Components and Contractors

of the

AUTOMATED AIR WAR

Compiled by

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Contents

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Epitaph For Igloo White?

As originally conceived in 1966, the Igloo White program was a master plan for sealing off the "Ho Chi Minh trail" in southern Laos. Ground sensors and airborne "people sniffers" and infrared detectors would monitor any movement of enemy personnel or vehicles. Electronically guided planes would drop sophisticated new bombs at just the right moment, and tiny air-dropped land mines would form barriers to enemy movements. The whole operation would be directed by computer from a distant command station.

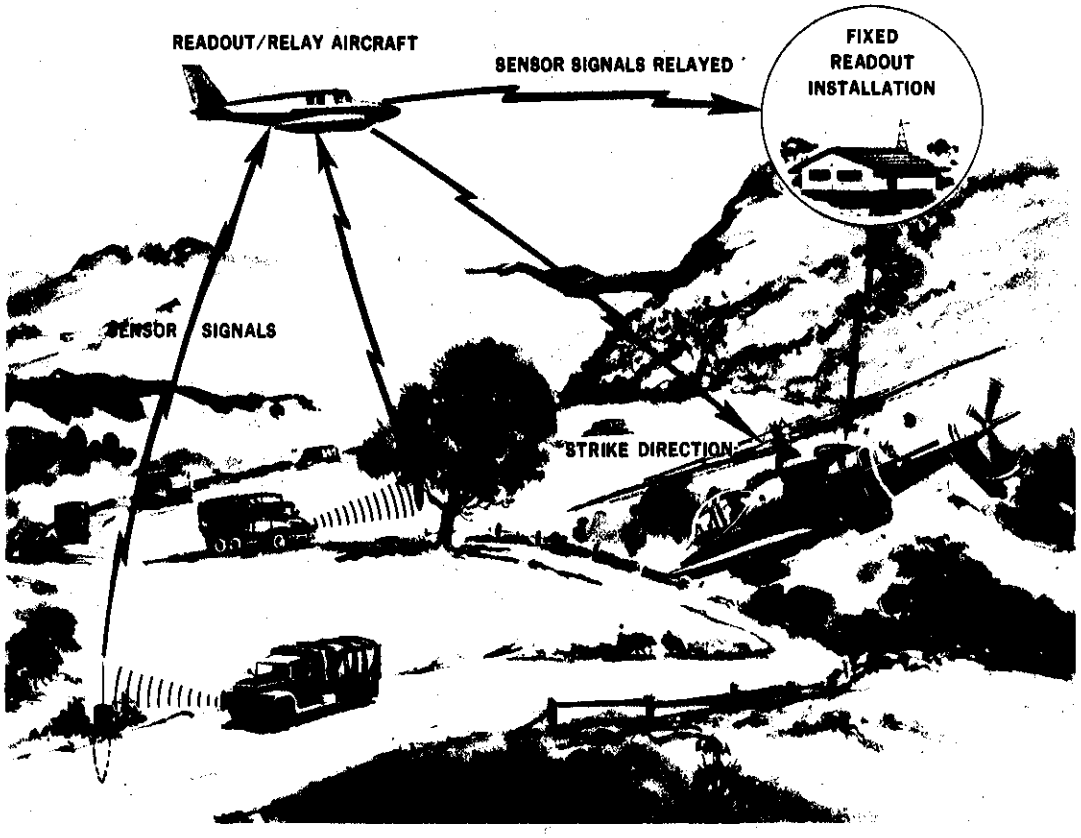
Installed in 1967, the Igloo White program ran into difficulties in Indochina. Ingenious guerrillas are said to have hung buckets of urine in trees to mislead ammonia-detecting "people sniffers." Millions of dollars' worth of complicated equipment was not enough to warn the military to prepare for the 1972 spring offensive. (See story, p. 3.)

In mid-1972 the military began quietly dismantling the network of sensors. The computer center in Thailand that monitored the sensors reduced operations and then disbanded completely on November 27. A squadron of QU-22B planes carrying electronic equipment for the sensor program was crated and sent back to the United States. Sensors moitoring movements along the "Ho Chi Minh trail" in southern Laos were curtailed.

If Igloo White is on the way out, other parts of the automated air war still thrive. Airborne detectors seek out moving targets on the ground; radar guides aircraft to predetermined points; electronic warfare planes escort bombers to counter ground defenses; "smart" bombs find their targets on TV screens and laser beams; and the whole operation is coordinated by computer. (See story, p. 16.)

With a ceasefire in the offing, the air war continues. As negotiators hold secret talks in Paris, U.S. flyers set new bombing records. An estimated 3,626 fighter-bomber strikes were conducted over North Vietnam alone in the month of November and at least nine fixed-wing aircraft were

Army version of one of the ways the automated air war is supposed to work. (Army Research and Development News Magazine, Jan-Feb. '72)



Many Air Force officials now concede that hundreds of millions of dollars spent on what was called Task Force Alpha—a secrecy-shrouded, computer-controlled effort to drop hundreds of electronic sensors along the Ho Chi Minh Trail in Laos to detect the movement of men or trucks—was not worth the money.

The project produced more information than could be absorbed and used properly, was foiled on numerous occasions by North Vietnamese tricks and by-pass roads, and required continual reseeding with new sensors.

Asked about the project, Gen. Vogt said he would not quarrel with the assessment that it "was not cost-effective. It was very expensive to operate, complex, and took a lot of resources."

—Washington Post, Dec. 12, 1972. Gen. Vogt is head of the 7th Air Force.

lost, including an F-111 and a B-52. Hundreds of planes and helicopters were donated to President Thieu, making his air force the third largest in the world—although South Vietnamese officers would also like to have the speedy F-4 so that they can attack the North (Washington Post, 12/11/72). If a ceasefire is signed, Theiu's air force will be ready to resume fighting at a moment's notice—as will the U.S. 7th Air Force, whose command center covering all southeast Asia is being moved from South Vietnam to Nakhon Phanom airbase in Thailand (Dispatch News Service International article, 12/11/72).

As the United States moves to turn the fight against liberation movements over to its "allies," certain components of the automated air war become export items. Even before the South Vietnamese buildup this fall, the Air Force was giving old T-28's to the Laotian Air Force, and A-37's were going to such model democracies as Portugal and Brazil. The CBU-25 cluster bomb, dispensing hundreds of antipersonnel bomblets, is being given to the South Vietnamese and Laotian air forces.

This booklet supplements NARMIC's slide show, The Automated Air War, by breaking the air war down into its components and naming companies that were awarded defense contracts for their production in the first ten months of 1972. Principal sources are defense industry publications, government publications, and the annual House and Senate hearings on the Department of Defense budget.

An earlier version of this booklet, compiled by Gene Massey, was published as The Components and Manufacturers of the Electronic Battlefield (NARMIC, 1971).

Resounding Success or Costly Failure?

In September 1966, the Defense Communications Planning Group (DCPG), forerunner of today's Defense Special Project Group (DSPG), was established.

Initially, its mission was to put into operation a military concept that was to become loosely known as the McNamara Wall. This concept included an air-supported anti-vehicular and anti-personnel system in Laos, collectively referred to as "Igloo White," and a fixed conventional barrier system across the demilitarized zone (DMZ).

The conventional barrier system was intended to combine sensors to detect enemy intrusions, physical obstacles to impede and canalize enemy movements, and tactical troop units operating from fortified strong point bases to strike at enemy incursions.

Although the conventional barrier system was never fully implemented, by the end of Calendar Year 1967 an over-all Anti-Infiltration System capability for use in Southeast Asia had been developed and deployed.

The success of this initial system was to have a far-reaching impact on operational commanders. The information derived from the use of sensors and related equipment, which was to become more complex and highly sophisticated in a very short time, was found to be invaluable in complementing normal intelligence-gathering systems.

In early 1968, certain air-supported system components were directed to the battle of Khe Sanh. The employment of sensors in the defense of Khe Sanh demonstrated conclusively that improved sensors could be used to great advantage in support of ground combat operations.

ARMY RESEARCH AND DEVELOPMENT NEWS MAGAZINE JAN.-FEB. 1972

From Our Wire Services

SAIGON. — The United States has curtailed operations of its multi-billion dollar super-secret electronic battlefield along the Ho Chi Minh Trail in southern Laos, it was learned Wednesday.

The cutback involves a reduction in the number of Orwellian "big brother" sensors that measure supply traffic and fresh troops moving from North Vietnam to Communist forces in the South.

The information is used, in part, to pinpoint targets for U. S. bombing attacks.

As a result of the cutback, military intelligence sources have far less data available to gauge potential north Vietnamese military capabilities and intentions. At the same time, the North Vietnamese have more freedom of movement along the labyrinthine network of roads than they've had at anytime since 1968.

MILITARY SOURCES said the cutback was ordered both because of the prospects of an Indochina cease-fire and the enormous cost of the program. One source called the reduction "significant" but refused to indicate its scope.

There is also a possibility that this year's Communist offensive, which took more than a year to prepare for and involved moving hundreds of tanks and heavy artillery pieces down the trail, proved the sensor system to be less effective than enthusiastic U. S. Air Force officials hav clained in the past.

Battery powered and often costing up to $1,000 each, the sensors have a life of 90 days.

They are camouflaged to look like tropical trees and plants, and are programmed to self-destruct if tampered with or when their batteries become weak. Thousands of sensors have been used since the program began in 1963.

The U. S. Air Force Command here refused to comment.

Philadelphia Inquirer Thursday, Dec. 14, 1972

THE COMPONENTS: AIRCRAFT

Attack aircraft are planes designed for attacking ground targets. Fighters are designed for dogfights; those listed here have been adapted to drop bombs. Bombers are designed for bombing and can carry large loads of munitions. Observation planes fly low over the ground to spot targets; reconnaissance planes fly high and perform spy missions over enemy territory. Cargo planes carry cargo, troops, or fuel; some have also been fitted with guns to shoot at persons and materiel on the ground, as have certain helicopters. Remotely Piloted Vehicles (RPV's), or drones, are pilotless planes used for reconnaissance and communications--and recently being adapted to drop bombs so as to reduce pilot losses.

The following list includes most of the principal aircraft used in the air war in Indochina. For details on other aircraft, see NACLA's U.S. Military Apparatus (details inside front cover); T. Morgan, Bomber Aircraft of the United States and Fighter Aircraft of the United States (New York, Arco, paperback); Jane's All the World's Aircraft.

Attack Aircraft

Aircraft	Description; Comments	Producer
A-4 Skyhawk	A Navy, carrier-based light attack fighter-bomber. It is armed with two 20mm. cannon and can carry five tons of munitions. Powered by a single turbojet engine, it flies at subsonic speeds enabling it to stay over a target area longer, and to deliver its munitions with greater accuracy, than a faster flying plane. The Skyhawk was headed for retirement but when the war in Vietnam got under way, the Navy revived it.	McDonnell Douglas ENGINES: United Aircraft
A-6 Intruder	A Navy twin-engine, carrier-based attack aircraft that can carry up to nine tons of bombs. The A-6 has been mainly used for close support of ground troops but it has sometimes also been used over North Vietnam. Some A-6's have been modified to be used for electronic countermeasures - jamming enemy radar.	Grumman
A-7 Corsair	A single-engine, subsonic plane used by both the Air Force and the Navy. Designed as a replacement for the A-4, it can carry 7½ tons of munitions. The Navy activated its latest model, the A-7E, despite problems with the engine casings, in order to meet the spring 1972 offensive in Vietnam.	LTV ENGINES: General Motors
A-37 Dragonfly	An Air Force twin-engine, subsonic plane that is armed with a 7.62mm. Minigun and can carry two tons of munitions. Modified from the T-37 trainer for use in counterinsurgency and close support, it has been used in Indochina and has recently been sent to other countries such as Guatemala, Brazil, Pakistan, Portugal, and Thailand.	

T-28 Trojan	Originally a trainer, this single-engine, propeller-driven Air Force plane has been armed with machine guns and bombs and used as a counterinsurgency aircraft aircraft since the beginning of the war in Indochina. It is now being phased out of U.S. Air Force use and has been supplied to the Royal Laotian and Saigon regime's air forces.	Out of production

Bombers

B-52 Strato-fortress	Originally designed for nuclear bombs, this eight-engine, subsonic bomber carries a payload of 30 tons of bombs which it can unload in a fraction of a minute, saturating an area three miles long and half a mile wide. In 1971, according to Pentagon figures, B-52's flew 12,500 missions of which 70% were against Laos, 19% were against South Vietnam, and 11% were against Cambodia. Since spring 1972 some B-52's have also been used to bomb North Vietnam.	Out of production; Boeing, the original producer, now works on B-52 modifications.
B-57G	A twin-engine, subsonic B-57 Canberra bomber converted into a gunship. It is armed with .50 caliber machine guns or 20mm. cannon and can carry four tons of munitions. It flies at lower levels than the B-52 and is widely used by the Air Force against the "Ho Chi Minh trail" because of special electronic equipment installed in it under the Air Force's "Tropic Moon 3" program.	Swedlow, Inc. (spare parts)

Fighters

F-4 Phantom 2	A Navy and Air Force twin-engine, supersonic fighter-bomber that carries up to eight tons of bombs. It can fly "cover" for B-52's and reconnaissance planes or it can fly its own bombing missions. The work horse of the air war, especially over North Vietnam. Two reconnaissance versions, the RF-4B and RF-4C, contain photographic, infrared, and radar equipment and are used to make analyses of ground targets before and after bombing.	McDonnell Douglas
F-100 Supersabre	An Air Force single-engine, supersonic fighter-bomber that carries four 20mm. cannon and three tons of bombs. A relic of the final days of the Korean war, the Supersabre has been widely used in Indochina, principally for close ground support and interdiction of supplies.	Out of production
F-105 Thunderchief	An Air Force single-engine, supersonic fighter-bomber that is armed with a 20mm. cannon and can carry more than six tons of bombs and missiles. Widely used in interdiction missions and in bombing North Vietnam.	Out of production

F-111	The Air Force's controversial all-weather, variable geometry fighter-bomber that flies at supersonic speeds at low levels. This twin-engine plane can carry up to ten tons of bombs and has a habit of crashing. First sent to South Vietnam in 1968, the F-111's were grounded after three out of six crashed. In late September 1972 the Air Force decided to send two squadrons of F-111's to Thailand for use in bombing North Vietnam. This prompted Senator John Tower of Texas (home of General Dynamics, the manufacturer) to say the decision proved "that the F-111 is the finest target-penetration aircraft in anybody's inventory and is the most effective air-borne weapons delivery system in the world." Within the next few days another F-111 crashed and the rest of the "all-weather" planes were grounded because of a typhoon.	General Dynamics

Reconnaissance & Observation

SR-71	An Air Force twin-engine, supersonic reconnaissance plane. The successor to the well-known U-2, it flies spy missions at 70,000 feet over North Vietnam and China, investigating possible targets and assessing damage to targets already bombed.	Lockheed
O-1 Bird Dog	A lightweight, single-engine observation plane used by Air Force forward air controllers to spot targets and direct attacks on them. It can be armed with a 7.62mm. gun for strafing.	Cessna
O-2	Another light observation plane for forward air controllers. The O-2 is also used in psychological warfare for dropping leaflets or broadcasting messages over a loud speaker.	
OV-10 Bronco	A Navy and Air Force twin-engine, short takeoff and landing plane for use in counterinsurgency. It is used largely as a spotter plane in Indochina but it can also be armed with four 7.62mm. machine guns and can carry two tons of bombs, making it useful for armed reconnaissance missions. Under development is a laser designator that would be used to direct laser-guided bombs to the desired targets.	North American Rockwell

Cargo Planes

C-130 Hercules	A four-engine Air Force cargo plane that can carry 92 troops or more than 15 tons of supplies. The AC-130 is a C-130 converted into a gunship through the addition of various automatic guns; it replaces the DC-3 and C-47 gunships of the earlier days of the Vietnam war which have now been given to the Saigon government. Some AC-130's under the Air Force's "Surprise Package" program have been	Lockheed

	equipped with low light level TV and forward-looking infra-red for spotting supplies moving on the "Ho Chi Minh trail," and laser designators for directing laser-guided bombs to their targets. Another version, the EC-130, is used as a command and control plane in bombing raids. It flies at 35,000 feet and is used to direct the planes below as they bomb and strafe ground targets.	
KC-135 Stratotanker	An Air Force tanker that can carry 31,000 gallons of fuel. It flies at 20,000 feet accompanying bombing missions. Used for refueling B-52's and other planes.	

Helicopters

AH-1G Huey Cobra	A modified, armed version of the UH-1 Iroquois helicopter, developed by Bell Helicopter Co. in the mid-1960's to compete with Lockheed's projected AH-56A Cheyenne attack helicopter (which, in the end, was scrapped). The Huey Cobra is used by the Army in close support missions and can carry a variety of 2.75-inch rockets, 7.62mm. guns, TOW missiles, and Fuel Air Explosive weapons. Some Huey Cobras have been fitted with forward-looking infrared and radar for use in locating desired targets.	Bell Helicopter

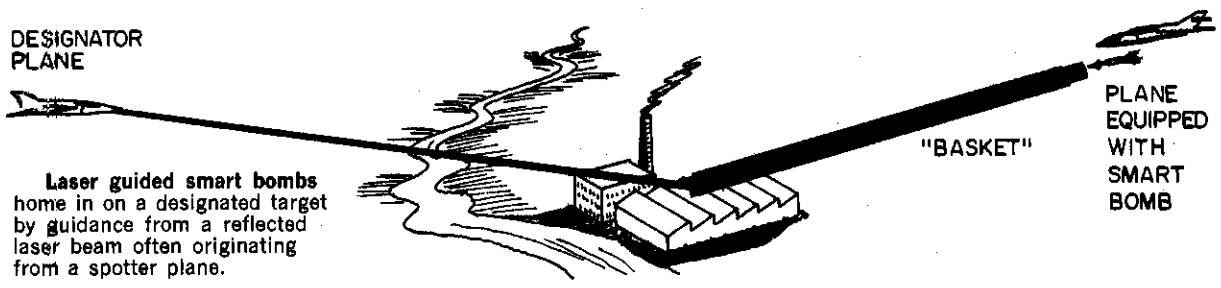
Remotely Piloted Vehicles (RPV's)

AQM-34	An Air Force RPV that comes in several versions. The AQM-34H is used to drop chaff - narrow strips of metal or metallized glass used to confuse enemy radar. The AQM-34L is used for surveillance and according to Aviation Week & Space Technology (3/13/72), it is "being modified for air-surface weapon delivery" -- in other words, to drop bombs or launch rockets and missiles against ground targets. The AQM-34R, another version, is used to detect enemy radar.	Teledyne
QU-22	An Air Force RPV, controlled from the ground, that relays information from ground sensors to a target information center from which air strikes are planned. QU-22's are also used for reconnaissance missions.	Beech Aircraft

AVIONICS

A wide variety of sophisticated and expensive equipment--radar, radio, infrared, lasers, computers--is used for navigation, confusing enemy radar, photographing enemy territory, finding enemy targets on the ground, and directing bombs and missiles against them. Following are a few such devices for which production contracts were awarded in 1972.

Name	Description	Producers
AN/ASN-91	Navigation and weapons delivery computer for A-7D/E and AC-130 aircraft. The AN/ASN-91 provides mathematical calculations on how best to drop bombs on a given target, and how best to get there.	IBM
AN/AVQ-7	Display set used on A-7 aircraft. Projects computer data on to a transparent mirror in the cockpit of the plane, thereby providing the pilot with information on day and night visual attack, radar bombing, and all-weather navigation.	SPARE PARTS: E-A Industrial
AN/USH-17	Records and reproduces data received from radar, infrared sensors, computers, and intercom systems. Used on A-6 aircraft for analyzing each mission.	RCA Corp.
Chaff	Narrow strips of metal or metallized glass, dropped from planes to confuse enemy radar	Demac Corp. Lundy Electronics Reynolds Metals DISPENSER: Sells
Forward looking infrared (FLIR)	FLIR is aimed from the front of the plane and picks out objects that are warmer than their surroundings. It can detect persons, fires, engines, and foxholes.	Aerojet Electro Hughes Aircraft Spectronics
LLLTV	Low Light Level Television (LLLTV). Special TV cameras that operate by the light from stars to give pilots a close-up view of movement on the ground.	General Electric



Use of airborne laser designator (left) to mark target for laser-guided bomb. (Microwaves, October 1972)

COMMIKE (left) and EDET on display. (Aerospace Daily, 11/1/72)

SENSORS

Air-dropped sensors come in several types. They are generally slender, pointed metal objects several feet long that penetrate the ground, leaving exposed antennas that transmit messages back to aircraft circling overhead. Air-dropped sensors detect moving people and vehicles by their sounds or by seismic waves in the ground.

Sensors are a weak spot in the automated air war. Some sensors may be activated by children, by passing animals, or even by the rain. The failure of sensors to give adequate warning of the spring 1972 offensive in Vietnam has raised doubts about their efficacy.

Sensor	Description	Producer
ACOUBUOY	Acoustic Buoy. An air-dropped sensor containing a microphone powered by long-life batteries. It is parachuted into jungle foliage where it is extremely difficult to see. ACOUBUOY is used to keep track of truck movements in suspected truck parks.	No recent contracts
ACOUSID	Acoustic Seismic Intrusion Detector. A combination acoustic and seismic sensor that is dropped from helicopters and buries itself in the ground.	No recent contracts
ADSID	Air Delivered Seismic Intrusion Detector. A sensor that can be dropped from F-4 Phantoms and other airplanes at speeds over 500 miles per hour. The nose of the sensor is buried far underground while the tail remains at the surface, exposing only a green antenna that resembles a jungle plant. The ADSID picks up movements of men or vehicles and transmits information about them.	No recent contracts
COMMIKE (AN/GSQ-187)	Commandable Microphone. An acoustic device, dropped along trails. Part of the Air Force's Igloo White program.	No recent contracts
DSID (AN/GSQ-159)	Disposable Seismic Intrusion Detector. A sensor that can be deployed by helicopters and used to detect intrusion of "enemy" forces over a large area.	No recent contracts
EDET	Engine Ignition Detector. Dropped from planes, this sensor buries itself in the ground and detects emissions from the ignition systems of trucks.	Hazeltine
SPIKEBUOY	An acoustic sensor, similar to Acoubuoy, that is dropped from airplanes and buries itself in the ground with only its camouflaged antenna showing.	No recent contracts

MUNITIONS

U.S. fliers have a large selection of munitions for use against different targets. Rockets, missiles, and bombs are designed for a variety of purposes. The same rocket can be used with a fragmentation warhead (against people) or a white phosphorus warhead (for target marking and incendiary effect). The same cluster bomb dispenser or "mother bomb" can be loaded with a variety of little bombs or "bomblets" for different purposes. An ordinary general purpose bomb can be converted into a "smart bomb" by the attachment of a laser- or TV-guidance kit which is strapped on to it. The same bomb can be fitted with a nose extension, making it effective in rice paddies, or it can be used with a special jungle penetration fuze that makes it explode just off the ground in jungles.

Below are listed most of the air-to-ground rockets, missiles, and bombs used in the air war in Indochina. Also included are a few of the air-dropped land mines which are one of the more significant new developments in aerial munitions. For further details on antipersonnel bombs, rockets, guns, and grenade launchers, see NARMIC's booklet The Simple Art of Murder (details inside front cover). Also useful: Napalm and Incendiary Weapons, an interim report by the Stockholm International Peace Research Institute (Sveavägen 166, S-113 46 Stockholm, Sweden; 1972), and U.S. Army Technical Manual TM 9-1325-200, Bombs and Bomb Components (1966, illustrated; available in libraries).

Rockets & Missiles

Name	Description; Comments	Producers
Maverick (AGM-45A)	An eight-foot, TV-guided air-to-ground missile scheduled for deployment in early 1973. It has a range of five miles and has a shaped charge warhead which makes it suitable for attacking small, "hard" targets such as tanks. The pilot maneuvers until an image of the "target," transmitted by a TV camera in the nose of the missile, appears on a screen in the cockpit of the plane. He then "locks" the missile on the target and fires the missile which is then guided automatically to the target, so that the pilot is free to get out of the way of enemy ground fire. The Air Force in 1972 asked Congress for $61-million to buy some 9,000 Mavericks; this works out to more than $6,000 apiece. The Air Force has also been working on infrared and laser guidance systems that could be used when bad weather rules out the use of the TV camera.	
Shrike (AGM-65A)	An air-to-ground missile with a range of eight to ten miles, designed to home in on enemy radar that are being used to track the plane from the ground. According to North Vietnamese, the Shrike warhead produces 3/16-inch cubical fragments of metal that have caused many casualties. Constant refinements in the Shrike guidance system have raised the average unit cost of the missile from about	MOTOR: Aerojet GUIDANCE: Texas Instruments

	$17,000 in the early 1960's to $32,000 in early 1970. But for all its fancy guidance, the Air Force "has finally admitted the weapon does not work," according to a report in the defense industry publication Aerospace Daily 7/31/72. "According to Lt. Gen. Otto J. Glasser, head of research and development for the service," the report continues, "'they are not good' because the enemy operator shuts down 'when he sees one of those /radar homing missiles/ launched toward him,' the missile goes ballistic, misses, and the radar is turned back on." The Air Force asked Congress for $10.8-million for purchase of Shrike missiles in fiscal 1973. DMS Market Intelligence Report (July 1972) notes that Shrikes "are being consumed at a steady rate in Vietnam."	
Standard Antiradiation Missile (Standard ARM AGM-78)	An air-to-ground missile that is similar to the Shrike, but longer and heavier, and newer in design. It has a high explosive warhead and, like the Shrike, it homes in on enemy radar on the ground. The Navy asked for $39-million for Standard ARM's in July 1972 emergency supplemental defense request in response to the spring 1972 offensive in Vietnam.	
TOW	A wire-guided antitank missile, designed to be fired from the ground or from helicopters, and intended to replace the French SS-11 missile which is presently used on U.S. helicopters against enemy tanks. The gunner keeps his eye on the target through a telescopic sight; a computer measures any deviation of the missile from its intended path and brings the missile back on its path by sending messages to it over wires that unwind from the missile as it flies through the air. TOW missiles cost about $3,000 apiece.	
2.75-inch rocket	An air-to-air rocket of Korean war vintage, converted in the early 1960's for use against personnel and other ground targets in Vietnam. With its range of up to 2,500 meters, a pilot can launch it and still stay a safe distance from enemy small arms ground fire. The rocket can be used with a variety of warheads: fragmentation warheads, which produce fragments of metal on explosion; a white phosphorus warhead, which is used to mark targets and can cause terrible burns; and a flechette warhead filled with little finned nails that can tear gaping wounds. A new antipersonnel antiarmor warhead for the 2.75-inch rocket was recently sent to Indochina to help counter the spring 1972 offensive, according to Aerospace Daily (6/29/72).	WARHEAD PARTS: Airport Mach'g, Medico, Northrop OTHER PARTS: Baldwin, Ensign Bickford, Fairchild Camera, Hoffman, Norris LAUNCHERS: General Motors, Harvard Ind.
Zuni	Another relic of the 1950's, this air-to-ground rocket is five inches in diameter, weighs about a hundred pounds, and has a range of five nautical miles. The rocket can be used with fragmentation, antitank, or white phosphorus warheads.	VARIOUS PARTS: Eng'g. Research, Hutchinson, Marquardt, Norris, Reynolds Rocket

Bombs & Mines

BLU-24 bomblet looking like an orange sitting on curved plastic fins. The fins make the bomblet spin in flight, stabilizing it and arming the fuze. (North Vietnamese photo)

DECODING MILITARY DESIGNATIONS: Cluster bombs consist of dispensers loaded with bomblets, and are generally designated as follows:

CBU- (Cluster Bomb Unit)
= SUU- (Suspension Unit, Utility)
+ BLU- (Bomb, Live, Unit).

Thus for example the CBU-24 is a cluster bomb consisting of the SUU-30 dispenser loaded with BLU-26 bomblets.

Older Air Force- or Army-designed bombs are designated M- ; Navy-designed bombs, Mk- .

BLU-24	A 1.6-lb. bomblet designed to penetrate jungle foliage. An official Air Force list describes the BLU-24 as a "fragmentation, antipersonnel" bomblet. The BLU-24 is apparently what North Vietnamese refer to as the "orange" bomblet. Used in the CBU-25 cluster bomb.	Aerojet Ordnance
BLU-26 "guava" bomblet	A 0.9-lb. spherical bomblet in which steel balls are embedded in the case. The bomblet explodes and the balls shoot out in all directions. BLU-26 bomblets have been produced in millions and are probably responsible for wounding thousands of Vietnamese. The BLU-26 is no longer in production; stockpiles are now being used up and the Air Force plans to replace the BLU-26 with the new BLU-63 bomblet in early 1973. Used in the CBU-24 cluster bomb.	Out of production
BLU-52	A chemical bomb filled with 270 pounds of CS-1 or CS-2 riot control agent. An Air Force witness testified at the 1970 Senate "electronic battlefield" hearings that the BLU-52 had "been employed to a very limited degree in South Vietnam on carefully selected targets."	No recent production contracts
BLU-61	Described in an official Air Force list as a 2.2-lb "antimateriel" bomblet filled with a high explosive. An Air Force witness stated at a 1972 Congressional hearing that incendiary particles had been added to the explosive filler of the bomblet to ignite fuel in trucks hit by the bomblet. Used in the CBU-52 cluster bomb.	Honeywell Martin Marietta
BLU-62	A 0.9-lb. fragmentation bomblet that hits the ground and then bounces back up before exploding. An Air Force witness stated at a 1972 Congressional hearing that the BLU-62 was "primarily developed for the flak-suppression role." Development of the BLU-62 was supposed to be completed by mid-1972.	

BLU-63	A new 0.9-lb. spherical bomblet "made of steel that is scored to break into shrapnel fragments when it explodes." The Air Force claims on the basis of preliminary tests that in comparison with the BLU-26, which it is intended to replace, "the BLU-63, packing more explosive and with shrapnel that is heavier than the BLU-26 steel balls, is proving to be the superior weapon." Production problems in gluing the two halves of the bomblet together are delaying the introduction of the bomblet (Business Week, 4/15/72). Designed for use in the CBU-58 cluster bomb.	Ajax Hardware Scovill Mfg. Co.
BLU-82/B "Daisy Cutter"	A 15,000-lb. explosive bomb, largest of all U.S. non-nuclear bombs. It is delivered by parachute from a C-130 transport plane. According to the Air Force, the BLU-82 is useful for clearing helicopter landing zones and triggering landslides to block road traffic. North Vietnamese say it has also been used on troop concentrations and on hamlets in Laos.	No recent contracts
CBU-24 = SUU-30 + BLU-26	A cluster bomb consisting of 665 BLU-26 "guava" bomblets loaded in an SUU-30 dispenser. To be replaced by the CBU-58	Out of production
CBU-25 = SUU-14 + BLU-24	A cluster bomb consisting of BLU-24 antipersonnel bomblets loaded in the SUU-14 six-tube dispenser. The Air Force asked Congress for funds to buy 47,958 CBU-25's in fiscal 1973, more than triple the quantity for fiscal 1971. The Air Force wanted the CBU-25's to give to the South Vietnamese and Laotian Air Forces. The CBU-25 is used with low-speed aircraft and "is the only cluster bomb munition being provided allied forces in quantity," an Air Force witness explained at a 1972 hearing.	See BLU-24, SUU-14
CBU-38 = SUU-13 + BLU-49	A cluster bomb consisting of BLU-49 13-lb. fragmentation bomblets loaded in the 40-tube SUU-13 dispenser. An Air Force film shown at the American Ordnance Association meetings in October 1972 claimed that the CBU-38 was effective in destroying a combination surface-to-air missile and automatic antiaircraft site.	Aerojet Ordnance
CBU-52 = SUU-30 + BLU-61	A cluster bomb consisting of 254 BLU-61 "antimateriel" bomblets loaded in an SUU-30 dispenser. In the June 1972 supplemental appropriation request the Air Force asked Congress for $22.3-million to buy 24,746 CBU-52's.	See BLU-61, SUU-30
CBU-55 Fuel Air Explosive (FAE) Weapon	A radically new type of bomb. It hits the ground and breaks open, scattering little drops of ethylene oxide "fuel" which mix with the air, forming an explosive cloud. At the point of proper mixture the cloud is ignited, setting off an explosion that kills "enemy personnel" and sets off any booby traps or mines that may be in the area. Useful for clearing helicopter landing zones in "unfriendly" territory and especially attractive because the droplets seep into cracks and	No recent contracts, but production will probably resume shortly

	openings of underground bunkers and then kill people inside by concussion when they explode. The Fuel Air Explosive weapon has been used in Indochina since 1970. There are several versions of the weapon, the CBU-55 being the most common. In the June, 1972 supplemental request the Air Force asked Congress for $20.5-million for CBU-55's.	
CBU-58 = SUU-30 + BLU-63	A cluster bomb consisting of 650 of the new BLU-63 fragmentation bomblets loaded in an SUU-30 dispenser. The Air Force wants to buy a large quantity of CBU-58's: it asked Congress for $44.2-million for them in fiscal 1973.	See BLU-63, SUU-30
Dragontooth	A featherweight, 0.7-ounce antipersonnel mine that is laid from planes. Dragontooth mines are so small that 4,800 of them can be carried in a single SUU-13 dispenser. Air Force major R.D. Anderson told the Senate Armed Services Committee in 1970, "It is purely antipersonnel. If a person steps on it, it could blow his foot off. If a truck rolls over it, it won't blow the tire."	Out of production
Firebombs (BLU-32, Mk 77, etc.)	A firebomb is a cigar-shaped metal canister filled with napalm or other jellied fuel. Napalm is a jellied fuel that burns and sticks to whatever it touches.	Atlas Fabricators
Fuel Air Explosive	See CBU-55	
General Purpose Bombs	A general purpose bomb consists of a metal bomb case filled with a high explosive. Its purpose is "general" because it is effective both against people and light material (from fragmentation of the case) and against structures (from blast). General purpose bombs come in various sizes, commonest of which are 500-lb. (Mk 82) and 750-lb. (M117). One of the most widely used munitions in Indochina, where they have produced thousands of craters.	AMF, Amer. Mfg., Amer. Standard, Intercontinental, Norris, U.S. Steel FINS: Metals Eng., Poloron, Temtex, Whittaker
Gravel Mine	A small explosive charge contained in a canvas cover that looks like a leaf or a tea bag. Like the Dragontooth mine, a Gravel mine "will blow a man's foot off but it will not blow a hole in a truck tire," according to Air Force major Anderson. Gravel mines can be laid by plane, by helicopter, by hand, or by means of a trailer-mounted dispenser.	Out of production
"Guava" bomblet	See BLU-26	

Homing Optical Bombs (HOBO's)	A large Mk 84 (2,000-lb.) or M118 (3,000-lb.) general purpose bomb with a special TV-guidance kit strapped on to it. The bomb is kept on course by means of cross-shaped wings which position themselves automatically in response to signals from the TV camera. One of the newer of the Air Force's efforts to develop "smart" bombs, HOBO is expensive (approximately $16,000 per kit) and will not work unless there is sufficient contrast between the target and its surroundings. About 200 HOBO's had been dropped in southeast Asia as of April 1972.	North American Rockwell
Laser Guided Bombs	A Mk 82 (500-lb.), Mk 83 (1,000-lb.), or Mk 84 (2,000-lb.) general purpose bomb with a laser seeker and guidance kit attached to it. A laser beam is first directed at the target, either by someone on the ground, or from a spotter plane or the attack aircraft itself. The bomb is then dropped and the seeker detects and homes in on a "spot" of laser energy that is reflected from the target. The most frequently used of the "smart" bombs, laser guided bombs also have some problems. The target must first be located, thus bad weather can hamper a bombing mission. The bomb itself may skid harmlessly off target if the angle of impact is too great. The military claims to have destroyed many bridge spans in North Vietnam: bridge spans are easier to hit than bridge foundations, but they are also easier to repair. Lt. Gen. H.E. Goldsworthy of the Air Force told the House Appropriations Committee in April 1972, "We have dropped something on the order of 10,000 laser-guided bombs. They have covered quite a variety of targets, from vehicles to places that we can identify, for example, troops in bunkers or caves where they have stored munitions or we think they have stored munitions, any object that we can identify and put the laser designator on" (emphases added). The use of laser guided bombs was being increased in "the current dry season," he said, and more laser target designators were now available. The Air Force requested $42.2-million to buy 12,420 laser bomb guidance kits in fiscal 1973, somewhat more than $3,000 per kit.	Texas Instruments (laser guidance kits)
M36 Incendiary Cluster Bomb	One of the older cluster bombs in the U.S. inventory, the M36 contains 182 4-lb. M126 thermate bombs. Thermate is a mixture of powdered minerals in an oil binder; it burns at about 4,000° F. and is especially suited for burning through armor. As recently revealed in the New York Times (7/17/72), thermate bombs were used in 1966-67 in an attempt to set South Vietnamese forests on fire. The forests were damp and the program was a failure.	Atlas Fabricators (fins)
Rockeye	A Navy-designed cluster bomb containing 247 shaped charge bomblets designed to perforate the armored wall of a tank. When a bomblet goes off, the shaped charge produces a long, thin jet that will bore through the side of a tank. The metal liner of the shaped charge is converted into tiny, hot particles which follow in the path of the jet, injuring crew members and setting fire to explosives and fuel inside the tank.	Honeywell Marquardt

Like other shaped charge weapons, the Rockeye is officially known as an "antitank" weapon. North Vietnamese charge that it is being used against air-raid shelters. A North Vietnamese doctor told a French journalist that his hospital in Thanhoa province had been hit by 12 2,000-lb. general purpose bombs and 24 "antitank bombs that penetrated the concrete roofs of the hospital as well as the air-raid shelters" (New York Times, 5/9/72).

U.S. corroboration of such charges is hard to find, but the Air Force in spring 1972 supplied Congress with a list of combined Rockeye and general purpose bomb targets that included such stationary targets as "Bunker," "Buildings," "Gun position," "SAM site," and "Supplies/rice/weapons," as well as mobile targets such as "Tank," "Barge/boat," and "Troops." The Air Force said it had dropped approximately 500 Rockeyes in southeast Asia in April 1972, and approximately 553 in May.

Rockeye production has grown steadily since production began in 1968. The Air Force requested $96-million for Rockeyes in fiscal 1973 and the Navy asked for $32.1-million. When President Nixon resumed bombing North Vietnam in response to the spring 1972 offensive, the Navy asked for an additional $68.6-million for Rockeyes.

SUU-14	A six-tube bomblet dispenser designed for use with some of the slower-speed aircraft. It is slung under the plane and the pilot ejects bomblets from the tubes of the dispenser as he flies along.	Lasko
SUU-30	A bomblet dispenser that resembles an empty 750-lb. bomb case and is slit down the middle so that it can be made to open in the air, releasing the bomblets that are carried inside. The bomblets then disperse and fall to the ground. Can be loaded with "guava" bomblets or with various other bomblets.	Lanson Temtex
Walleye	The first of the "smart" bombs: a general purpose bomb with a TV camera in its nose. The pilot drops the bomb and guides it to its destination by adjusting the fins (by remote control) if the bomb veers from its course. There are two versions, Walleye I (1,100-lb.) and Walleye II (2,000-lb.); the cost of the latter is estimated at more than $23,000 apiece. No further large-scale production is planned: when present stocks are used up, the Navy will start using Homing Optical Bombs instead.	WINGS: Lockley, Spaco WARHEADS: Western Gear
Wide Area Antipersonnel Mine (WAAPM)	A spherical high explosive antipersonnel mine, dropped from the air in large numbers. When it comes to rest on the ground, each mine shoots out eight tripwires (hence the Vietnamese nickname, "spider mine"). If a tripwire is disturbed, the mine explodes. Used in Indochina to form barriers to the movement of people.	Out of production

MUNITIONS

Fuzes

"The brains of munitions," a military magazine once called them--fuzes are timing devices that cause munitions to explode at a certain moment. Timing is of the essence: a bomb may do much less damage if it goes off a fraction of a second too early or too late. Different types of fuzes can be used depending on the chosen target. Following is a list of 1972 producers of fuzes and fuze components used in the automated air war.

Fuzes and Fuze Components For -	Producer
CBU-24/49/52 cluster bombs	Motorola
Firebombs	Colt, Fourdee, General Time, Space Ordnance
General purpose bombs	CCI Aerospace, Conover, Contract Machining, Honeywell, Impex, Keystone Micro-Scan, Maxson Electronics, Morey, National Union Electric, Pyrotechnic Specialties, REDM, Raymond Engineering, Raytheon, Sta-Rite, Univ. Quality Mfg., Van Dee
Rockeye bomb	General Time
Shrike missile	Barry Miller Ordnance
Zuni rocket warhead	Reynolds Rocket

THE AUTOMATED AIR WAR TODAY

Computers Call the Shots for Bombers

By Michael Getler
Washington Post Staff Writer

TANSONNHUT AIR BASE, South Vietnam — In the basement of this sprawling U.S. military headquarters just outside Saigon, a dozen U.S. Air Force officers seated behind consoles preside over the world's first computerized air war.

The officers "preside" because it's the computers, located a few miles from here, that really run much of this bombing campaign, the most intensive in history...

Since the North Vietnamese offensive last April reopened heavy U.S. bombing of the North, the American fondness for technology and for every conceivable type of support aircraft to protect the bombers has brought the air war up to date.

"It's all computer-run now," explains the 7th Air Force chief, Gen. John W. Vogt Jr. "To get all those planes, all this support, in the right place at precisely the right time you need a better brain than man's."

An Air Force F-4 pilot from Takhli airbase in Thailand puts it more simply: "We just got our s--- together."

A typical Air Force mission against four bridges and marshaling yards along the vital northeast railroad from China involves as many as 130 planes from all seven bases in Thailand. Only about 40 of the planes carry bombs.

Sixteen F-4 Phantom fighter-bombers, flying in groups of four and each carrying two 2,000-pound laser-guided smart bombs, would hit the bridges. The computer tells each flight what time and from what direction to hit each bridge. Another six flights of four fighter-bombers each would hit the rail yards using conventional 500-pound bombs.

Each four-plane group is escorted in and out by other F-4 protective fighters, and high above the bombers and their escorts fly still more F-4s to provide both groups with a second defensive screen against enemy Mig fighters.

Just before the attack planes go in, EB-66 electronic warfare planes—also on cue from the computer—try to jam the radars of SAM missile sites.

Cruising nearby are F-105 "Wild Weasel" planes carrying radar-seeking missiles, and still more F-4s carrying hundreds of small cluster bombs designed to wipe out the actual SAM site and the people running it.

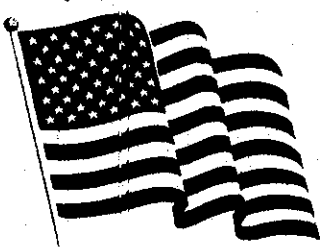
Most of this entire force needs to be refueled on the way in and out. Some 90 tankers a day take off from the base at Utapao in Thailand, and even from Bangkok's commercial airfield, with the computer telling them where to go, at what time and with how much fuel. There are extra tankers in the air in case a Mig dogfight runs the escorts low on fuel.

Just before the raids, high-flying SR-71 reconnaissance planes from Okinawa take pictures of the areas to be hit, or, if the weather is bad, low flying pilotless photo drones are dropped from the wings of C-130 aircraft based at Danang in South Vietnam to try to fly in below the clouds.

Other four-engine EC-135 jets from Thailand do airborne electronic eavesdropping in search of the hard-to-spot radars that guide North Vietnamese Migs into the U.S. formations.

"It's all timed to get the fighter-bombers through with minimum losses," says Gen. Vogt.

THE WASHINGTON POST *Tuesday, Dec. 12, 1972*



THE CONTRACTORS

When General Curtis LeMay wanted to bomb Vietnam "back to the stone age," he expressed an idea that would not have occurred to stone age people (to paraphrase a recent remark of Russell Baker's in The New York Times). It takes civilization to come up with such an idea. And that segment of civilization that makes the bombing possible is industry.

Below are listed some 74 companies that were awarded production contracts for components of the automated air war in 1972. The list is far from complete. Other aircraft such as the A-1, F-5A, C-5, AC-119, and C-142 have now been given to President Thieu and may be expected to play an important part in the "Vietnamized" sector of the air war. Many avionics devices besides those listed on page 7 are used to guide planes, direct bombing raids, and perform other functions. The Pentagon makes hundreds of contract awards every month to obtain this equipment.

The production process for a particular item often involves more than the companies listed. A company that receives a prime contract from the government will then award subcontracts to other companies for materials, subcomponents, and other items as needed. On many ammunition items the government buys the metal parts from a company and has them shipped to an Army Ammunition Plant where they are assembled and loaded with explosive by another contractor.

The contracts listed below are generally the most recent available. The dollar amount is the amount awarded on the date given, and does not necessarily reflect the total amount that the company received over the year. Antiwar groups contemplating an action against a particular company should make sure the contract is still in effect. (For some tips on this, see NARMIC's How to Research Your Local War Industry; details inside cover.)

Company; Location of Work	Product; Date of Contract Award	Contract Number; Amount
AMF INC. White Plains, N.Y.	M117 general purpose bombs 9/5/72	DAA09-72-C-0054 $13,938,800
AEROJET-GENERAL CORP. (Subsidiary of Gen. Tire) Azusa, Cal.	Spare parts for AN/AAQ-5 Forward Looking Infrared (FLIR); 5/31/72	DAAG05-72-A-0009 $61,800
Sacramento, Cal.	Rocket motors for Shrike missile 9/22/72	N00019-73-C-0056 $1,439,000
Batesville, Ark.	BLU-24 bomblet parts 9/27/72	F42600-73-C-0799 $9,750,000
AIRPORT MACHINING CORP. Martin, Tenn.	M229 high explosive warhead parts for 2.75-in. rocket; 6/29/72	DAAA09-72-C-0193 $597,600
AMER. MFG. CO. OF TEXAS Fort Worth, Tex.	Mk 83 general purpose bomb bodies 8/2/72	N00104-73-C-A009 $4,038,250
AMER. STANDARD CORP. Waco, Tex.	M117 general purpose bomb metal parts 9/11/72	DAAA09-72-C-0330 $7,220,000
ATLAS FABRICATORS, INC. Long Beach, Cal.	BLU-32C/B firebomb filled with napalm B 10/25/72	F42600-73-C-1163 $3,738,448
	Fins for M36 incendiary cluster bomb 6/30/72	DAAA15-72-C-0393 $199,867

BOEING CO. Wichita, Kan.	Modification kits for electronic countermeasures for B-52 aircraft; 3/6/72	F34601-72-C-2800 $13,000,000
CCI AEROSPACE CORP. Ogden, Utah	M147 adapter booster parts for general purpose bomb fuzes; 6/21/72	DAAA09-71-C-0378 $198,690
COLT INDUSTRIES Frazer, Pa.	FMU-7C/B fuze for firebombs 3/30/72	DAAA15-72-C-0269 $388,606
CONOVER CO. Grand Prairie, Tex.	M148 adapter booster parts for general purpose bomb fuzes; 6/30/72	DAAA09-72-C-0145 $503,812
CONTRACT MACHINING CORP. Burlington, Mass.	MAU-87 fuze parts for general purpose bombs 7/13/72	F42600-72-C-3436 $174,593
DEMAC CORP. Hicksville, N.Y.	Chaff, countermeasures (see p. 7) 11/3/72	F09603-73-C-3600 $230,000
E-A INDUSTRIAL CORP. Chamblee, Ga.	Spare parts for AN/AVQ-7 visual display unit 3/23/72	N00156-72-C-0413 $32,000
ENGINEERING RESEARCH, INC. Indianapolis, Ind.	Nozzle and fin assemblies for Zuni rocket 7/20/72	N00104-73-C-B207 $251,770
ENSIGN BICKFORD CO. Simsburg, Conn.	Mk 125 Mod 5 igniters for 2.75-in. rocket motor; 6/26/72	DAAA21-72-C-0810 $186,864
FAIRCHILD CAMERA & INSTRUMENT CORP. Amityville, N.Y.	2.75-in. rocket parts 3/9/72	DAAA21-72-C-0665 $84,000
FOURDEE INC. Casselberry, Fla.	M23A1 igniters for firebomb fuzes 1/26/72	DAAA15-71-C-0217 $99,429
GENERAL ELECTRIC CO. Utica, N.Y.	Low Light Level Television (LLLTV) for AC-130 gunship; 2/8/72	F33657-72-C-0984 $1,792,000
GENERAL MOTORS CORP. Indianapolis, Ind.	Aircraft engines for A-7D aircraft 3/21/72	F33657-72-C-0238 $24,660,000
A.C. Electronics subsidiary, Huntsville, Ala.	2.75-in. rocket launchers 4/21/72	DAAH01-72-C-0170 $355,860
GENERAL TIME CORP. La Salle, Ill.	Mk 343 Mod 0 fuzes for Mk 77 firebomb 3/10/72	N00104-72-C-A048 $575,554
Rolling Meadows, Ill.	Mk 339 Mod 0 fuzes for Rockeye bomb dispenser and CBU-59/B cluster bomb; 5/31/72	N00104-72-C-A061 $667,800
GEN. TIRE & RUBBER CORP.	See Aerojet-General Corp.	
GRUMMAN AIRCRAFT ENG. CORP. Bethpage, N.Y.	A-6E aircraft 6/29/72	N00019-72-C-0206 $47,130,000
HARVARD INDUSTRIES, Standard Armament Div. St. Louis, Mo.	2.75-in. rocket launchers 4/27/72	DAAA09-72-C-0137 $1,069,990
HAZELTINE CORP. Greenlawn, N.Y.	AN/GSS-23 EDET (Engine Ignition Detector) (see p. 8); 1/27/72	F19628-72-C-0066 $192,500
HOFFMAN ELECTRONICS CORP. El Monte, Cal.	Nozzle and fin assemblies for 2.75-in. rockets 6/21/72	DAAA21-72-C-0796 $1,387,728

HONEYWELL INC. Minneapolis and Hopkins, Minn.	BLU-61 fragmentation bomblet parts 6/2/72	F08635-72-C-0067 $1,483,356
	Rockeye bombs 11/10/72	N00104-73-C-A021 $30,863,800
	FMU-72 long delay fuzes for general purpose bombs; March 1972	F08635-72-C-0014 $11,884,675
HUGHES AIRCRAFT CO. Culver City, Cal.	Forward Looking Infrared (FLIR) systems (see p. 7); 6/8/72	N00019-72-C-0609 $4,760,000
HUTCHINSON MFG. CO. Redlands, Cal.	Zuni rocket parts 1/14/72	N00104-72-C-B063 $34,800
IBM CORP. Owego, N.Y.	AN/ASN-91 navigation and weapons delivery computers for A-7E aircraft; 6/8/72	N00383-70-A-4103 $1,486,800
IMPEX KEYSTONE CONSOLIDATED INC. Crawfordsville, Ind.	M904 fuze parts for general purpose bombs 1/12/72	DAAA09-72-C-0065 $101,242
INTERCONTINENTAL MFG. CO. Garland, Tex.	Mk 84 general purpose bomb bodies 8/2/72	N00104-73-C-A008 $5,091,982
KEYSTONE MICRO-SCAN INC. Boston, Mass.	M905 fuze parts for general purpose bombs 5/30/72	DAAA09-72-C-0325 $67,160
LTV AEROSPACE CORP. Dallas, Tex.	A-7E aircraft 9/29/72	N00019-72-C-0098 $17,137,100
Falls Church, Va.	XM114E3 fuze for TOW missile 3/21/72	DAAG39-72-C-0113 $784,617
LANSON INDUSTRIES INC. Cullman, Ala.	SUU-30 cluster bomb dispensers 1/31/72	F42600-72-C-2589 $1,806,271
LASKO METAL PRODUCTS INC. West Chester, Pa.	SUU-14 cluster bomb dispensers 12/5/72	F42600-73-C-1371 $1,686,904
LOCKHEED AIRCRAFT CORP. Marietta, Ga.	C-130E aircraft 3/9/72	F33657-72-C-0430 $42,485,000
LOCKLEY MANUFACTURING CO. New Castle, Pa.	Wings and fins for Walleye bomb 4/27/72	N00019-72-C-0454 $44,141
LUNDY ELECTRONICS & SYSTEMS INC. Glen Head, N.Y.	Chaff (see p. 7) 6/23/72	N00104-72-C-A069 $631,250
McDONNELL DOUGLAS CO. Long Beach Cal.	Effort to support procurement of A-4M aircraft 1/13/72	N00019-71-C-0189 $1,732,000
St. Louis, Mo.	F-4E aircraft 3/9/72	N00019-71-C-0213 $49,514,000
MARQUARDT CORP. Ogden, Utah	Mk 63 warheads for Zuni rocket 7/18/72	N00104-73-C-B208 $528,960
Van Nuys, Cal.	Rockeye bombs 6/30/72	N00104-72-C-A072 $6,650,000
MAXSON ELECTRONICS CORP. Macon, Ga.	M905 fuze parts for general purpose bombs 6/15/72	F42600-72-C-3296 $264,772

MEDICO INDUSTRIES Wilkes-Barre, Pa.	M229 high explosive warhead parts for 2.75-in. rocket; 6/13/72	DAAA09-72-C-0298 $398,496
METALS ENGINEERING CORP. Greeneville, Tenn.	Fin assemblies for Mk 82 general purpose bomb 10/12/72	N00104-73-C-A018 $586,603
BARRY MILLER ORDNANCE INC. Great River, N.Y.	Mk 330 Mod 2 electronic fuzes for Shrike missile; 6/30/72	N00019-72-C-0639 $292,275
MOREY CORP. Downers Grove, Ill.	Bomb fuze arming assembly for general purpose bombs; 4/24/72	N00104-72-C-A055 $791,860
MOTOROLA INC. Scottsdale, Ariz.	FMU-57C/B fuzes for CBU-24/49/52 cluster bombs 7/27/72	F08635-73-C-0007 $7,398,000
NAT'L UNION ELECTRIC CORP. Bloomington, Ill.	M904E3 fuze parts for general purpose bombs 6/27/72	DAAA09-72-C-0175 $534,000
NORRIS INDUSTRIES Los Angeles, Cal.	2.75-in. rocket motors 6/23/72	DAAA21-72-C-0804 $906,000
	Mk 81 general purpose bomb bodies 6/19/72	N00104-72-C-A067 $11,135,520
Vernon, Cal.	Zuni rocket motor parts 3/6/72	N00104-72-C-B076 $932,880
NORTH AMER. ROCKWELL CORP. Columbus, Ohio	OV-10D and OV-10E aircraft 5/25/72	N00019-72-C-0572 $5,800,000
NORTHROP CORP. Anaheim, Cal.	WDU-4/A flechette warhead for 2.75-in. rocket 6/27/72	DAAA09-71-C-0022 $1,447,650
POLORON PRODUCTS, INC. New Rochelle, N.Y.	Fin assemblies for Mk 82 general purpose bombs 10/12/72	N00104-73-C-A015 $2,615,100
PYROTECHNIC SPECIALTIES Byron, Ga.	FMU-72 fuze parts for general purpose bombs 3/31/72	F08635-72-C-0142 $79,622
RCA CORP. Camden, N.J.	AN/USH-17 airborne recorder and reproducer 8/18/72	N00173-72-C-0615 $99,500
REDM CORP. Wayne, N.J.	M905 fuze parts for general purpose bombs 5/22/72	F42600-72-C-3234 $432,029
RAYMOND ENGINEERING LAB Middletown, Conn.	Mk 346 fuzes for general purpose bombs March 1972	N00104-72-C-A024 $564,984
RAYTHEON CO. Lexington, Mass.	M904E3 fuze parts for general purpose bombs 6/29/72	DAAA09-72-C-0352 $1,158,360
REYNOLDS METALS CO. Richmond, Va.	QRC-530 aluminum chaff countermeasures (see p. 7); 10/3/72	F33657-73-C-0254 $566,400
REYNOLDS ROCKET SYSTEMS La Puente, Cal.	Detonator for Mk 63 warhead for Zuni rockets 1/14/72	N00104-72-C-B062 $98,778
SELLS INC. San Diego, Cal.	Chaff dispensers 7/27/72	N00019-72-C-0527 $1,176,816

SPACE ORDNANCE SYSTEMS INC. Saugus, Cal.	Mk 273 Mod 1 igniters for Mk 77 firebombs 4/18/72	N00104-72-C-A050 $523,388
SPACO INC. Huntsville, Ala.	Wings and fin containers for Walleye bombs 4/27/72	N00019-72-C-0465 $851,945
SPECTRONICS INC. Richardson, Tex.	AN/AAD-7 Forward Looking Infrared (FLIR) components (see p. 7); 5/26/72	F33657-72-C-0733 $164,635
STA-RITE GINNIE LOU INC. Shelbyville, Ill.	FZU-20/B arming wire assembly for general purpose bomb fuzes; 2/18/72	F42600-72-C-2793 $72,000
SWEDLOW INC. Garden Grove, Cal.	Spare parts for B-57G aircraft 7/17/72	F09603-72-C-1676 $58,590
TELEDYNE INC. San Diego, Cal.	Modification of AGM-34G Remotely Piloted Vehicle (RPV; see p. 6); 5/26/72	F33657-72-C-0812 $1,600,000
TEMTEX INDUSTRIES INC. Garland, Tex.	Fins for M117 general purpose bombs 7/17/72	F42600-73-C-0238 $2,586,675
	SUU-30 cluster bomb dispensers 3/14/72	F42600-72-C-2831 $1,771,327
TEXAS INSTRUMENTS INC. Dallas, Tex.	Guidance sections for Shrike missile 6/30/72	N00019-72-C-0629 $8,956,055
	Laser guided bomb kits 1/14/72	F08635-72-C-0007 $22,508,410
UNITED AIRCRAFT CORP. East Hartford, Conn.	Engines for A-4 and EA-6B aircraft 7/31/72	N00019-72-C-0185 $21,511,000
U.S. STEEL CORP. McKeesport, Pa.	Mk 82 general purpose bomb bodies 6/12/72	N00104-72-C-A062 $38,700,000
UNIVERSAL QUALITY MFG. CO. Williamnsett, Mass.	Rotor assemblies for M904 and M905 fuzes for general purpose bombs; 6/23/72	DAAA09-72-C-0059 $69,090
VAN DEE MFG. CO. Batavia, Ill.	M148 adapter booster parts for general purpose bomb fuzes; 6/30/72	DAAA09-72-C-0111 $46,654
WESTERN GEAR CORP. Everett, Wash.	Warheads for Walleye bomb 5/4/72	N00019-72-C-0558 $2,111,600
WHITTAKER CORP. Cornwells Heights, Pa.	MAU-93/B fin assemblies for Mk 82 general purpose bombs; 10/12/72	N00104-73-C-A022 $3,098,900

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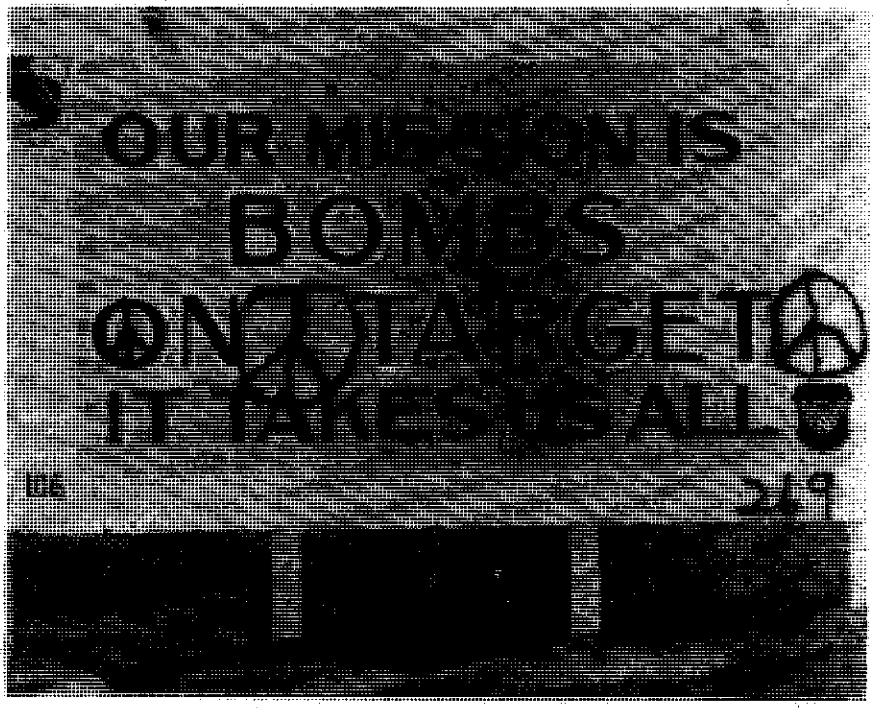

Into the belly of the monster: the message is getting across. Sign at the Strategic Air Command's B-52 base in Guam. (Washington Post, 12/13/72)