifying compounds over different areas of Ho Chi Minh Trail system and its associated infiltration routes, through the utilization of UC-123 Providers, from another unit previously involved in "Ranch Hand" defoliant flights. It's believed that this revisioning of the Commando Lava project was a direct result of Saint-Amand's input, combining the emulsifiers and the water together on the aircraft and spraying them over targeted areas of the trail.



USAF C-130 Wreckage at Chu Lai air base.

Although Commando Lava (combined) flew 28 sorties, dispensing approximately 120 tons of soil destabilizers and did cause mudslides that were said to have wiped out two roads and a road junction along infiltration routes within the A Shau Valley (South Vietnam), the program failed to cause widespread destabilization of the soil along other parts of the HCMT system. It's been suggested by U.S. military intelligence units that the Communists caught onto the Commando Lava scheme and literally sent out "sweepers" to sweep up the chemical compound off the roads and trails before it had a chance to rain. Other intelligence reports suggested the VC sweepers would also lay camouflage bamboo mats down on the roads and trails to catch the "soap" sprayed by U.S. aircraft, protecting the trails from destabilization.

*A word about perspective;* this project is mentioned here as an example of another U.S. counter-insurgency warfare application applied against the enemy's trail network, (and was a potential inspiration to Saint-Amand and his concept of broader applications of cloud seeding technology in the war) it was not an example of cloud seeding or weather modification itself, despite what some public domain references might suggest. It was more of a "chemical" counter-insurgent weapon application, where chemicals were used to achieve a tactical result – much like Ranch Hand defoliant spraying operations – which were also not a weather modification application as some internet references would have you think.

*Historical Note:* this brings up another issue that needs correcting. Public domain perceived histories of Popeye weaponized weather modifications operations in SEA



USAF UC-123 Provider used towards Commando Lava II.



Ranch Hand UC-123 defoliant -spraying aircraft ; not a photo of Project Popeye weather modification aircraft.

often illustrate their presentations with a photo of Ranch Hand defoliant spraying aircraft, inferring that this photo is of Popeye aircraft conducting weather modification. This is not historically nor generally accurate.

Besides the potential of the proposed joint Popeye – Commando Lava project, the first (known) broader application of Saint-Amand’s tactical weather modification capabilities in Southeast Asia encompassed the use of cloud seeding techniques towards warm fog clearing.

### **Khe Sanh Fog Clearing (1968)**

In 1968, the long-troubled U.S. Marine Corps combat base (outpost) at Khe Sanh, located in Quang Tri Province, just south of the Vietnamese Demilitarized Zone (DMZ), had its logistical supply line under near constant attack by enemy forces. The base’s lifeline was the almost daily air support and logistics supply flights it received from transport aircraft, made possible by a (3900 foot / 1189 m) airstrip build next to the base. Unfortunately, persistent, and ground-hugging fog would roll in over the hills and settle down over the base daily during monsoon season, making it difficult to get re-supplied and unable to see the enemy sneaking up on the Marines’ positions.

Khe Sanh Fog was a protracted event during the monsoon season that was actually comprised of four different types of precipitation; two different types of fog, drizzle and light rain, that caused a widespread low overcast (low ceiling) down to the ground that prevented resupply aircraft from landing on the airstrip – which provided an opportunity for the North Vietnamese to over-run the camp during an 11-week siege in early 1968.

It was at this point that Saint-Amand was approached to devise a way to disperse the warm fog and make it dissipate – in support of the US’s Operation Pegasus effort to relieve the base and break the siege. Utilizing hygroscopic compounds (a mixture of sodium chloride salts and water), Saint-Amand secured the use of several USAF Ranch Hand (Agent-Orange defoliant) spray-equipped UC-123 Providers, (forward deployed to Da Nang) and flown by



A resupply C-130 Hercules trying to land in Khe Sanh fog.

USAF’s 309th Air Commando Squadron, to fly fog-clearing missions over Khe Sanh. More than 15 fog clearing sorties were flown over the base, before it was determined that the seeding solution was not that effective.

It’s been said that Saint-Amand (and his China Lake team) then came up with a modified Silver iodide compound (flare cartridge) that could be fired from a hand-held AN/M-8 (pyrotechnic) “Very pistol” (flare gun). Capable of streaking upwards of 1500 feet (457 m) into the low-lining fog and clouds, the Very pistol technique could be utilized by the Khe Sahn troops themselves on the ground to dissipate the fog. Unfortunately, there are no specific records to suggest if Khe Sanh base fog operations ever worked successfully, given that there were no other metrics recorded towards this effort, and the implementation of the ability of resupply aircraft to LAPES (Low-Altitude Parachute-Extraction System) supplies to the beleaguered Marines – which eventually broke the siege.

*It’s interesting to note;* that a few months later (June 1968) Khe Sanh was abandoned completely, leaving the A Shau Valley open to North Vietnamese forces, with a clear shot to infiltrate northern South Vietnam.

It was at this point that another cloud-seeding application materialized and was established to help the Marine base and the wider – regional tactical air operations within the whole of the A Shau Valley itself.

### **A Shau Valley Rainmaking (1968)**

The A Shau Valley weather modification application was established as a separate cloud seeding effort to those weather modification missions over the HCMT. Flown by Popeye aircraft, the project seemingly sought to “clear the skies” over the A Shau Valley to support tactical air operations and bombings along the HCMT infiltration routes (in Laos) and other key entry points into South Vietnam – as an extension of new operations at Khe Sanh, called Operation Delaware, to interdict communist forces logistically staging out of the valley towards their journey down the HCMT through Laos.



The A Shau Valley, scene of many heavy conflicts.

Strategically, the A Shau Valley lay just 30 miles (50 kms) to the southwest of Hue and approximately 1.2 miles (2 kms) to the east of the Laos border and those HCMT routes through Laos and Cambodia. Unique to the valley, was its short window of good weather in April to strike North Vietnamese forces that amass in the valley. Beyond April, the Valley is usually shrouded in low ceiling fog and drizzle with occasional thunderstorms – cutting combat visibility to zero. According to a USAF Air Weather Service Support to the U.S. Army in Vietnam report, the weather in this part of Vietnam was “like another enemy”.

The proposed A Shau Valley weather modification plan was to fly cloud seeding operations to “over-seed” the clouds to rain-out and dissipate them, to clear up the skies, providing improved visibility towards air combat operations. In the words of the above-mentioned AWS report, “... an inch of rain that falls in 30 minutes, then clears, is much better than a light mist and fog that [persists] for 24-hours or more ....”

*It's interesting to note;* that it was during this cloud seeding application over the A Shau Valley that the 54th WRS began utilizing the deployment of dropsondes, collecting horizontal (flight level) and vertical weather data that would subsequently be shared with the 1st Weather Group weather center (Det. 14) at Tan Son Nhut Air Base – that fueled the misinterpreted belief that the squadron conducted weather reconnaissance flights in SEA.

Under this China Lake weather modification application, more than 175 cloud seeding sorties were flown within the A Shau Valley over a five-month period (January to May 1968) that were separate and apart from the 734 cloud seeding sorties conducted in 1968 under Operation Popeye.

### Quang Tri Rainmaking (1972)

As the Vietnam conflict continued, those few senior regional commanders aware of Operation Popeye requested additional weather modification support. DoD historical references suggest that operational commanders directing the air war in SEA, were hampered by foul weather (low



ceilings, rain and fog as well as overcast stratus clouds) obscuring bombing targets and interfering with tactical aircraft supporting allied ARVN [Army of the Republic of Vietnam] ground troops engaged in battles with North Vietnamese Army. This situation came to ahead in March 1972 during the Easter / North Vietnamese offensive in Quang Tri Province. The poor weather conditions favored the enemy’s advances, due to the inability of U.S. Tac Air assets to see the ground (targets) near ARVN ground troops. Thus, weather modification was proposed and requested to break up the poor weather conditions to advance U.S. tactical operations to counter the enemy’s offensive.

Unfortunately, as the story goes, neither the China Lake control group, nor the 54th WRS seeding assets were in-country at the time and subsequent technical information provided by others weather experts suggested a limited effectiveness with the weather conditions being experienced in the region by the cloud seeding capabilities available. Thus, no cloud seeding flights were known to be conducted to lift the siege at Quang Tri.

However, it has been suggested in other DoD /USAF (CHECO) reports that cloud clearing and precipitation reducing cloud seeding operations were conducted to benefit U.S. tactical air missions at various times during the war between 1966 and the end of Popeye in 1972.



## SEA Acidic Rain

One potential broader application, that continues to resist disclosure (verification), is the SEA Acidic Rain cloud seeding project. Believed to have been conceived in 1968, this cloud seeding technique comprises the seeding of warm stratus clouds with chemical compounds that not only caused seeded clouds to dump their precipitation, but also creates something akin to a caustic “Acidic Rain”.

First presented into the public domain in the original Rainmakers of SEA newspaper stories in 1971-72, the understanding of this seeding project (according to unnamed civilian and Air Force cloud seeding program personnel interviewed by the press at the time) was for a caustic rain to fall over North Vietnamese controlled areas and corrode and / or rust metal it came in contact with. The hope was that the caustic rain would foul the mechanical and electrical components of SAM air-defense targeting radars as well as other mechanical air defense systems to make them fail during U.S. B-52 bomb strikes.

According to various military history publications, some related to specific SA-2 (two-stage) SAM missiles, weapons museums and organizations associated with Vietnamese missileers veterans; suggest that there were “no” SAM missile and / or radar guidance / targeting operation issues during the Vietnam war – associated with caustic, corrosive, acid rains. It’s not fully understood where specifically the newspaper reporters of the day, their sources, came up with this story of corrosive “Acidic Rain” weather modification\*.

## Korean WxMod Application

Another broader application of tactical weather modification in SEA, and in the greater surrounding Asian region, comprises the potential use of weaponized weather modification applications against North Korea. Conducted between 1968-69, this application of (alleged) weaponized weather modification in North Korea coincides with the urgent escalation of (war) tensions between the U.S. Government and North Korea, during the Korean Crisis of 1968-69, precipitated by the capture of the USS Pueblo (AGER-2) Intelligence (spy) Ship on January 23, 1968, by North Korean gunboats. This crisis was complicated by the perception that any wrong reactions by the U.S. to the ship being seized, could have easily provoked a reengagement of the Korean War between North Korea and South Korea – that could then escalate into a World War III scenario.†

Despite a more aggressive posture, that encompassed a number of cross-border attacks along the DMZ, an attempted assassination of South Korean President Park Chung-Hee and the shutdown of American EC-121 electronic intelligence aircraft prior to (and again months

\* Some additional random internet sources suggest that B-52 Bombers themselves may have been involved in this potential project as seeding aircraft utilized in the SEA Acidic Rain weather modification project.



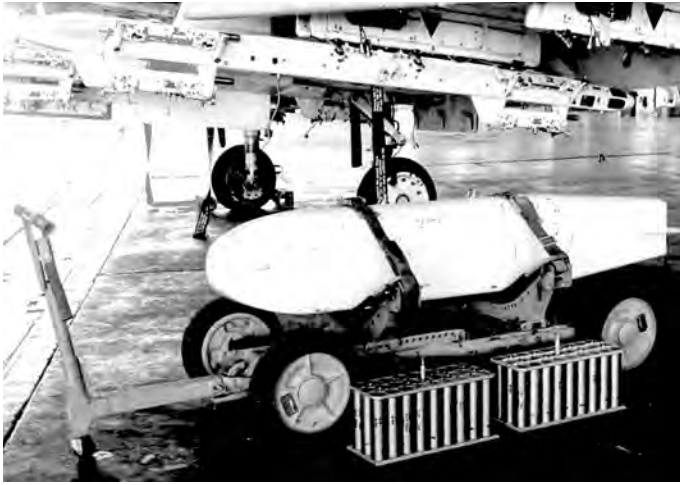
15th Tactical Recon Squadron RF-4C aircraft.

after) the taking of the Pueblo (that included beating and torturing the ship’s crew), the North Korean’s did “not” specifically mobilize for an all-out war with the West – according to U.S. overhead reconnaissance spy planes. While the U.S. DoD & Joint Chief’s of Staff strongly recommended punitive retaliatory strikes, the Johnson administration chose to exert constraints, and presented a strong “show of force” action in concert with diplomatic pressure to force the return of the crew of the Pueblo.

Rather than take any potential (pre-emptive) punitive action; i.e. conduct tactical air attacks on North Korean military targets (airfields, bases -etc-), attack North Korean Patrol Boats, seize or sink North Korean merchant vessels, air attacks on industrial manufacturing facilities, electrical power plants, railways – with a potential extreme option of the use of a tactical nuclear device; Johnson chose to utilize a less provocative show of force without causing the establishment of a second theater of hostilities within Asia. In this concept, Johnson had a large contingent of U.S. troops in Vietnam, redeployed to South Korea, newly trained soldiers and material on the way to Vietnam were redirected to South Korea, with high-altitude intelligence/reconnaissance spy planes (the CIA’s A-12 Oxcart and the Air Forces’ SR-71) flying missions in SEA redirected to South Korea, with elements of the U.S. Navy’s 7th Fleet (a large carrier task force built around the USS Ranger CVA-61 and USS Enterprise CVN-65 and approximately 28 additional surface combatants and a nuclear submarine armed with nuclear Polaris missiles) redeployed to the Sea of Japan, taking up station off the east coast of North Korea in international waters, as counter-measures to armed conflict.

It was also within this constrained environment, that more covert actions were presented, such as the use of in-

† Given that the original Korean War (1950-53) had only been paused, with cessation of hostilities curtailed via the signing of the Korean Armistice Agreement on July 27, 1953, separating the two countries along the subsequent Korean Demilitarized Zone (DMZ) between North and South Korea (along the 38th Parallel North) and no real specific peace treaty was ever signed, reengagement of the war between the two Koreas was ever present and had the potential of destabilizing the entire Northeast Asian region - escalating into a third World War.



Navy China Lake developed fast-jet weather modification (cloud seeding) generator Pods, devices used in Operation Popeye in Southeast Asia.

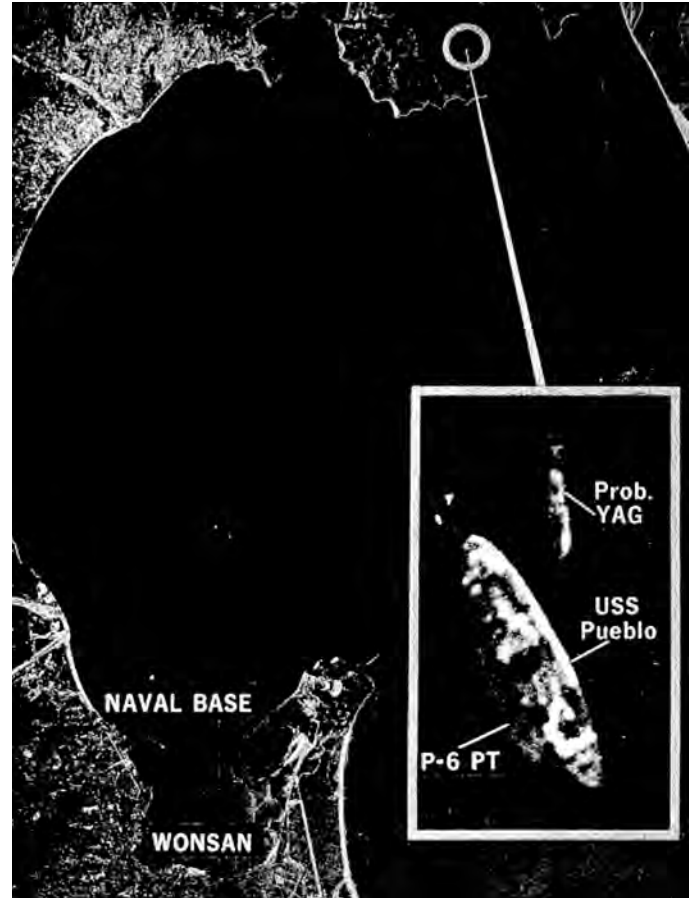
telligence gathering drones to compliment overhead reconnaissance, electronic countermeasures flights, flown to purposely disrupt North Korean early warning and air defense systems and (for this discussion) the presumptive use of tactical weather modification.

The cloud seeding aircraft utilized in this unique environment are believed to have been tactical reconnaissance RF-4C from the 18th Tactical Fighter Wing / 15th Tactical Reconnaissance Squadron, equipped with the same (type) Navy China Lake designed fast-Jet cloud seeding generator / flare ejector systems, being utilized in Operation Popeye by Air Force RF-4C Jets in SEA.

Under the reactionary deployment of forces and aircraft into South Korea, in the wake of the *Pueblo* Incident, the 18th TFW sent a 6-9 plane detachment of RF-4Cs from Kadena AB (Okinawa, Japan) to Osan AB in South Korea. Records show that the squadron operated from Osan between February and June 1968, before re-deploying to Itazuke AB in Kyushu, Japan to continue their area air defense mission over North Korea\*.

Any weather modification mission in Korea would have been conducted to support U.S. and South Korean interdiction / anti-infiltration efforts against North Korean incursions across the DMZ and generally harass the North Koreans during the period that they held the crew of the *Pueblo*. This issue of interdicting cross border incursions by North Korean commandos became a priority action and the use of tactical weather modification as an anti-infiltration countermeasure (like that being conducted in SEA by

\* By June 1968, area U.S. Commanders became concerned with the high number of U.S. Aircraft in South Korea, should a surprised escalation and or attack come from North Korea. Thus, a plan was established to redeploy U.S. tactical aircraft back to Japan, rotating a smaller number of aircraft back and forth to South Korea, from Japan, every 4-8 days. Besides those rotating aircraft, additional U.S. tactical aircraft could be quickly deployed to Korea within a few short hours of any attack.



The imprisoned USS Pueblo captured by CIA A-12 Oxcart overhead spy-plane.

Operation Popeye) would have been seen as a viable action to employ in Korea.

*It's interesting to note;* that for an extended period (well before September 1– November 30, 1968) the North Korean Pyongyang (-Sunan) Airport reported some form of precipitation “everyday” during this time. Including mists, drizzle, light rain, intermittent rain, rain, fog, freezing rain, flurries and light snow, or a combination of all these forms of precipitation, for several months straight during the 1968 crisis.

The *Pueblo* crew of 82 were eventually released 11 months after having been captured. The *Pueblo* itself is still held captive to this day. It was never decommissioned by the U.S. Navy and is still on the books as an active serving Naval vessel.

### Cambodia / Laos Cloud Seeding (1969-72)

As part of the CIA's secret war in Cambodia & Laos, conducted between 1960-73, escalations occurred in 1968-69 fueled by an up-tick in infiltration of North Vietnamese Army troops into Cambodia via western adjunct routes of the Ho Chi Minh Trail network – in the north and southern panhandle region of Laos. The NVA were building “sanctuary” areas, truck parks and logistical storage areas, all protected by newly introduced anti-air defenses (*SAM missiles*) just over the border in Cambodia, as well as develop-



A representative image of the area where another weaponized weather modification application was employed.

ing new trail sections of the HCMT. In some case, new drivable sections of the trail through the various mountain passes were being developed\*.

To generally harass the Chinese road builders, unseat NVA troops in Cambodia and support the Royal Lao Government against the Pathet Lao and Viet Minh communist insurgents in the Laotian civil war, the CIA and U.S. Special Forces fought an unconventional secret war, for the most part separate from the Vietnam War being fought just over the border. In these covert efforts, the CIA also fought to interdict NVA infiltration and resupply routes branching off the HCMT into Cambodia and Laos†.

Besides persistent B-52 Bomb strikes conducted throughout the year, over several years, between March – June 1970, President Nixon sent regular U.S. Combat troops from Vietnam to invade Cambodia after months of secret bombings there in Laos, in areas adjacent to the Ho Chi Minh Trail.

Given the priority of these covert operation in Laos and Cambodia, it seems evident that additional cloud seeding operations were also conducted, independently employed to interdict the North Vietnamese supply lines into this area. What is known, is that the monsoon rains of 1969 were the heaviest ever seen on record in Southern Laos – while at the same time experiencing 100-year drought conditions. Both USAF Air Weather Service records and CHECO reports suggest that a specific (*and separate*) cloud seeding / weather modification effort, to that of Popeye, was

\* It has long been known within military intelligence circles that China had (grand) secret plans to conquer all of the nations in SEA, including Thailand, and complete a new modern highway from southern China all the way south, to a new “Chinese” port on the Indian Ocean. In this regard, over 6000 Chinese military personnel, mostly engineering troops and security soldiers, were building extensions of a road and support facilities in northeastern Laos – independent of the North Vietnamese. Since the 1950s, the CIA mounted covert commando raids in northern Burma and Laos to harass the Chinese road builders, by blowing up construction equipment, setting up boobytraps, ambushes along supply lines and outright killing Chinese personnel when detected.



Dr. Edwin X. Berry (left) with Dr. Pierre Saint-Amand, in the Philippines for Project Gromet II, in 1969.

established to specifically focus weather modification operations on Laos and Cambodia.

It is here that public domain references and inferences have suggested that this specific cloud seeding operations conducted in Laos and Cambodia may have employed the use of B-52 bombers as cloud seeding aircraft. Besides a random mention of the proposed effort in a DoD report on weather modification in SEA, one of the more public references of B-52s as seeding aircraft comes from an unlikely source, a webpage on the internet.

The potential of B-52 Bombers utilized for weather modification comes to us via an internet website belonging to Dr. Edwin X. Berry (Ph.D.) (The original website is now archived at; [www.kimberry.com/ARCHIVES/edwin\\_x\\_berry/ed\\_in\\_philippines\\_1969.html](http://www.kimberry.com/ARCHIVES/edwin_x_berry/ed_in_philippines_1969.html)). Dr. Berry is an American Atmospheric Physicist that at one time was one of Pierre Saint-Amand’s contracted specialists involved in NWC China Lake weather modification projects in the Philippines and potentially on Operation Popeye, in 1969. It’s clear from information on Berry’s website, and from personal conversations directly with him, Saint-Amand

† At this time other “In-Country” SEA conflicts were waged that encompassed the USAF’s secret [Project 404] to conduct covert bombing missions in Cambodia and Laos via Thailand. A subset of this project “Commando Hunt” sought to counter North Vietnamese aggression in Northern Laos; to interdict material support to the Pathet Lao / Viet Minh from adjunct sections of the HCMT and the drivable road sections being built as well as sanctuary camps (and to prevent the communists insurgents from penetrating further west reaching Lao villages) [previously known as Operation Steel Tiger] And other USAF missions in Southern Laos (panhandle) to interdict NVA and VC forces moving down the HCMT to South Vietnam - through Laos and Cambodia –[previously known as Tiger Hound].



USAF B-52 Bomber in the western Pacific circa 1969.



USAF Air Weather Service WC-135B weather reconnaissance aircraft at Clark AFB Philippines (circa 1969).

had Berry train USAF B-52 pilots (based nearby at Clark Field) in the art and science of cloud seeding – during Operation GROMET II cloud seeding / drought relief operations conducted in the Philippines in 1969.

Berry additionally reports that later, while still in the Philippines at Clark AB, he saw Silver iodide cloud seeding dispensers mounted to the airframes of B-52 bombers at Clark Field. The seeding devices were mounted aft of the wings, between the aircraft's wings and the tail sections of a B-52 bombers.

Unfortunately, it's fairly clear from Dr. Berry's website that he is somewhat in the dark about this aspect of his participation in weather modification for Saint-Amand. It is his understanding that the B-52 cloud seeding aircraft and aircrew training were just part of Operation Popeye. However, no currently available archival documents to date (those from the DoD, Congressional or Navy / China Lake archival sources) mentions cloud seeding operations by B-52s, nor associated with Operation Popeye. In fact, there is currently no archival information or references to date that suggest any cloud seeding operations were conducted by B-52 aircraft. Dr. Berry's website and his comments are the only current reference source that identifies USAF B-52s as having been (potentially) used as cloud seeding aircraft, and directly links Pierre Saint-Amand (China Lake) to other weather modification efforts in SEA.

No disrespect to Dr. Berry intended, but there are a few simple facts on the surface that dissuade B-52s at Clark Field from being utilized as seeding aircraft. Principally, there were "no" B-52s stationed at Clark Field in the Philippine during this period or at all – so he could not have seen them on the tarmac equipped with seeding dispensers. The fact is, the wing span of B-52s are too long for the narrow taxiways around Clark AFB. Configured with engines out near the wingtips, these engines would easily suck-up gravel and other debris during taxing. However, there were both WB-47E Stratojets and WC-135B Stratolifters from the U.S. Air Forces' Air Weather Service at Clark during Berry's time there. The WC-135B looks something like a B-52 and could have easily been mistaken by Berry back in 1969.

Armed with this knowledge, it is potentially evident that the secret weaponized weather modification application conducted over Laos and Cambodia in 1969-72 could have easily

been conducted by USAF AWS WC-135B weather reconnaissance aircraft equipped with cloud seeding dispensers.

*It's interesting to note;* that at this same timeframe between 1968-70, covert WC-130Es and WC-135Bs were stationed in Ubon (Thailand) on secret weather reconnaissance missions, scouting air-to-air refueling areas over the South China Sea (and over Thailand itself) towards the refueling of the CIA's A-12 Oxcart spy planes forward deployed to Kadena air base on Okinawa. (the CIA's A-12s, under Project "Black Shield" flew overhead photo reconnaissance missions of North Vietnam, along the border of North Vietnam and Southern China and Laos) These AWS support weather reconnaissance scout flights were flown by a special detachment of the AWS's 55th Weather Reconnaissance Squadron (utilizing WC-130s from the 54th WRS at Guam and WC-135B aircraft from the 56th WRS based in Yokota, Japan). Air Force archival records (as well as declassified CIA archival [CREST] documents) also identified that the 55th WRS also flew "Special Meteorological Reconnaissance Flights", during this same time, which is similar to the "Special Weather Reconnaissance Flights" designator utilized in internal AWS memos (when) talking about the 54th WRS's rainmaking operations in SEA. As cloud seeding missions go in SEA, these AWS aircraft at Ubon were in very close proximity to Laos and Cambodia by which to have also conduct these little-known cloud seeding missions\*.

\* Although this Laos cloud seeding project is barely perceptible within the public domain, with most of these details only discernable in military archival records, it should not be confused with a little-known 1968 aerial HCMT interdiction effort, where USAF UC-123 and C-130 "Blind Bat" flare-ship aircraft (flying out of Udorn) deployed "tear gas" along the Ho Chi Minh Trail area in Laos and Cambodia to hamper enemy infiltration. Under this effort, tear gas chemicals were carried in 55gal drums, and equipped with explosive detonators, were dropped over areas of Laos and Cambodia. The barrels would then explosively dispersed tear gas at ground level in different infiltration sites to hamper enemy troops. Military records indicate that this operational program failed its objective, further curtailed with the discontinuation of Blind Bat flare-ships and their subsequent development into AC-130A Spectre gunships.



Cloud-seeding device being installed on the side of an unspecified USAF aircraft.

Though some of the northern areas of Laos may have been seeded as part of a normal component of the ongoing Popeye operations by the 54th WRS in their WC-130s, other Air Force AWS records suggest that two other AWS aircraft were assigned and equipped for specific rainmaking operations in Southern Laos and Cambodia, to specifically interdict North Vietnamese infiltration down the HCMT through Laos and Cambodia. And if that weren't enough, one of the two "other" AWS seeding aircraft was tasked to conduct Drought Relief cloud seeding in Laos and Cambodia.

### Drought Relief

*It's interesting to note:* that despite seasonal monsoons in Southeast Asia, many areas of SEA experienced severe droughts during the latter decade of 1960s / early 1970s. In fact, most of the world was experiencing an emergence of anthropogenic driven [human induced] severe droughts during the over-lapping decade, with more than 36 countries experiencing severe drought conditions causing heavy crop losses, including India, Pakistan, China, Korea, the Philippines, Indonesia and several countries in SEA. Both rice and corn production (yields) were dangerously low in Thailand, Cambodia, Laos and elsewhere in SEA at this time.

The artificial rains from cloud seeding / weather modification flights in Laos and Cambodia would go a long way to easing the stress of potential famine in Laos and Cambodia. Drought relief weather modification was one of Saint-Amand's more successful applications of weather modification.

### Popeye: Storm Seeding

One of the more controversial suspected weaponized weather modification applications potentially conducted as part of Operation Popeye or more likely separately, was "typhoon modification". Leveraging off years of China Lake's experimental hurricane seeding operations in the Atlantic (believed to have been operationally implemented by this time in the Atlantic, creating, intensifying and steering hurricanes towards Cuba to destroy its economy), it was not outside the realm of possibility for China Lake to take



USAF Air Weather Service WC-130 Hercules in Pacific typhoon eye clouds.

tactical weather modification operations in SEA one step further and seed typhoons and tropical storm clouds, affecting Vietnam, in order to create an even more destructive outcome.

What is known is that between 1970-71, based on circumstantial anecdotal and largely unsubstantiated "hearsay" evidence, it's believed that the Popeye folks conducted seeding operations on clouds associated with convective thunderstorms, tropical storms, typhoons / or the remnants of typhoons that tracked into or near Vietnam. If confirmed, the seeding of clouds within the circulation of a storm, with the express interest of increasing rainfall over strategic areas of North Vietnam, meant to inflict severe damage on the enemy – aimed to specifically washout railways and bridges, flood urban highways and roads as well as cripple the electrical generating capability of North Vietnam - is perceived as criminal. This concept of deliberately seeding storms initially evolved from congressional investigators for Senator Pell, who suspected that particular tropical storms (i.e. remnants of Western Pacific typhoons) affecting Vietnam were potentially cloud seeded to ultimately cause catastrophic flooding and damages throughout the whole of North Vietnam.

The fact of the matter is that unusual torrential rains did occur in August 1971 and contributed to severe flooding, that wrought significant destruction on to North Vietnam, that had not been seen there since before WWII. Known generally as the severe flooding of August 1971, unusually heavy and prolonged (widespread) torrential rainfall, flooded three different river systems in the north, that breached 1000-year-old dikes surrounding the heavily populated city of Hanoi. More than 618,000 acres (250,095 hectares) were flooded, wiping out the annual rice crop of North Vietnam (for that year), and killed approximately 100,000 people, rendering approximately 300,000 homeless and ultimately affecting more than 2.7m people. It's been said that the Nixon Administration had been reluctant to bomb these same dikes and or attack the food (rice) supplies of North Vietnam, because of the bad press that it would have generated towards his administration.



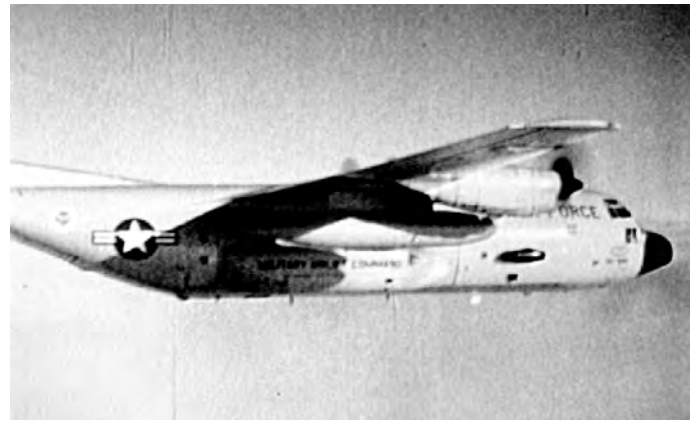
(Above & below) Storm damage from Typhoon Hester, October 1971.



*It's interesting to note;* that Typhoon Kate (October 14-25, 1970) is known to have inundated 140 square miles of Vietnam, including South Vietnam (south of Da Nang) creating the worst floods in the region since 1964. Several storms in 1971, Typhoons Harriet (June 30 – July 8, 1971), Severe Tropical Storm Kim (July 8-14, 1971) and Typhoon Della (September 24–October 1, 1971), impacted North Vietnam with severe heavy rains causing catastrophic flooding. DoD statistics recorded significant drops in movement along the Ho Chi Minh trail network during June - July 1971, the same period of some of these storms. During Typhoon Patsy (November 14-22, 1970) the weakened tropical storm made landfall near the DMZ between the two Vietnams and potential effects from the seeding of this storm had disastrous consequences on U.S. combat operations, including the November 15, 1970 “Son Tay Raid”.

The raid encompassed a U.S. Special Forces assault on a small enemy compound of Son Tay, 23 miles (37 kms) west of Hanoi, believed to have been housing approximately 65 American POWs. Unfortunately, when the assault force finally reached the POW camp it was empty – no POWs. It's been suggested that severe rainfall (flooding) from a presumed Popeye cloud seeding operation on the remnants of this storm, caused the North Vietnamese to move the POWs sometime before the raid. The Popeye cloud seeding operations were so secret, even in-country, that the Raid's military planners were not informed or were unaware of the potential effects of artificially induced flooding would have on the rescue mission.

Despite efforts in the public domain and in military circles to blame the failure of the raid on Popeye weather modification activities, potentially on storms in November 1970, the reality is that it was an intelligence failure in the Raid's planning. The POWs at Son Tay had actually been moved to a facility 15 miles (24 kms) closer to Hanoi on July 14, 1970 (approximately 4 months earlier) due to potential flooding from a tropical storm – that eventually veered away to make landfall in China.



54th WRS WC-130E Hercules that took over Operation Popeye flights.

Another Vietnamese storm suspected of having been seeded by Popeye includes Typhoon Hester (October 18-24, 1971). Hester developed in the southern Philippines Sea and tracked northward into the South China Sea. The storm struck central Vietnam on October 23, 1971 and brought all combat operations within the whole of Vietnam to a halt. There was heavy damage to both sides of the conflict with severe flooding in North Vietnam killing thousands, while causing damaged to a number of U.S. and ARVN facilities in South Vietnam.

Again anecdotal, and not proven in fact, is that persistent rumors of typhoon(s) seeded by an unspecified U.S. Military organization echoed through the hallways of the Joint U.S. Military Western Pacific weather services, during this time period (1970-71). In one alleged storm seeding mission, referenced by a (perceived) member of Operation Popeye, it's been claimed that one key strategic bridge in North Vietnam was undermined and washed away, having previously resisted repeated bombings.

Given that the 54th WRS was a “typhoon reconnaissance squadron” and equipped with weather modification capabilities, coupled with Saint-Amand's vast experience in seeding hurricanes in the Atlantic, all the elements were in place by which to conduct weather modification operations of available tropical cyclones to further cause damage to the enemy. It's all very plausible, but currently no definitive archival evidence exists to verify that it ever occurred.

Apparently, Senator Pell himself firmly believed that the U.S. military forces (i.e. DoD /U.S. Air Force) had seeded a storm or storms which ultimately killed tens of thousands of people in North Vietnam in 1971. Nearly every witness that appeared before Senator Pell's Committees, was asked if they knew anything about seeding typhoons and manipulation of tropical storms causing severe flooding in North Vietnam. Despite testimonies before Congress, that no seeding flights were ever conducted during tropical storms (as stated in the transcripts of the Congressional hearings on the rainmaking operations in SEA 1972-74), comments by others claiming to have been associated with Operation Popeye, suggest that storm(s) “were” seeded and caused the very types of damage seen in the aftermath of these known storms in North Vietnam.



Senator Claiborne Pell of Rhode Island (left - seated) during congressional hearings with other Senators, aides, and committee members.

Although not discussed publicly, Pell it seems personally viewed the weaponized weather modification operations in SEA as criminal and specifically the seeding of storms (that caused the death and destruction seen in 1970-71) as tantamount to “war crimes”. Pell was so adamant about this aspect of the secret rainmaking operations in SEA, that he repeatedly sent letters to DoD officials, U.S. Air Force Chief of Staff and Director(s) of the CIA, specifically asking if rainmaking seeding flights were ever flown into tropical cyclones in SEA. (according to declassified CIA archival [CREST] documents).

### The Beginning of the End

Although not revealed at the time, these letters of inquiry from Pell were concerning to the CIA. Coupled with continued press interests in the Rainmaking in SEA story, the agency was hard-pressed to devise a strategy to deal with the situation. Revealed now to some extent through declassified CIA archival [CREST] documents, internal memos and adjunct support strategy (memos) specifically directed towards responses to Pell’s inquiries, the CIA ended up sacrificing Popeye as a means to end public interest (and that of Pell’s) in this story. But more importantly, to protect their on-going covert geophysical warfare campaign against Cuba – which just so happened to include the manipulation of hurricanes as a weather weapon of war.

*It’s interesting to note;* that the CIA struggles to strategize an acceptable response(s) to Pell’s inquiries, was made difficult because the CIA could not be seen to be actually lying and simultaneously appear truthful in their response without having to answer difficult questions. [ the old UFO “swamp gas” or “nothing to see here” remarks were not going to suffice] As indicated in numerous declassified CIA archival [CREST] documents - internal memos associated with the CIA’s crafting direct responses to Pell’s inquiries - CIA lawyers forbade the agency to lie in writing. Written lies are subject to disclosure in the event of subsequent legal or government investigative proceedings. With telling

the truth not necessary an option, the only way for the agency to communicate a lie would be verbally (hopefully not recorded on tape or film) which presents additional legal issues. The result of this situation for the CIA, encompassed a number of elements. Telling the truth (or a version of the truth) to steer away unanswerable questions, deflections to avert the truth, through the use of messengers who are unrelated to the topic in question, and thus, who can offer up “... to the best of my knowledge ...” and not be lying, and or the traditional go-to comments that didn’t actually answer the question and invoked some level of National Security. Thus, SACSA (under its guise as the DoD / JCS support staff office) chose a combination of all these options and offered to provide Pell’s committee with a Top Secret / Classified briefing of the Rainmaking Operations in SEA in 1974.

Additionally, knowing that Pell would not be able to resist disclosing the classified brief to the public (Remember this was the era of Watergate, the disclosure of the Pentagon Papers just a month or two before and major public displays of civil disobedience) it was hoped that the distraction of the dissemination of Operation Popeye and the true(ish) details of the presented cloud seeding / weather modifications operations in SEA, would divert attention away from Pell looking any further into the U.S. Military’s weather modification operations. The subsequent effort taken towards the eventual Environmental Modification ban treaty (ENMOD) also lent itself to easing continued interest in their covert weather modification efforts – to some degree.

In the end, Operation Popeye (specifically) conducted approximately 2602 cloud seeding sorties, expending approximately 47,409 canisters (flares) of Silver iodide seeding materials over North Vietnam, Laos, Cambodia and South Vietnam, at a cost of \$21.6 million dollars, between 1967-72.

Although the results of these secret weather modification operations were played down, once the project was made public in 1974, to a total rainfall increase of 10 percent over normal precipitation, it’s believed that the actual



Operation Popeye aircraft after their 500th cloud seeding mission on July 31, 1968.

total was much higher or as much as a 30 percent increase in precipitation along different areas of the HCMT network. The program's further goal of extending the seasonal monsoon conditions to 30 days or more was also achieved, with upwards of 37 days on average extended to the southwest monsoon seasons. Peak for the cloud seeding project occurred between 1969-71, coinciding with record annual rainfalls of more than 48 inches of rain in the month of July 1969 alone. DoD / Defense Intelligence Agency (DIA) reports establish that trafficability of enemy combatants along the Ho Chi Minh Trail dropped from 9000 per week to 900 per week in June 1971 due to an unusual period of heaviest rains.

Public domain references on this issue downplayed the successfulness of Popeye because that was what was stated in the released classified briefing presented to Pell's Committee. Unbeknownst to the public, Popeye eventually established capabilities to collect rainfall data along the HCMT and analyze it. The unexpected higher rates of rainfall estimates came as a result of rainfall data collected as part of an ongoing DIA information gathering project associated with tracking the increases and decreases of enemy movements along the Ho Chi Minh Trail network and infiltration routes. Known as "Project Roadwatch", special indigenous 12-man reconnaissance guerrilla teams, integrated with U.S. Special Forces personnel, were employed to specifically surveil the trail system. (declassified DoD reports and operational histories associated with the various interdiction operations in SEA, reports that Project Roadwatch was actually a CIA operation established under the "Studies & Observation Group" [SOG] division of MAC-V [i.e. MAC -V- SOG]. SOG was established by SACSAs in 1964 and placed under MAC-V.)

In an effort to better support Popeye operations, SACSAs arranged for USAF Air Weather Service weather personnel to train Roadwatch guerrillas in basic weather observations and reporting. The guerrillas were also taught how to collect rainfall measurements along areas of the HCMT system (via rain gages). Twice a day, Roadwatch personnel sent local area weather reports, with rain gage /



This photo of the Viet Cong moving along a section of the Ho Chi Minh Trail was taken by a MAC-V-SOG guerrilla monitoring enemy movements along the trail system under Project Roadwatch.



Igloo White components utilized included this CIA-operated P-3 Orion (above), as well as Acoustic Brown Buoys (sound activated listening devices) dropped along the HCMT system (below).



rainfall measurements to Popeye HQ via specialized CIA radio circuits. These rainfall measurements and their analysis supporting trafficability estimates were also backed-up by electronic intelligence sensor data collected as part of a monitoring component of another anti-infiltration / interdiction project known as "Igloo White."

Igloo White was a covert (DoD) military operation that introduced "Electronic Warfare" into the SEA War. (i.e. the "Electronification" of the war) Igloo White was a state-of-the-art Electronic network of systems, sensors and instruments (as well as a clandestine P-3 Orion operated by the CIA), collectively creating an electronic barrier to detect and track mechanical and human foot trafficability along the HCMT and other areas of infiltration in SEA. This was the system that McNamara requested be established – per his September 17, 1966 letter request – and was to be operationally implemented by 1967. As it was, Igloo White via a number of various sub-component elements developed through 1967, saw final operational status in January 1968.

Although a number of road sections, trails and dikes were completely washed away, and much flooding was produced (destroying 10 % of the total North Vietnamese Rice crop during Popeye's 5-year run) Popeye might seemingly have been considered a technical success. However, there





as indicated by this image, the Viet Cong were able to overcome the problems of flooded trails with bicycles replacing trucks.

is no statistical evidence that Popeye had any appreciable tactical effects on the movements of the enemy's logistical supplies or troop infiltrations into the south along the Ho Chi Minh trail system. Although it can be said that Popeye slowed infiltration down to some degree, it did not halt trafficability altogether – which was the hoped goal. The Vietnamese were seemingly very adept at approaching a situation and overcoming any or all obstacles. It would seem logical to assume that NVA and VC had previously conceived of techniques by which to move supplies and personnel along the trail system during a normal rainy monsoon season (based upon Project Roadwatch trafficability reports and statistics). It would have been easy for them to have just continue those procedures if the monsoon conditions persisted beyond their normal period – or develop new ones to overcome increased rainfall and flooding along the trail system. In this view, Popeye was a futile attempt to use weather as weapon, when the weapon was useless in the kind of environment that was the Vietnam Conflict.

Ultimately Operation Popeye came to an end on July 5, 1972, when the last cloud seeding missions were flown. The end was precipitated by the virtually concurrent public disclosure of the rainmaking operations in SEA, by a series of *New York Times* newspaper articles written by investigative journalist Seymour Hersh beginning on July 3, 1972. This series encompassed “*Rainmaking Is Used As Weapon by U.S.*,” “*Cloud-Seeding in Indochina Is Said to Be Aimed at Hindering Troop Movements and Suppressing Antiaircraft Fire*,” “*Rainmaking Used for Military Purposes by the U.S. in Indochina Since '63*” and “*67 Ordered to End Rainmaking*,” were all published between July 2-5, 1972. Hersh had only recently joined the newspaper in April, 1972, after his freelance reporting of the My Lai Massacre.

*It's interesting to note;* that the first actual disclosure of the “Popeye” weather modification in Southeast Asia occurred in August 1971, through the unauthorized release of the so-called “*Pentagon Papers*” by Daniel Ellsberg, wherein early versions, Volume 4, Number 8 mentions: “*cause interdicting rains in or near Laos.*” The *Pentagon Papers* [officially entitled “*the Report of the Office of the*

*Secretary of Defense – Vietnam Task Force*” ] was a 3000-page historical record of the U.S. involvement in Indochina. Analysis of the document illustrated the Government's gross mismanagement of the war, the Government's misleading of the U.S. public with regards to its handling of the Southeast Asian conflict and the conclusion that through all the death and destruction, the war was unwinnable and futile, and that they knew this early on—and yet they continued the war anyways.

Among its many pages were references to the weather modification operations in Southeast Asia, that comprised Project Popeye (1966) and the first year or so of Operation Popeye (1967), but were generally missed for some months amongst all the other pertinent information regarding the U.S. Military's prosecution and management of the war.

Most public domain stories about Popeye report that it was syndicated newspaper columnist Jack Anderson that first disclosed the rainmaking operations in Vietnam in his *Washington Post* column “*Air Force Turned Rainmakers in Laos*” on March 18, 1971. Despite his newspaper story sourced by supposed U.S. Government informants and information provided by a slew of (hired) confidential investigators, the story he told was not quite right. It is now evident that Anderson did not have (early) access to the *Pentagon Papers*, that at the time were floating around Washington in various versions seeking a means to be published in any newspaper that would dare. If Anderson had seen the “papers” and noticed the references to weather modification in SEA, his story would have been much different and more accurate.

Despite Anderson's article, some of the very first accurate reporting of the weaponized weather modification in SEA, derived from the *Pentagon Papers*, was a newspaper article published in a local Chicago paper in early May 1972. The article, published in the *READER; Chicago Free Weekly*, [Vol.1 No. 29, 12 May 1972], entitled “*Report Implicates Pentagon in Weather Warfare*” by Andrew Segal, highlights “.... Geophysical warfare rain-making, earthquakes and tidal wave control, and other forms of climate modification for military purpose – is being research and developed by the Pentagon ....”

This article was based on a preliminary report written by the Chicago Collective of “*Science for Viet Nam*” or SFVN. The SFVN was in-turn a component of the national [university - based] “*Scientists and Engineers for Social and Political Action*” or SESPA, which produced its own magazine called “*Science for the People*”, where another article based upon their report was published, later in March 1975 issue of the *Science for the People* (Vol. 7, No.2). The SFVN report “*The Big Gun, is The Rain*” was a preliminary (semi-technical) report on the use and potential of Geophysical Warfare by the United States (circa April 1972).

The Chicago Collective (chapter) of *Science for Viet Nam*, made up of a group of science-based professors, engineers, grad-students and students at the University of Chicago (where there was a strong meteorological program), were already involved in world climate change debates and the ethics of weather modification – when someone in the group noticed references to weather modi-

fication embedded in a circulating copy of the *Pentagon Papers*. It was decided by the collective, to create an investigative sub-committee to looking into the references of weather modification within the Pentagon Papers and any other references to government [geophysical] weather modification in meteorological literature and government reports, papers and records. It was this investigative effort, that lead to the SFVN's report that fed into Andrew Segal's article.

The SFVN and the SESPA story is an interesting peek into a little-known chapter of the anti-Vietnam War history of the 1970s. As educated and liberal American scientists, the SFVN and the SESPA tried to equalize the playing field in reactions to the devastation wrought by the U.S. Military and the conservative U.S. Government on the Vietnamese people. These scientists made visits to North Vietnam and had university -to- university connections (like with the University of Hanoi) to provide their counterpart Vietnamese professors and scientists with the latest knowledge of agricultural science, medical, meteorology and atmospheric [science] papers, reports and publications – as scientist -to-scientist peace offerings.

Unfortunately, these actions ran a foul of the FBI and separate investigations were undertaken against the SFVN and the SESPA, labeling them radical, leftists, socialist / communists and more than likely guilty of revolutionary activities. For full disclosure, this story of the SFVN and the SESPA is much more comprehensive than can be told here. However, the irony is that this story might never be told, if it weren't for the FBI's investigations that included surveillance, confidential informants who infiltrated the groups and an entertaining sub-plot of lost (or intercepted) luggage that the FBI found to contain copies of the SFVN's paper "*The Big Gun, is The Rain*" earmarked for the (North) Vietnamese "Commission for the Investigation of Crimes of War" in Hanoi. Thanks to the FBI, the components by which to produce the next new binge-worthy streaming series are waiting in declassified FBI archives.

*A word about Codenames:* when Operation Popeye was disclosed by Jack Anderson in the Washington Post in March 1971, he actually never mentioned the codename of the Southeast Asian weather modification project as being "Popeye". Instead, he used the codename "Intermediary - Compatriot". The actual name Popeye was not used for more than a year after Anderson. Only first appearing in the series of New York Times articles, beginning in early July 1972, on the weather modification project in Southeast Asia, as reported by Seymour Hersh.

It's been suggested on internet webpages and elsewhere in the public domain, that the original name of the Southeast Asia cloud seeding project was called Popeye initially and later, having been compromised on a couple of occasions, changed its code name to "intermediate" and or "compatriot" or both as in the case of Anderson's reporting. However, this is not actually the case and this understanding of codenames is not historically accurate.

After deep archival review of U.S. State Department, Congressional, DoD and U.S. Navy (China Lake) archival

records, it seems evident now that all the various agencies and services that directly supported or had over-view of the rainmaking project in SEA, utilized their own individual codenames for these weather modification applications in SEA. The Military Assistance Command-Vietnam (MAC-V) used the codename "Flat Tire" for Project Popeye (1966). The 54th WRS used the codename "Motorpool" for discussions (and scheduling) of the cloud seeding flights within the squadron. The codename "Compatriot" apparently stems from a memo from White House National Security Advisor Walt Rostow to Defense Secretary, Robert McNamara in early 1967. (Compatriot was also used in a memo to McNamara from CM Wheeler at the State Department May 1967) In the previously mentioned Rostow memos to President Johnson, the codename "Compatriot" was used. However, Ambassador Sullivan in Laos used the Popeye codename in all his cables to Washington on the subject of the SEA weather modification effort during the same 1966-67 timeframe. (It's now evident, that Anderson's initial source for his article on the Rainmaking in SEA, was from the White House or the State Department)

Ultimately it was China Lake's codenames Project Popeye and Operation Popeye, that stood the test of time and were never compromised. (except in the *Pentagon Papers* that few noticed) The reason that Operation Popeye did not come to a screaming halt in March of 1971, with the publishing of Jack Anderson's article, is that "Intermediary-Compatriot" was not the name of the project. However, once Seymour Hersh published his articles in early July 1972, all cloud seeding flights in Southeast Asia, suddenly ceased on 5 July 1972.

Despite public domain assertions that the SEA rainmaking operations had been compromised and had to change codenames several times, this is historically inaccurate. It's also dismissed by the level of secrecy surrounding the program and the lengths that SACSA (disguised as the DoD / JCS) would go through to keep it all secret. In this regard, you don't have to look any further than what happened to USAF Capt. Jeffrey E. Millard, assigned to the AWS's 54th WRS in Guam.

In April 1971, Capt. Millard had been rotated to Udorn AB, Thailand, his first time participating in Operation Popeye rainmaking operations over southern Laos and sections of South Vietnam. Like many squadron members from the 54th, they didn't learn what their mission was until they landed in Thailand and received their first brief on the on-going operation. After just one operational cloud seeding flight, Millard approached his detachment Officer-in-Charge and questioned the operation on moral grounds. He apparently went on to say that "in all good conscience" he could no longer fly these weather modification flights, that in his mind they "were against his ideology". He is also said to have requested a transfer back to Guam and to the squadron, or if need be, reassign him on to another squadron to serve out his tour of duty. As the story goes, Millard was told that he would be immediately sent back to Guam and reassigned to another unit. However, once he landed in Guam, he was immediately grounded and detained. He was then told that he would be transferred to



**Senator Claiborne Pell, democratic senator from Rhode Island, and Deputy Chairman of the Senate Foreign Relations Committee.**

another unit back in the United States and was subsequently put on a transport aircraft for the U.S. Once there, he was detained again and the U.S. Air Force (more likely the CIA) put him through a series of debriefs, while preparing the paperwork (for him to sign) to separate him from the service, despite any objections. Within a few short weeks of that first Popeye rainmaking flight in SEA, Capt. Millard was a civilian again and disappeared – fading back into the fabric of American society.

The point to this story is that, despite the subsequent newspaper and news stories of the secret rainmaking in SEA, weather as a weapon of war, and the public congressional hearings on the truth of weaponized weather modification conducted by the U.S. Military, nobody came forward to say “hey, I know about that” or “hey, I participated in rainmaking flights in SEA”. No one “ever” came forward. Especially anyone with the name of Millard.

As a result of all the newspaper articles written by Anderson, Hersh and later Victor Cohn from the Washington Post Service, detailing the clandestine cloud seeding operations, Senator Claiborne Pell (D - RI) began a Congressional investigation and subsequent hearings on the weather modification program in Southeast Asia. Although public opinion in the wake of the newspaper disclosures centered mostly on the moral implications of this type of warfare, Pell and other lawmakers saw the weaponization of the weather “... as opening a door on a new and dangerous form of warfare causing large-scale and quite possible uncontrollable (and unpredictable) destruction ...” much like the way atomic weapons were viewed after Hiroshima. The Popeye seeding operations had created a negative environment, within the U.S. and elsewhere around the world, towards the artificial interference of Mother Nature and the manipulation of the world climate in general.

Senator Pell, at the time, was the Deputy-Chairman

for the Senate’s Foreign Relations Committee, and Chairman of its sub-committee on Oceans and International Environment. It was in these capacities that Pell began looking into the rumors and newspaper accounts regarding rainmaking by the U.S. Military in Southeast Asia. Pell began with a letter writing campaign in September of 1971, requesting information (and the somewhat disclosure) of rainmaking in SEA from the Secretary of Defense and other DoD officials, the U.S. Air Force Chief of Staff and the Director(s) of the CIA. In most cases Pell did not receive many replies to the letters he sent. In a couple of responses he did get, he was given curt replies citing “classified program and National Security” that he (as a U.S. Lawmaker) was not privy to. When Pell question these responses, the subsequent replies were terser in the strongest terms, telling him that subject mentioned was none of his %#@&! business.

Accordingly, with the start of the new year (1972), Senator Pell formally instigated an official Senate investigation (and a series of public hearings) into Rainmaking in SEA issue, through his sub-committee on Oceans and International Environment. A number of Senate investigators, from the Library of Congress’s “Congressional Research Service” were assigned to the task and Pell began sending “invitations” for Military representatives, government officials as well as other technical witness to appear before his sub-committee to discuss and inform the committee on the science of weaponized weather modification and if the witnesses themselves had any knowledge of the secret military weather modification activities being carried out in SEA.

Unfortunately, again important government officials with potential knowledge of the military weather modification activities in SEA refused to appear before his committee. In one case, Pell had to think outside the box quickly, when it became known that the Defense Secretary Melvin Laird was scheduled to appear before the Senate’s Foreign Relations Committee, to discuss the Government’s resumption of bombings in North Vietnam (the so-called spring bombing and mining operations) in early 1972. On April 18, 1972, Laird appeared before the Foreign Relations Committee. Pell, attending the committee as the Deputy Chairman, (as well as other Senator members of the committee) turned the tables on Laird and ardently began to question the Defense Secretary about the published accounts of military weather modification operations in SEA. Appearing to be evasive in answering any questions about the SEA weather modification activities, eventually later, Pell asked Laird one last time “... Has the U.S. engaged in weather modification activities for military reasons in SEA ...” Laird, perhaps tired by all the repetitive questioning, finally made a statement “... We have never engaged in that type of activity [weather modification] over North Vietnam ...” Thus, this was the final comment from the Defense Secretary on the subject during this hearing.

However, for Pell, the statement presented more questions than answers. Laird had said “over North Vietnam” but nobody had asked him about specifically weather modification over North Vietnam. His answer additionally did



Secretary of Defense Melvin R. Laird, Jr. (seated).



Pierre Saint-Amand from NWC China Lake.

not address potential weather modification efforts over South Vietnam, Laos and Cambodia. Did he Lie to Congress (?)

*It's interesting to note;* that although the Defense Secretary was willing to discuss the military [B-52] bombing campaigns in SEA before the Senate's Foreign Relations Committee, he was not inclined to discuss any possibility of military weather modification in the same countries.

The question if Laird lied to congress is fleeting. After subsequent public disclosure by the released classified DoD brief on the Rainmaking operations in SEA, Laird is quoted as having said "[he was] Ignorant of the whole operation" and that "he never approved it" according to Seymour Hersh. Laird also is said to have remarked, in a subsequent letter to Congress (to Pell) "... I have just been informed ...." and that he was unaware of the rainmaking program in SEA previous to his earlier statements.

The reality of whether Laird knew about Popeye before his appearance before the Senate's Foreign Relations Committee on April 18, 1972 is unclear. However, the facts of the matter, according to U.S. State Department archival documents, establishes that Laird had a secure long phone conversation with Presidential National Security Advisor /Aid General Alexander Haig on April 21, 1972. In this exchange, Laird and Haig spoke regarding [SEA] troop redeployments and "cloud seeding". Did Laird know about Popeye prior to this discussion or was this moment the first-time hearing about the secret weaponized weather modification program, in the wake of his testimony before Congress.

### **Did He Know (?)**

Although not obvious to anyone at the time, there was another important witness to testify before Senator Pell's Oceans and International Environment sub-committee on

July 26, 1972; Pierre Saint-Amand. Saint-Amand actually appeared before Senate congressional hearings before (in 1966) to present the DoD (i.e. U.S. Navy's) point of view in support of weather as a weapon of war. At that time, he is quoted as saying "...I don't think using weather to discourage people from moving is a bad thing to do ...." which seems like a paraphrasing of another known supportive weaponized weather modification quote "... If an adversary wanted to keep me getting from point A -to- point B, I'd rather he stop me with a rain-storm than stop me with a bunch of bombs ...." These quotes are meant to instill a measure of humanity into the justification of weaponized weather activities.

In his further testimony, Saint-Amand stressed the importance for the U.S. to acquire and develop these weather modification capabilities before the Soviets could develop them and use these weather weapons against the U.S. Homeland. In these and subsequent Congressional hearings Saint-Amand echoed others who said "that weaponized weather is no more than military applications of artificial weather change". Personally, Saint-Amand was often unapologetic regarding his views of the military's (right to the) utilization of weather as a weapon and the U.S. government's "potential" development of weaponized weather.

In these appearances before Congressional committees, Saint-Amand always presented himself as a U.S. Navy scientist familiar with the concepts of Geophysical Warfare. It was never disclosed that Saint-Amand was actually "the" pioneer of the weaponization of weather, nor that he had been the man in charge of Popeye on the ground in Southeast Asia and weaponized weather in general.

During the Congressional hearing with Pell, Saint-Amand focused most of his prepared and live comments on the cloud seeding development by the U.S. Navy at China

Lake, that to some extent was already public knowledge, as well as some other cloud seeding projects that were less-known. (to Pell, these encompassed cloud seeding support to other countries) Saint-Amand otherwise was more vague regarding questions about more or less secret weaponized weather modification efforts. Although he was supportive of the notion of weaponized weather, he presented a view that was less than cognizant as to the existence of any secret weaponized weather modification efforts in SEA – to the best of his knowledge. However, asked at point blank if he knew anything about military weather modification / rainmaking activities in Southeast Asia (?) Saint-Amand said “No”.

No disrespect intended toward Mr. Saint-Amand here, but it is now known that his specific response was not historically accurate. If one were to review the transcript, of his appearance before Senator Pell’s committee, there are other occasions where he misrepresented his knowledge of military weaponized weather modification operations in SEA and elsewhere and deflected other questions without actually answering them – skirting others. However, in retrospect, some of the blame for Saint-Amand’s testimony before Congress is due to Pell’s own lack of understanding of the subject at hand, that he was investigating. [retrospectively] Pell had no understanding of the specifics that he was questioning witness about, no perspective and no understanding of who he was really questioning and if they were actually telling him the truth. One example of this was where Pell missed a potential line of questioning encompassing Saint-Amand’s mention of the experimental cloud seeding effort out of Brownsville, Texas, into the Gulf of Mexico. The reality is that this mention was the tip-of-the-iceberg of the geophysical warfare / weather modification program being conducted against Cuba – that created severe droughts.

Again, looking at the transcript, another area of China Lake’s public weather modification capabilities that Saint-Amand avoided altogether, was any mention of its (ongoing) efforts towards hurricane modification – publicly supporting Project Stormfury. At the time of Saint-Amand’s appearance before Pell’s committee, the Navy (China Lake) was conducting a secret Geophysical warfare campaign against Cuba sending weaponized hurricanes and causing widespread drought to destroy Cuba’s economy. Saint-Amand essentially had visibility of these weaponized weather modification applications against Cuba, if not being out-right in-charge of them. Thus, it is unclear, if Pell ever knew who Pierre Saint -Amand really was, and what “it” was really all about.

As Pell continued to excavate for the truth and bring the (still) secret weather modification operations in Southeast Asia out into the open, he began a Congressional effort to establish guidelines towards the banning of future development of environmental modification (ENMOD) as a weapon of war. It was at this moment that his dogged determination was about to pay off.

As previously mentioned, the pressure placed upon the CIA by Pell’s inquiries, hearings and a renewed letter writing campaign, resulted in the agency presenting the Senator with what he’d been looking for, in the great hopes of

dissuading, distracting, and derailing any further inquiries into weaponized weather programs. The object that they were willing to disclose was a Classified / Top Secret briefing on the U.S. military’s weather modification activities in SEA. (i.e. Popeye)

The so-called “Brief” was presented to a classified session of Pell’s “Oceans” sub-committee on March 20, 1974. (by this time, Operation Popeye and other SEA weather modification projects had been discontinued for over two years) The brief was presented by representatives of the DoD and JCS that consisted of U.S. Army Lt. Col. Harry “Ed” Soyster, (representing the JCS), Mr. Dennis J. Doolin, DoD’s Deputy Assistant Secretary of Defense [for East Asia and Pacific Affairs] and U.S. Air Force Lt. General Raymond B. Furlong, (principal) Deputy Assistant Secretary of Defense [for Legislative Affairs].

*It’s interesting to note;* that although public domain and internet references suggest that Soyster and his colleagues were from the organization that conducted the weaponized weather modification in SEA, and that Soyster himself was the leader of these weather modification operations, this is not historically accurate. Lt. Col. Soyster was in fact assigned to JCS as Operations and Plans officer, for the Joint Reconnaissance Center, of the Operations Directorate at the time. He was “not” from SACSA and therefore would not have any direct knowledge of weaponized weather modification operations in SEA – beyond the brief he provided. Doolin, previous to his position as a DoD’s Deputy Assistant Secretary of Defense, was with the CIA as an East Asian expert, but again, had no direct knowledge of Popeye. General Furlong was there to represent the Defense Secretary, with questionable knowledge of the operations to be briefed.

The 36-page brief, although seeming very comprehensive, only outlined the basic information associated with Project Popeye and Operation Popeye and did not mention any of the other weaponized weather modification “applications” mentioned in the pages above. Subsequent Committee questions posed to these military briefers were often met with “I don’t know” and “to the best of my knowledge” or ambiguous answers that didn’t really answer the questions posed to them. Some of the more probing questions of Pell’s, centered around were storms modified and are there any other weaponized weather modification programs (?) were met with standard “no – not to my knowledge”, which actually meant that these specific representative of the DoD / JCS “didn’t” specifically know anything – and therefore were not specifically lying. This is also not the same as the DoD / JCS agencies themselves denying the existence of any other potential weather modification programs.

One of the more interesting aspects of this presented DoD briefing, is that it seriously contradicted the testimony (or statements) of the previous Secretary of Defense Melvin Laird, made before a congressional oversight committee and who had denied that the U.S. had conducted military weather modification in SEA. This official government briefing essentially undercut Laird and implicated him in congressional perjury or (i.e.) lying to Congress.

It wasn't until later, after Senator Pell disclosed the DoD briefing, publishing it in the U.S. Congressional Record, that former Secretary of Defense Laird realized what had been done to him and raced to send Congress (Pell) an apology letter. The letter (in part) categorized his previous comments as "mis-statements", and acknowledged that - "he was unaware of any U.S. military weather modification activities conducted over North Vietnam - .i.e Southeast Asia on the whole - during the Johnson Administration" and that "... I have just been informed ...." Again, this situation (if Laird wasn't actually lying) demonstrates to what lengths the SACSA (i.e. the CIA) would go to deflect from their current (at the time) ongoing weaponized weather operations. It further re-emphasizes that the Popeye weather modification operations were not actually DoD programs and that the military organizations, like the U.S. Air Force, were just covers for those who were really conducting these activities.

In the aftermath of the congressional disclosure of the Popeye activities to the public and press, in May 1974, Pell introduced a Senate Resolution No. 281 (SR-281) to prevent any more U.S. weaponized weather modification programs in the future. Reintroduced as SR-71, Pell's resolution subsequently passed in the Senate by a vote of 82-10 in July 1974. This resolution would eventually lead to a United Nations international treaty banning all forms of environmental (geophysical) weather modification or warfare. Later in 1974, the Nixon Administration signed international agreements, limiting environmental (*weather*) modification towards geophysical warfare – save only for scientific investigations of peaceful purposes.

In May 1977, the UN General Assembly ratified the international "Environmental Modification Treaty" or ENMOD Treaty that had as its main tenant; "... that each party to this convention undertakes not to engage in military or any other hostile use of environmental modification techniques having wide-spread, long-lasting or severe effects as means of destruction, damage or injury to any other party ....". Many will tell you that this agreement (treaty) is riddled with loop-holes and allows for those who will, to violate the main tenant of this agreement and conduct continued weather modification projects towards weapons of war.

## In the Wake

After passage of Pell's Congressional resolution to ban all forms of environmental modification, to include weaponized weather modification, personnel at China Lake involved in weather modification projects (and their colleagues) were disgusted by the actions taken by the U.S. Congress against, what they saw as their vital work and perceived mission of fighting communism throughout the world. Saint-Amand in-turn was hailed as a Cold Warrior and a hero trying to protect the United States against the evil empire of the Soviet Union, by China Lake and the conservative enclave of Ridgecrest, California. Pierre Saint-Amand is still revered there today, many years after his passing.

Senator Pell eventually became the full Chairman of the Senate's Foreign Relations Committee. Although he should have been pleased to have constructively spear-headed one of the few instances of active "checks-and-balances" of a modern Democracy, he continued to question if they had been given the full truth regarding the military's utilization of weather as a weapon. In fact, Pell always suspected that there was more. That the military did modify typhoons that stuck Vietnam, that caused so much death and destruction, and that there were more weaponized weather programs out there, and that there had been an active program against Cuba.

As late as July 1976, Pell wrote a letter to then CIA Director, George (H.W.) Bush, inquiring if the U.S. (i.e. the CIA or DoD) had conducted a Geophysical warfare program against Cuba that encompassed "...seeding clouds near Cuba to have caused droughts [to destroy Cuba's export economy] in the 1960-70s ...." This information was mentioned (in passing) in a recent book by a former specialist with "International Research and Technology Corp" (a government funded think- tank) turned author "Lowell Ponte", in his 1975 book "*The Cooling*".

According to declassified CIA archival [CREST] documents, encompassing internal memos and CIA legal opinions surrounding "how" Director Bush was going to answer Pell's question, again suggested that they cannot lie in writing. The subsequent crafted response scheme consisted of a two-sentence (paragraph) written statement "... You will recall that in connection with our correspondence earlier this year (your 23 January letter to Mr. Colby and my 19 February reply) my colleagues briefed two members of your personal and committee staff(s) on certain Southeast Asian activities, none of which were directed against harvests or obviously – against Cuba. I would be happy to discuss this further with you personally if you wish. ...." Then another paragraph statement "... "no". The CIA has never been involved in any project employing weather modification techniques against Cuba, off the coast of Cuba or against any [other] nation's harvest activities ...." to be presented to Pell "verbally", uttered by Director Bush the next time he came across Pell, face-to-face, at an official Government function. In this manner, Bush could lie (to Pell's face) with a legal "he said -vs- he said", that was inadmissible in any court or legal proceedings. All in an effort to get Pell to stop investigating potentially other weaponized weather modification projects in SEA and now against Cuba.

*It's interesting to note;* that although this was the CIA's preferred method of replying to Senator Pell, according to declassified CIA archival [CREST] documents, it was not the one that George Bush went with. During the deliberation on how the CIA Director should respond to the Pell inquiry, Bush was offered a chancy reply that principally encompassed a direct letter with both the proposed paragraphs (one that was an all-out-lie) presented to Pell in a letter. According to declassified CIA archival [CREST] documents, encompassing internal memos and CIA legal opinions surrounding "how" Director Bush should reply to Pell, an internal memo suggested "... On the other hand, you

may not care to sail quite this close to the wind so far as the written record is concerned and, hence, may want to incorporate something like the suggested second paragraph in the actual written response ....” And that is just what Bush did.

The reality is that there “were” other weaponized weather modification programs being conducted, and particularly against Cuba. As it’s understood currently, the Geophysical warfare campaign against Cuba continued by SACSA and the Navy (China Lake), with the perceived blessing of the Nixon Administration (i.e. Kissinger) until 1975, when the weaponized hurricane and drought weather modification programs came to an abrupt end.

Various public domain references suggest that the secret team office of SACSA quietly disappeared from the Pentagon in 1971, perceived to have been disestablished with the winding down of the U.S. involvement in the Vietnam War. Public domain references additionally tried to establish the actual identities of SACSA commanders over this perceived period of the office’s existence, with limited details and results.

The reality of those that ran SACSA, between 1961-1975, comprised: USMC Major General Victor H. Krulak (1961-1964); USAF Maj. Gen. Rollen H. (Buck) Anthis (Feb 1964- Jan 1966); USAF Maj. Gen. William R. Peers (Jan 1966 – Jan 1967); U.S. Army Maj. Gen. William E. Dupuy (1967 - 1969); U.S. Army Brig. Gen John F. Freund (Jan 1969 – Aug 1969); U.S. Army Brig. Gen. Donald D. Blackburn (Aug 1969 – Feb 1971) and USAF Brig. Gen. Leroy J. Manor (Feb 1971 – Feb 1973).

During the SACSA tenure of General Manor, issues were presented to reorganize SACSA. According to declassified CIA archival [CREST] documents (including an internal March 1971 letter), the difficulty with the visibility of Counterinsurgency operations within the government was highlighted, with recommendations presented to lower the view (visibility) of SACSA by making the organization more palatable within the civilian agencies [such as Congress]. Thus, shortly after General Manor took over the position of SACSA, this area of the CIA’s counter insurgency and special operations was reorganized as the office of Special Operations Division (SOD), positioned under the DoD / JCS Operations (J-3 OJCS) [now JP-3-05 Special Ops] Section – where General Manor became the Deputy Director of Operation, JCS/ SOD that assumed all the responsibilities, operations and missions of the previous SACSA office.

To continue with the SACSA / SOD (special ops) management of the weaponized weather modification operations through July 1972 in SEA, and the Geophysical warfare campaign against Cuba through March 1975, the SOD office was led by U.S. Army Col. Clarence E. Skoien

as Director of Special Operations Division, JCS Operations from February 1973.

The irony is, that the weaponized weather operations were shut down not because of any of the mighty efforts spearheaded by Senator Pell. It all came to a screaming halt due to the Congressional Amendments of the Hughes-Ryan Act. Enacted in late 1974, the Hughes-Ryan Act established new U.S. Congressional oversight controls specifically introduced against the American Intelligence Agencies (the CIA, DoD / DIA and NSA) in an effort to limit any and all U.S. covert operations against Cuba and any other countries. This Congressional Amendment required the President to be responsible for, and report, all non-Intelligence (related) CIA covert operations to a congressional select oversight committee in a timely fashion – as a means to increase (mostly) CIA accountability to Congress. Failure to do so, prohibited the use of government appropriated funds (tax dollars) for the conduct of such covert actions.

So, it was in the CIA’s advantage to discontinue all the geophysical warfare operations against Cuba, and perhaps other adversaries, before having to disclose said operations to Congress – under Hughes-Ryan Act. Thus, came the end of the military’s development and utilization of weaponized weather applications – as far as it is authoritatively known for this specific period in history.

The perception -vs- reality of history, of the Popeye story, is important towards setting the record straight in the public domain with regards to the actual history of weather modification and the development of weather as a weapon during this period of the Cold War. In that, this comprehensive history serves as a guide, pointing out the flaws, inaccuracies, superficialness, and bias conspiracy-leaden weather modification history information currently prevailed within the public domain and its perceived instances of weaponized weather modification. In this age of “fake news” and “historical fiction” being accepted as historical fact, those times when the truth is actually known, it’s important to point these facts out to correct the public’s perception and present the true history.

## Epilogue

In November 1972, four-months after the cessation of Operation Popeye in Southeast Asia, the Nixon Administration began a systematic B-52 bombing campaign to carpet bomb key areas of the Ho Chi Minh Trail and a network of dikes.

P.S. *It’s interesting to note*; that in military communications (Brevity – codewords) the codeword for flying in clouds / flying in weather with reduced visibility is “POP-EYE” ■

