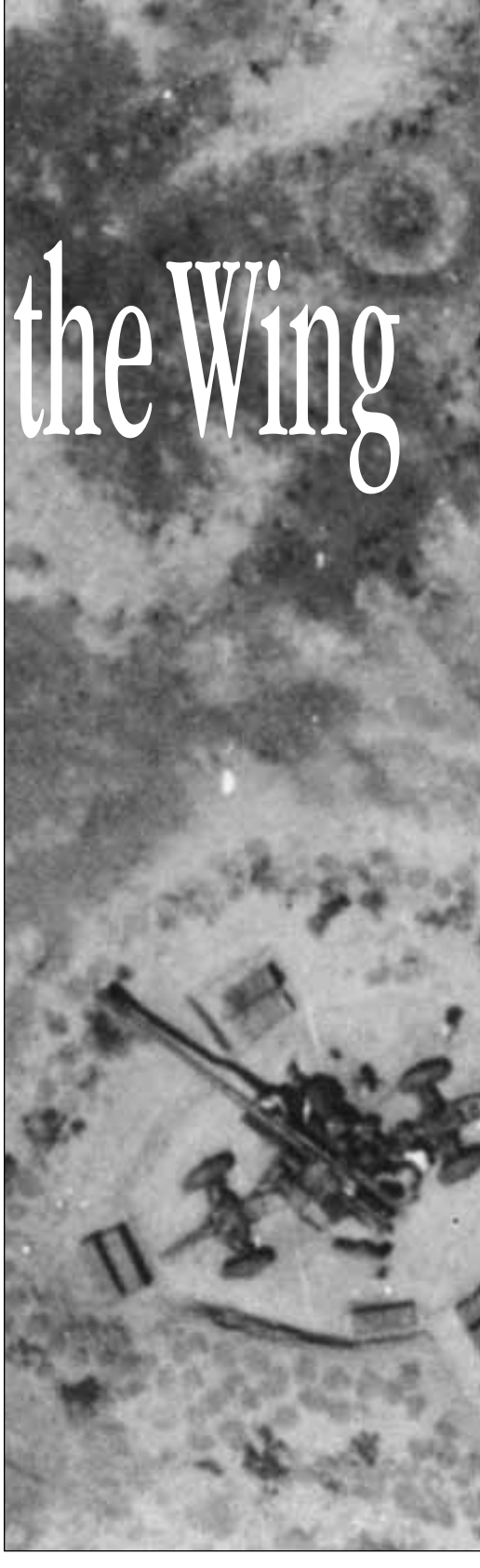
The mission soon became too complicated for bombers and fighters to perform as an additional duty.

Reconnaissance on the Wing



By Walter J. Boyne

The first-ever long-range aerial reconnaissance missions occurred in 1914 at the beginning of World War I. In late August three separate crews of Britain's Royal Flying Corps were tasked to establish the position and direction of the German armies then rampaging through France. Information that they gathered enabled the embattled British Expeditionary Force on the Continent to avoid being surrounded, trapped, and destroyed.

French forces benefited from their own airborne eyes. The great aircraft builder Louis Breguet went aloft to observe German forces and reported directly to Gen. Joseph S. Gallieni, the French commander. In response, Gallieni launched an attack that allowed the French to concentrate forces for the Battle of the Marne, where a desperate France, in one of history's decisive military actions, finally managed to halt the German advance.

With these two contributions, long-range reconnaissance forces did much to prevent the Kaiser from knocking France out of action quickly and winning the Great War by winter 1914.

Over the next 85 years, virtually everything about long-range aerial reconnaissance saw radical change. The definition of "long range" changed—from 15 miles, to a few hundred miles, to a few thousand miles. The definition of "reconnaissance" changed—from eyeball views, to photography with highly advanced cameras, to collection of signals in air and space with advanced gear.

After World War I, tight budgets kept most national armed forces to a minimum; in almost every air force, reconnaissance suffered the most. The great Air Service/Air Corps proponent of aerial reconnaissance was George W. Goddard, who risked his career and his life on many occasions in his dedication to the discipline. Goddard's career stretched from the Billy Mitchell era to the 1962 Cuban Missile Crisis. He was the father of night and color aerial photography, use of long-distance lenses, the stereo-strip camera, and many other advances. Despite arguments with his superiors, including Gen. Henry H. "Hap" Arnold, Commanding General of the Army Air Forces, Goddard's dogged efforts on behalf of all of the elements of reconnaissance paid great dividends. These included new cameras, developing equipment, distribution, interpretation, training, aircraft, and crews. The work of Goddard would form the bedrock of Army and Air Force intelligence gathering for decades.

Covert Operations

Another giant of the era was Australian Sidney Cotton, who moved to England and served as a Royal Naval Air Service Pilot in World War I. On the eve of World War II, he returned to England from Canada, where he had pioneered aerial surveying, and obtained two Lockheed Model 12 aircraft for use in many covert reconnaissance operations. The airplanes were painted a duck-egg green (to render them less visible at high altitudes) and modified to carry extra fuel tanks. A concealed, remotely controlled opening was built into the bottom of the fuselage. Three F-24 cameras were mounted, one pointing straight down and two set at an angle to take obliques, and all three were operated from the pilot's control wheel. Leica cameras were mounted in the wing, and Cotton used a handheld camera as well.

The RF-101 was the principal photoreconnaissance aircraft in the early days of the Vietnam War. Used primarily as a long-range interceptor in its earlier role, the Voodoo often flew deep into enemy territory over heavily defended targets—in this photo, dodging anti-aircraft weapons over North Vietnam.

By the end of World War II, the US had a reconnaissance force adequately equipped and manned and effectively used the intelligence gathered. Here, a camera technician at right checks a camera during preparation for a mission.

In 1939, Cotton flew the aircraft extensively through the Mediterranean and North Africa to gain information on disposition of Italian forces. He also flew into Germany, on some flights taking Luftwaffe officers on sight-seeing trips over their home fields, covertly snapping photos as they flew. His last flight was from Berlin, the week before the outbreak of war on Sept. 1, 1939. While these spy flights obtained a great deal of intelligence for Great Britain, their most important result was the establishment of a dedicated photoreconnaissance unit in the Royal Air Force, one which would serve as a prototype for later US efforts.

Not surprisingly, the Germans had done almost exactly the same kind of covert spying. They used a Heinkel He 111 with civil markings on what were called "route-proving" flights for Deutsche Luft Hansa, now Lufthansa. They were in fact photographic sorties over British, French, and Soviet territory. The reconnaissance unit, under the command of Lt. Col. Theodor Rowehl, was attached directly to Hitler's High Command, indicating the priority placed upon its work. In 1940, Rowehl's unit also employed the Junkers Ju 86P to operate at altitudes near 40,000 feet. Fitted with an extended wing (like the later RB-57s) and a pressurized cabin, the Junkers Ju 86P was immune to interception until a special, stripped down Spitfire Mark V was readied to counter it.

When it came to such airborne reconnaissance activities, Germany was much more systematic in operations over the Soviet Union. Rowehl's special reconnaissance unit had conducted almost 500 long-range flights using special Dornier Do 217A-O aircraft to pinpoint Soviet airfields, troop concentrations, and railheads, all targets for Hitler's planned invasion. Even though one aircraft crashed inside the Soviet Union, complete with its cameras and exposed film, Stalin was playing for time and did not protest. However, these clandestine German overflights and the subsequent invasion of the Nazi forces made the Soviets sensitive to the later US overflights during the Cold War.

Reconnaissance in the US Army during the interwar years remained locked in the embrace of the artillery, which demanded the sort of close-range artillery-correction support provided during World War I. The basic organizational setup remained the same until 1943, when requirements of both tactical and strategic reconnaissance had been writ large on every front.

No Specialized Aircraft

The requirements for reconnaissance of all types was immediately apparent after Pearl Harbor, but the US Army Air Forces had no specialized aircraft available for the task. From the start, most fighters and bombers conducted their armed reconnaissance missions as an "additional duty"; it was necessary to create variants dedicated to reconnaissance. Among these conversions, the P-38 became the F-4 and then the F-5; the P-51 the F-6; and the B-29 the F-13. (Later attempts at a specialized reconnaissance aircraft, such as the Hughes XF-11 and the Republic XF-12, were both more expensive and less successful than the modification of standard types.)

In the European and Mediterranean theaters, it made sense for USAAF to adopt well-proven British tactics and procedures and to

At first, fighters and bombers conducted reconnaissance missions. Then came their variants, adapted for the role. Later, aircraft like this Republic XF-12 were specifically built for reconnaissance.

Piloted Long-Range Reconnaissance Aircraft

Recce Designation	Original	Popular Name	Number	Missions
F-3A	A-20J/K	Havoc	46	photo
F-9/FB/RB-17	B-17	Flying Fortress	71	photo
F-7	B-24	Liberator	224	photo
F-8	PR.Mk XVI, XX	Mosquito	140+	photo, weather, ECM
F-13/FB/RB-29	B-29	Superfortress	119	photo, Sigint, weather
FA/RB-26	A-26/B-26	Invader	?	photo, Elint
RB-50	RB-50	Superfortress	45	photo, weather
RB-36	RB-36	Peacemaker	143	photo
GRB-36J	RB-36	Peacemaker	12	fighter conveyor
RB-45C	RB-45	Tornado	33	photo, Elint
RB-47	B-47B	Stratojet	24	photo
RB-47E/K	RB-47	Stratojet	255	photo, weather
RB/EB/ERB-47H	RB-47	Stratojet	38	Elint
XR-16/RB-52	RB-52	Stratofortress	27	photo, Elint
RB/EB-57A/B/E	RB-57	Canberra/Intruder	67?	photo, Elint
RB-57D	RB-57	Canberra/Intruder	20	photo, Elint
RB-57F	RB-57	Canberra/Intruder	21	photo, Elint, sampling
RB-58	YB/B-58	Hustler	?	photo, Elint, SLAR, SAR
R/EB-66	B-66	Destroyer	186+	night recce, Elint, ECM
RB-69	P2V-7U	Neptune	7	Elint, SLAR
F-4 & F-5	P-38	Photo Lightning	1,400+	photo
F-6	P/F-51	Mustang	480+	photo
RP/F-80/XF-14	P-80	Shooting Star	280+	photo
RF-84F	F-84F	Thunderjet	742	photo
RF-86	F-86	Sabre	418	photo
RF-101	F-101	Voodoo	284	photo, ECM
RF-4	F-4	Phantom II	699	photo, SLAR, IR, Elint
EC-97G	C-97	Stratocruiser	1	Elint
E/RC-121	PO-1, PO-2	Warning Star	321	ECM, Elint, AEW, weather, Comint
RC-130	C-130	Hercules	52+	Comint, AEW, Sigint, photo, ABCCC
RC-135	KC-135	Stratotanker	48+	ECM, SLAR, Sigint, etc.
E-3	EC-137	Sentry	50	AWACS
E-8A		Joint STARS	15	battle management
F-15	P-61	Reporter	38	photo
U-2/TR-1	U-2	Dragon Lady	35	photo, ECM, Sigint, SLAR, Elint, Comint
A-12 (CIA)	A-12	Oxcart	15	photo, Elint, Sigint, etc.
SR-71	SR-71	Blackbird/Habu	30	photo, Sigint, Elint

Note: Numbers are approximate. Some aircraft took on missions not listed here.

a certain extent even use British aircraft, most notably the Supermarine Spitfire and the Mosquito. By mid-1943, USAAF reconnaissance efforts had grown substantially. The number of photographs of enemy dispositions was never plentiful enough to satisfy everyone, but the American air- and ground crews were becoming increasingly sophisticated and productive. Long-range reconnaissance missions were used for bomb damage assessment and for plotting the future course of the bombing campaign.

The growth in capability can be illustrated by the assets applied to one of the most demanding assignments of the war. The 7th, 10th, 25th, and 67th photoreconnaissance groups photographed the entire coast of Europe from Cherbourg to Holland, often from 15 feet above the water. Called "dicing" missions, they required skill and courage of the highest nature.

As the Allied photoreconnaissance increased, the once formidable German capability atrophied. The German army, forced to fight without close air support, had to do without aerial reconnaissance as well. The defense system established over Britain virtually eliminated German aerial reconnaissance until the operational debut in September 1944 of the sensational Arado Ar 234 jet, which was able to operate over England with relative impunity.

The Pacific Imperative

Nowhere was aerial reconnaissance more important than in the Pacific theater. Had the US possessed sufficient reconnaissance aircraft, it might have detected the Japanese fleet on its way to Pearl Harbor in December 1941. In 1942, an American reconnaissance airplane detected the Japanese move toward Port Moresby, New Guinea, and sparked the important Battle of the Coral Sea. Perhaps most significant, it was the simultaneous Japanese failure and American success in reconnaissance that led to the stunning US victory at Midway. A Japanese reconnaissance airplane, an Aichi E13A "Jake" from the cruiser *Tone,* was delayed in its launch and, after locating the US fleet, initially failed to report the presence of a carrier. Even as the Japanese scout airplane was failing in its mission, an American Douglas SBD torpedo bomber, flown by Lt. Cmdr. Clarence W. "Wade" McClusky Jr., found the Japanese fleet and fixed it for attack.

In the southwest Pacific, Capt. Karl L. Polifka revitalized USAAF's reconnaissance with his Flight A of the 8th Photographic Squadron. USAAF Headquarters had allocated 100 P-38Es to be modified into F-4s (with cameras and two additional 75 gallon fuel tanks). Only five F-4s were ready for Polifka to take with

Early in the Cold War, World War II–era aircraft still flew reconnaissance, primarily along the perimeter of enemy territory. That did not lessen the danger. This RB-29, based at Yokota AB, Japan, was brought down by two MiG fighters in 1954.

him to Australia to begin his combat career. Of these, one was damaged en route and another crashed. The 31-year-old Polifka left two in Brisbane, Australia, and took one to Port Moresby to begin operations April 7, 1942. He almost single-handedly mapped large portions of New Guinea and New Britain. The weather and the long distance combined to make these extremely grueling missions, but results were invaluable for Gen. Douglas MacArthur's later campaigns in the area.

Polifka's charismatic leadership was critical, for he created a squadron of pilots with his own daring, initiative, and skill. He would do the same thing in North Africa and the Mediterranean, each time overcoming faulty equipment and a lack of supplies. One of his greatest satisfactions was the operations of his 8th Photo Squadron during the battle of Okinawa, where it was able to take low-level oblique photographs of Japanese positions at last light and have annotated prints delivered to US platoons by morning. "Pop" Polifka went to war again in Korea, commanding the 67th Tactical Reconnaissance Wing, flying RF-51s. He again took the tough missions and was killed July 1, 1951, over North Korea.

The Japanese greatly appreciated reconnaissance aircraft. Two of their designs, the Kawanishi H8K "Emily" and the Mitsubishi Ki-46 "Dinah," were equal to those of any nation. Unfortunately for the Japanese, there were too few of them and when air superiority was lost they were too vulnerable to American fighters.

The security conscious Japanese kept tight rein over any intelligence on the home islands, and there was virtually no information available on the location of the most lucrative targets. On Nov. 1, 1944, an F-13A Superfortress—commanded by Capt. Ralph D. Steakley and traveling at an altitude of 32,000 feet—flew over Tokyo. It was the first US aircraft to do so since Jimmy Doolittle's April 18, 1942, raid.

The photographs Steakley obtained on his 14-hour mission were invaluable. The flight became the model for the hundreds of subsequent recce missions which would ultimately map every significant target in Japan. The F-13s would fly over enemy territory out of reach of almost every fighter. The heavy Japanese flak was not generally effective, but the weather was often bad.

Lost in the Shuffle

By the end of World War II, the US reconnaissance force had matured. It was more than adequately equipped with airplanes and personnel, and intelligence derived from the missions was routed with efficiency and dispatch to the units needing it. All of this would be jettisoned in the swift demobilization that took place after V-J Day. When the US found itself facing new emergencies in the Cold War, it no longer had an effective system of reconnaissance.

The primary target—the USSR—could not have been tougher. In the Soviet Union, no information of any conceivable use to an enemy was ever knowingly disseminated; citizens could not even obtain valid street maps of its cities. The US had inherited a vast amount of intelligence from the Germans and, to a far lesser extent, from the Japanese. While this was helpful in preparing target folders, it provided no insight into current developments.

In addition to the Soviet Union, many other potential trouble spots held Washington's interest. These included China and North Korea. As time passed, these would be but the tip of the reconnaissance requirement iceberg, as dangers developed in Cuba, Latin America, Southeast Asia, and the Middle East.

The development of long-range reconnaissance would follow two general paths. The first involved the use of specialized versions of bombers, fighters, and transports intended for the most part to fly along the perimeter of enemy territory, making an actual overflight only on rare occasions. The second course reflected the development of specialized reconnaissance aircraft of sensational capability and performance.

The Korean War might have been prevented if an effective long-range reconnaissance force had been available to note the North Korean buildup. Further, had Chinese buildup been detected in the winter of 1950, steps might have been taken to prevent the intervention of Red China.

When war started, the principal reconnaissance task fell to the tactical units. The vital necessity of photoreconnaissance was recognized immediately, and, once again, individuals with courage and ingenuity stepped in to fill the gap. One of these was 1st Lt. (later Gen.) Bryce Poe II, who in 1950 had flown 19 clandestine missions near or over Soviet and Chinese territory. When North Korea invaded, he took off in his RF-80A on the morning of June 28 for the first jet reconnaissance sortie of some 67,000 reconnaissance sorties to be conducted during the war. He himself would fly a total of 71. Later, 1st Lt. (later Maj. Gen.) Mele Vojvodich Jr. would set a long distance tactical reconnaissance record

when he flew his RF-86 all the way to Mukden, China, some 300 miles beyond the South Korean border.

The SAC Effort

No one knew the value of long-range reconnaissance better than Gen. Curtis E. LeMay, but it took time for Strategic Air Command to reach the required level of proficiency. SAC's recce fleet grew from 12 F-9s and 24 F-13s in 1947 to 120 RB-36s and 180 RB-47s by 1954. Over the years, the numbers of aircraft declined as more sophisticated equipment such as the RB-47D, U-2, SR-71, and RC-135s entered the inventory. The effort of SAC was supplemented by that of the Royal Air Force, which used B-45s for daring, long distance overflights of Soviet territory.

Soon, modified B-47s began to overfly the Soviet Union. USAF Col. Donald E. Hillman, then deputy commander of the 306th Bomb Wing, made the first Presidentially approved overflight Oct. 15, 1952. Taking off from Eielson AFB, Alaska, Hillman, Maj. Ed Gunter (copilot), and Maj. Edward A. Timmins (navigator) made a 3,500-mile flight over the Chukotskiy Peninsula in eastern Siberia, checking for a buildup of Soviet air bases. Soviet MiG-15s tried to intercept the American aircraft, but they failed, and Hillman and his crew were able to take camera and radar photographs of five airfields. They were airborne for more than seven hours and had covered more than 800 miles of Soviet territory.

In mid-1954, an RB-47 flown by Capt. (later Col.) Hal Austin on a similar overflight mission was attacked by MiG fighters and almost shot down. By this time, the need for information on Soviet missiles, atomic capability, and conventional forces was great. President Dwight D. Eisenhower approved development of an advanced reconnaissance airplane which would ultimately result in the U-2.

Flights probing the perimeter of Soviet territory could be as dangerous as any overflight, if the Soviet interceptors were ordered to attack, either mistakenly or as a political statement. Such an event occurred July 1, 1960, when an RB-47H from the 55th Strategic Reconnaissance Wing was on a standard electronic reconnaissance mission over the Barents Sea, probing the Soviet radar system. On board was the standard three-man B-47 crew plus three electronic warfare officers.

The RB-47 was outside of Soviet airspace when cannon fire from a MiG-19 interceptor smashed into its wing and engines, sending it into a flat spin. The crew ejected, but the only survivors were the copilot, 1st Lt. Freeman Bruce Olmstead, and navigator, 1st Lt. John McKone. They were captured, incarcerated in the Lubyanka prison in Moscow, and released after being confined for several months.

Reconnaissance crews put their lives on the line during the Cold War. Variants of the B-47, like this RB-47K on its maiden flight, began to overfly the Soviet Union and were attacked even when outside of Soviet airspace.

Olmstead's RB-47 was but one of more than 40 US aircraft shot down by communist bloc defenses during the Cold War. Most of the more than 200 crew members killed in these shootdowns were on long-range reconnaissance missions, putting their lives at risk to obtain information on Soviet capabilities and intentions.

Revolutionary Change

In the 1950s, global tensions made it imperative to find better ways to obtain intelligence about Soviet dispositions, and work was under way. For one thing, as an interim measure, the Air Force was carrying out extensive modifications to the B-57, resulting in the RB-57D and later the RB-57F, with huge wings and high-altitude engines. Yet to come, however, was a revolutionary change in capability.

In March 1953, Maj. John Seaberg, working at Wright–Patterson AFB, Ohio, developed the requirements for a system that would have a 1,500-mile mission radius and be able to carry up to 700 pounds of reconnaissance equipment. In Seaberg's project, the quest for new reconnaissance equipment centered upon the new high-resolution panoramic camera invented by Edwin Land of Polaroid camera fame. The new camera was to use advanced Hycon Corp. lenses and the new Eastman Kodak mylar-based film.

Though not originally invited to participate, Clarence "Kelly" Johnson of Lockheed's famed Skunk Works muscled his way into the project with the promise of building—for about $22 million—20 airplanes which would meet or exceed specifications. He further promised to have the first article flying in a mere eight months. The Air Force already had contracted for the Bell X-16, and the service rejected Johnson's proposal. Johnson persisted, going directly to the CIA, which bought his plan. The Air Force then came on board, canceled the X-16, and got what has been called the best bargain in reconnaissance history.

The Skunk Works produced the magnificent U-2, in which the late, great Tony LeVier on Aug. 1, 1955, made the official first flight. The first U-2 overflight of Soviet territory occurred on July 4, 1956. The Soviet Union was outraged at the US ability to violate its airspace with impunity

Photo by Ted Carlson

By the 1960s, the high-flying and high-speed SR-71 was already in the works as the ultimate reconnaissance aircraft. Today, computers have transformed both reconnaissance platforms and the types of missions they can undertake.

but at the time was impotent to stop it. Its diplomatic protests were muted, as it was unwilling to admit it could not prevent the flights.

In 23 missions over the USSR, the U-2 gathered far more information about the Soviet Union than could be gleaned from all other sources combined. The US learned not only what Moscow might be doing but also what it could not do. The Soviet bomber fleet was revealed as being less impressive than estimated, and its buildup of ICBMs, while substantial, was not as great as had been feared. The U-2 also conducted operations over other Warsaw Pact countries as well as trouble spots in the Middle East and other Third World areas.

End of the Line

The last U-2 mission over Soviet territory came on May 1, 1960. Francis Gary Powers, a "sheep-dipped" Air Force officer flying in civilian guise and assigned to the CIA, was flying high over Sverdlovsk when his U-2 suddenly came under attack. Crushed by the blast effect of a salvo of some 14 surface-to-air missiles, the U-2 broke apart and Powers's parachute opened, and he floated to earth. He was captured and imprisoned. Powers was given the usual show-trial and sentenced to 10 years in a labor camp. In 1962 he was freed in an exchange for the notorious Soviet spy, Rudolf Abel.

The U-2 made no further spy flights over the Soviet Union, but it was used intensively over the People's Republic of China, where as many as 13 were lost. Most of these clandestine missions originated in Taiwan and were carried out by Nationalist Chinese pilots trained by the US Air Force.

The critical moment in the life of the U-2 came during the October 1962 Cuban Missile Crisis when President John F. Kennedy received irrefutable photographic evidence of Soviet IRBM sites on the Caribbean island nation. Two veteran reconnaissance experts, Goddard and Steakley, were called upon by the White House to help interpret the photos. As the U-2 overflights went on, however, the Cuban forces managed to down a U-2 with a surface-to-air missile. Maj. Rudolph Anderson Jr., its pilot, was killed.

The U-2's capability was continuously updated and expanded, and it is still in service. The latest version, the U-2S, was recently awarded the prestigious Collier Trophy.

By the time of the Cuban Missile Crisis, however, Lockheed had already launched studies for a U-2 replacement aircraft. The plan called for an aircraft that would fly extremely fast and extremely high and be difficult for Soviet radar to spot.

Working with CIA's Richard M. Bissell, the Skunk Works team went through a long series of studies, which ultimately resulted in the fantastic A-12, the predecessor of the more well-known SR-71 Blackbird. Johnson and fellow Lockheed designer Ben R. Rich bent technology to their will, creating a new airframe, new engines, and new systems. The program, called Project Oxcart, won an appropriation of $96.6 million for five aircraft within two years. USAF ultimately built 15 A-12s and 32 SR-71s.

The official first flight of the A-12 took place April 30, 1962. Since that time, no other manufacturer in any country has been able to create an aircraft with comparable performance. Capable of operating at speeds in excess of Mach 3 and at altitudes of 75,000 feet and greater, the Blackbird was employed all over the world. Its military contributions were of immense importance. In the 1973 Mideast War, photos taken by the SR-71 helped keep US policymakers—notably Secretary of State Henry Kissinger—on top of dangerous military developments.

The advent of the lightweight computer has changed the nature of some long-distance reconnaissance. Reconnaissance aircraft are now primarily platforms for sophisticated equipment that is often linked to other aircraft, ground stations, and satellites. For the first time, long-range reconnaissance crews no longer have to land from their missions in order to process the "take." Real-time or near real-time electronic intelligence, advanced synthetic aperture radar signals, and electro-optical data can be transmitted from aircraft like the RC-135 and U-2.

As capabilities have increased, so have the types of missions. They now include airborne early warning and battle management, ground surveillance, electronic reconnaissance, weather reconnaissance, and more. The standard reconnaissance types have been joined by a new generation of unmanned aerial vehicles that clearly presage the direction of future warfare. ▪

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