

Last fall a B-58 and a SAC combat crew demonstrated the capabilities of a remarkable airplane and the versatility of our nuclear striking command by making the longest supersonic flight in aviation history—8,028 miles from Tokyo to London nonstop in 8½ hours . . .

**AIR FORCE**  
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# 'GREASED LIGHTNING'



The star of Operation "Greased Lightning" pops its drag chute as it touches down at Greenham Common, England, after the 8½-hour supersonic flight from Tokyo. The B-58 is part of SAC's 305th Bomb Wing at Bunker Hill AFB, Ind.

By Don Smith

**T**HE WORLD shrank a notch last October 16. On that date three men and a Strategic Air Command aircraft flew 8,028 miles from Tokyo to London in eight hours and thirty-five minutes.

The most significant fact about the flight, aside from setting a world's speed record, is that these three men were a regular SAC combat crew and the aircraft was a stock SAC B-58 bomber.

These men proved that if this aircraft and its weapons were needed half a world away from any base on the globe, they could be taken there by a SAC combat crew, on order, in a little more than eight hours. This fact is an aviation milestone, a tribute to the skill of SAC combat crews, a measure of the performance of a great aircraft, and a small victory in the cold war.

The story of this remarkable record flight is not the story of a maximum effort of heroic men. It is, instead, the story of the routine top performance of the Strategic Air Command.

## The Idea

Two generals—one of them Gen. Thomas S. Power, SAC Commander in Chief—were discussing the capability of the B-58 supersonic bomber at SAC headquarters on a hot Nebraska afternoon last summer.

The B-58 had been operational in SAC for over two years. Most of that time was needed to iron out the myriad small problems that had troubled this unique and complicated aircraft since it first joined SAC.

Once the B-58 had been a problem, the generals

agreed. Now it was a seasoned, reliable strategic weapon. What this aircraft needs next, General Power said, is to be pushed hard—beyond its normal operational performance. We need to show just how good and how reliable it is.

That afternoon a message went to SAC's Second Air Force headquarters and to the B-58 wing at Carswell AFB, Tex., directing the commanders to tell SAC headquarters just what their aircraft could do.

Six possible flights were suggested.

Tokyo to London was picked for several good reasons. First, the total route was, for the most part, identical with two regular training routes called "Glass Brick" (a regular practice mission to the Far East) and "Alarm Bell" (a similar practice mission to Spain). The Tokyo-to-London flight would be a shortcut beginning at Alaska and going across the Arctic and ending at London, which combined the "Glass Brick" and "Alarm Bell" missions.

Second, because the route was mostly over regularly planned corridors, tanker bases would be no problem, nor would aircraft servicing. Crews would accomplish their normal "Glass Brick" and "Alarm Bell" training while en route. The switch in destinations and flight path was just the kind of curve that SAC commanders like to throw at their people to keep them on their toes.

And third, the distance involved and the length of the supersonic run would be the best possible way that the B-58 could exceed its advertised performance.

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## 'GREASED LIGHTNING'

For these reasons, General Power approved the Tokyo-to-London flight, and it was given a code name—"Greased Lightning."

### Clearing the Way

A number of factors about "Greased Lightning" made the mission special but also made approval by a number of other agencies necessary. Since this was a supersonic flight, the governments of the countries to be crossed had to give specific approval. This was because the flight would drag a sonic boom wherever the flight track passed. As it turned out, approval was granted to fly over London faster than sound (at 50,000 feet), but such approval was not granted for a flight over Tokyo. And, not the least important, such a flight would be a problem to regular air-traffic control



At the end of the long, record-breaking mission, the B-58 crew members congratulate each other. At left, aircraft commander Maj. Sidney Kubesch, 33, El Campo, Tex. In the center is Maj. John G. Barrett, 32, San Antonio, Tex., navigator-bombardier, and at right is defense systems operator Capt. Gerard R. Williamson, 26, of New Orleans, La.

in the busy airspace around two of the world's greatest capitals.

Besides Air Force approval, it was, therefore, necessary to get a final go-ahead from the Department of Defense, Department of State, and many other national agencies.

Meanwhile SAC began planning.

"Greased Lightning" would only serve its operations and training objectives if it were a widespread exercise involving many units, crews, and support people. It might be more spectacular to have a single plane with minimum support fly the special Tokyo-to-London track, but it would be poor planning for several reasons. First of all, as a Strategic Air Command operations officer explained it, SAC doesn't fly that way. Every SAC flight is planned to be as safe and foolproof as men and equipment can make it. The Tokyo-to-London flight would be no gamble. There would be no discredit to the crew or SAC if fuel reserves were more than adequate and support complete.

Second, SAC doesn't have a varsity team backed up by a full bench of scrubs. All of SAC's combat-ready crews are first team. The more aircraft and personnel that could participate in "Greased Lightning" the better. The main purpose of both the regular "Alarm Bell" and "Glass Brick" missions was to give Far East and European bases practice in handling the B-58 aircraft and its related equipment. "Greased Lightning" would serve the same purpose. The primary aspects of this mission that would *not* be special were the aircraft and the combat crew. This team would be no more—or less—than the crew and aircraft that would be assigned an actual emergency war order target.

Finally, the more aircraft directly participating, the more reliability data would fall out of the mission. SAC wanted to see if the aircraft, crew, and support people could do the job. If they would fail in some way, it would be better to know where the system was weak now, rather than wait until a time when failure would be disastrous.

No significant expense would be involved in increased tanker and ground support. The tankers would be flying other training missions if they were not supporting "Greased Lightning." The experience of flying from unfamiliar bases over unfamiliar routes would be first-class training for everybody.

### The B-58 Hustler

"Greased Lightning" was designed to give the B-58 operational experience and test its capabilities. What kind of aircraft is this needle-nosed jet bomber?

To answer this, you might go to the headquarters of SAC's 43d Bomb Wing at Carswell AFB, Tex. There, on a table in a small room, in a rehabilitated World War II building, is a most remarkable collection of trophies.

The Hustler began shattering records in January 1961 when, within two days, it broke six world speed and payload records. Flying a closed course over the western US with 1,000- and 2,000-kilogram loads, the B-58 turned in speeds up to 1,284 miles per hour. This performance earned the combat crew the Thompson Trophy.

Four months later, on May 10, 1961, a B-58 and combat crew of the 43d Bomb Wing won its second trophy, the Blériot Cup. Flying a 669.4-mile rectangular course, the Hustler clocked 1,302 mph.

On May 26 a SAC B-58 commemorated Lindbergh's historic New York-to-Paris flight of thirty-four years before by flying nonstop from Carswell AFB to Paris via Washington and New York. With aerial refueling the Hustler flew the New York-to-Paris leg in just three hours and twenty minutes at an average speed of 1,105 mph and won the Mackay Trophy.

Less than a year later a SAC combat crew and B-58 took the Mackay Trophy a second time, plus the Bendix Trophy, by setting new coast-to-coast speed records. The flight from Los Angeles to New York and return took four hours and forty-one minutes. The aircraft commander of the B-58 pointed out later that if a cannon had been fired at New York from Los



Angeles at the same time he passed the West Coast gate, he could have landed at Idlewild and have had lunch before the shell arrived.

No aircraft has ever filled a table with trophies in quite that manner before.

But little is traditional about the B-58. In one giant step, the B-58 achieved a greater speed increase over the preceding strategic bomber than was reached in the previous fifty years of aircraft design.

The B-58 is a departure from the usual trend toward larger manned strategic aircraft. It was designed around a "minimum-size" concept.

An important part of this concept is the disposable armament pod carried beneath the B-58's slender fuselage. This pod makes it possible to carry the weight and space needed to hold weapons and reserve fuel only one way on a mission. After the pod is dropped, the bomber's fuel economy and survival probability are greatly increased on its trip home.

The Hustler's combat crew of three—aircraft commander, navigator-bombardier, and defense systems operator—is half the number needed to fly the much larger B-52. Consequently, the flight and bombing-navigation systems of the B-58 are highly sophisticated. The bombing-navigation system is estimated to be ten times as accurate as preceding systems with only two-thirds of the former weight and size.

The problem of temperature rise caused by flight at twice the speed of sound made necessary an entirely new approach to aircraft structure design. The B-58's heat- and fatigue-resistant skin is made of fiberglass, aluminum, and stainless-steel honeycomb, sandwiched between two layers of metal. This same heat made problems for the crew and their special equipment. To keep them cool the Hustler carries an air-conditioning unit that does the equivalent work done by an ice-making plant with a capacity of 160 tons of ice a day or by fifty-four home air-conditioning units.

To achieve speeds and altitudes far beyond any other bomber, the B-58 combines the very high lift/drag ratio of a delta-wing with an area-rule "coke-bottle" fuselage. This combination gives the bomber good stability and smooth transonic flight. With four General Electric J79 turbojet, pod-mounted engines, each with 10,000 pounds of thrust, plus afterburners, the B-58 cruises at a higher speed than the top speed of any previous bomber.

Statistically, the B-58 is also impressive. This medium bomber weighs over 160,000 pounds. It has a wingspan of over fifty-six feet while stretching just under 100 feet from nose to tail. The wing has an area of 1,542 square feet. The landing gear has ten wheels, and the aircraft carries over 15,000 gallons of fuel.

As remarkable as this aircraft may be, however, the combat crew that flies it is even more remarkable. The cold hardware of the B-58 only becomes a weapon when a dedicated, professional combat crew climbs aboard.

## The SAC Combat Crew

There is nothing like a combat crew. While some

teams may be as closely coordinated and trained, none shares the responsibility of a combat crew. Each SAC combat crew, whether missile or bomber crew, may have in its charge one or more nuclear weapons.

But, besides this responsibility and the role it gives them in world history, the combat crew is also a dedicated and skilled team of technicians. This combat crew, with all others in the Strategic Air Command, spends an average of seventy-four hours a week on duty. About 122 days a year these men are on alert, living on the flight line away from their families, undergoing almost continual training.

When not on alert, combat crews fly their aircraft to keep proficient and to keep the ground-support people proficient in their skills. This is why SAC continually flies practice bombing missions across the United States and one reason why bombers and tankers rotate to SAC overseas bases in Europe and the Far East. This is why SAC originally established the "Glass Brick" and "Alarm Bell" missions.

## Getting Ready

In keeping with the regular "Glass Brick" and "Alarm Bell" operations, support aircraft and people departed their US bases some time before the planned flight and repositioned themselves for the mission. The first of these aircraft to take off were several RB-47 weather scout aircraft that left Forbes AFB, Kan., on October 11. During the last few hours before the record flight, they would patrol the flight path and give up-to-the-minute weather observations to SAC headquarters where the mission would be controlled. They would assist the regular Air Weather Service aircraft that continually scan the Arctic area. Within forty-eight hours, KC-135 tankers departed from Lockbourne (Ohio); Kincheloe (Mich.); Bunker Hill (Ind.); Wurtsmith (Mich.); K. I. Sawyer (Mich.); Walker (N. M.); Beale (Calif.); and Wright-Patterson (Ohio) Air Force Bases. These aircraft would refuel the mission and airlift support people to their assigned bases. Most of this effort was routine "Glass Brick" and "Alarm Bell" support.

Some was special—for instance, extra tankers were needed for the 8,000 miles to be flown supersonic, the longest supersonic flight ever attempted. Flying faster than sound eats up a tremendous amount of fuel. Peacetime safety factors would require that the "Greased Lightning" aircraft be refueled five times between Tokyo and London.

The same tankers that supported "Greased Lightning" were also used for transporting the Fédération Aéronautique Internationale stewards who would verify the distance and speed of the record flight.

The FAI is the only world organization that can certify a record flight, and an impartial observer from one of the thirty-eight member countries would have to personally witness and time the aircraft as it passed through the "gates" at Tokyo and London. The FAI stewards would witness the flight from the air by riding aboard refueling tankers and by radar from the

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ground. This was because at more than 50,000 feet altitude, the B-58 would be almost invisible to ground observers.

By October 15 all support aircraft and people were in position.

### The Flight

On October 9 at Bunker Hill AFB, Ind.—two days ahead of the special "Greased Lightning" support—crews of the 305th Bomb Wing had carefully pre-flighted their B-58 bombers and had taken off on the October "Glass Brick" mission. Their destination was Guam. They crossed the western half of the United States in a few hours and headed out over the Pacific. Flying subsonically to conserve fuel, the bombers passed over Hawaii, then Midway, then Wake Island, and finally landed at Guam—tired, but keyed up for the coming Arctic dash. One of these crews would soon find a place in the history books.

At Guam the support people went into action, readying the bombers and performing their scheduled training. Later, the bombers took off again for Okinawa where support crews were waiting for their turn at working with the big birds. High over the Arctic Circle the weather scout B-47s reported to SAC headquarters that the weather would be good.

By now the FAI stewards were in place in London and Tokyo, the aircraft were ready, and the combat crews anxious to go.

The flight was planned to follow the regular "Glass Brick" route from Okinawa to Japan to Shemya in the Aleutian Islands. At that point SAC would divert two of the B-58s to pass over Alaska, the Parry Islands above the Arctic Circle, Greenland, Iceland, and then finally London. None of the combat crews knew which two it would be.

### 8,000 Miles in Eight Hours

At a few minutes before noon on October 16, under a bright tropical sun, a B-58 bomber taxied out to the end of the runway at Okinawa with its four jets whining. At exactly 1200 hours, its afterburners exploded into life and the 160,000-pound intercontinental bomber moved forward. It accelerated rapidly, trailing a dense, black cloud of smoke, and abruptly tilted its sharp nose upward and lifted free of the earth. Minutes later a second B-58 did the same. Then a third.

Flying subsonic, the three bombers moved close to their KC-135 tankers on schedule, about an hour after takeoff and topped their fuel tanks. Japan was in sight.

As the first tanker moved delicately into position, an FAI steward leaned over the boom operator's shoulder and identified the B-58. About twenty minutes later the bomber, its tanks filled with JP-4, broke free.

At 1:27, the Japanese FAI steward at Tokyo International Airport checked off the blips on his radar screen as, out of sight above him, the bombers went through the gate and climbed northeast. As they

climbed, they accelerated—afterburners flaming—until they were going faster than sound. Higher and faster they rose until at close to 50,000 feet and traveling over 1,000 mph, they leveled off, dragging a giant shock wave over the sea miles below.

They were not supersonic long. Their first refueling was due in about one hour. Every time the B-58s refueled they had to drop to below Mach 1 and descend about 30,000 feet to meet their tankers. This time the tankers were waiting off the northern tip of Japan.

The refueling was uneventful.

On the 2,000-mile flight to Shemya, the weather continued clear and bright. At 50,000 feet the three B-58s were miles above the scattered clouds that were forming below. Traveling faster than a .45-caliber bullet, the bombers flew back into yesterday as they crossed the International Dateline and raced toward darkness.

It was 7:00 p.m. when the B-58s made their second refueling, over Shemya in the Aleutian Island chain. Clouds were beginning to build up below them now as they dropped down to the tanker's altitude and slowed down to fill their fuel tanks again.

At SAC headquarters, in Omaha, the senior controller was told that the weather was turning bad over Anchorage, Alaska, the next refueling spot. There was also a report that one of the "Greased Lightning" B-58s was having navigation-system troubles.

The decision was made to land the ailing B-58 at Eielson AFB, Alaska, and send one of the others to Chicago and then home. The remaining B-58, flown by Crew S-12, was to proceed to London. Average speed so far from Tokyo to Anchorage was 1,116 mph.

At this moment, a KC-135 jet tanker lurched and rolled in heavy turbulence about 25,000 feet over Anchorage. The weather had worsened. It was pitch black, with visibility at times less than one mile. The tanker was carrying the thousands of pounds of fuel the B-58 would need to reach Greenland. Flying supersonically a B-58 burns over 1,000 pounds of fuel each minute.

The maneuver the tanker and its B-58 receiver would have to complete is called a high-speed rendezvous. So far, the B-58 had performed this operation twice since leaving Tokyo. The high-speed rendezvous is a difficult maneuver SAC pilots have had to master.

Essentially, this is what happens. The tanker flies at around 500 mph at about 26,000 feet. It is flying a twenty-four-nautical-mile holding pattern—a giant race track in the sky over the rendezvous point. Meanwhile, the bomber is flying toward him at 50,000 feet at almost three times the tanker's speed. On the side of the holding pattern when the two aircraft are heading in opposite directions, they approach each other at about 2,000 mph.

When the two aircraft are about seventy miles apart, the tanker makes a 180-degree turn timed to put him on the same course as the oncoming bomber but below him. At this same time, the B-58 pilot—flying at Mach 2 at 50,000 feet—pulls his bank of throttles back to idle, and begins a supersonic penetration. He lets down about 30,000 feet to an altitude about 1,000 feet



below the tanker and, with engines still on idle, begins to bleed off speed. At the same time the bomber is making his penetration, the tanker completes his turn back to the bomber's course. The bomber is now climbing slowly from below about four miles to the rear of the tanker.

When the bomber puts his nose just thirty feet from the tanker's tail, he is flying at the exact same course and airspeed as his tanker. The tanker boom operator, lying on his stomach in the tanker's tail, controls the long refueling boom until it locks into the bomber's nose. While the two aircraft are hooked together, the fuel is transferred. Such aerial refueling is a routine, constantly practiced operation within the Strategic Air Command.

But the black, stormy night made problems over Anchorage. The air at 26,000 feet was so turbulent and the visibility so poor, the refueling would have to be made at a different altitude. The two aircraft commanders conferred briefly by radio and decided the tanker would climb out to 28,000 feet and try to top the weather.

In the B-58, Maj. Sidney Kubesch, 33, of El Campo, Tex., the aircraft commander, watched his altimeter. He was in a shallow dive, still flying better than Mach 1 even though his engines were on idle. As his aircraft began to approach the top of the cloud layer, the turbulence began. At his speed, the air felt like a country road, hitting him with sharp jolts that made his engine pods swing.

Behind him, Maj. John O. Barrett, 32, of San Antonio, Tex., the crew navigator-bombardier, also watched the altimeter, but his main concern was a spot on his radar screen. This was the tanker, miles ahead and just beginning its turn.

Further back, Capt. Gerard R. Williamson, 26, of New Orleans, La., defense systems operator, reviewed the long checklist of the actions he would have to take during the coming refueling. He reached up and placed his hand against the bomber's skin. It was warm. They were still supersonic.

In the tanker, the FAI steward braced himself against the continual rolling and bucking in the tanker's tail. The boom operator lay beneath him wiping the small observation window clean. The FAI steward would have to spot and identify the B-58 and certify it. The boom operator would have to give it enough fuel to reach Greenland. The KC-135 broke out into bright starlight minutes later.

Major Kubesch saw the tanker's lights and black silhouette about six miles above and ahead of him, just where they should be. His B-58 was slowly drifting up to 28,000 feet, bleeding off airspeed. At the moment of contact he would have to be at exactly the tanker's speed.

Slowly the sharp nose of the B-58 moved into sight through the boom operator's window. There was still a lot of turbulence but like all SAC crews, S-12 had practiced this hookup hundreds of times. The telescoped boom began to stretch out under the boom operator's control. The bomber moved up to meet it. At just the right moment the operator punched the

boom sharply into the bomber's open refueling hatch. Fuel began flowing.

The bomber and tanker continued in this way for more than a half hour. Repeatedly, the turbulence broke the two aircraft apart. As they separated, jet fuel sprayed back over the bomber like water out of a fire hose. Repeatedly they moved together again.

As the tons of fuel passed from the KC-135 to the B-58, the trim and weight of the two aircraft changed. The tanker, lighter now, threatened to pull forward. The bomber became heavier and needed power to keep contact. As the bomber's weight increased, its critical stalling speed began to come close to its refueling speed. For thirty-eight minutes the two SAC combat crews fought their aircraft and the swirling air and shredded clouds around them. Finally, the bomber broke away for the last time.

The next tanker would be waiting over the Arctic Ocean west of Greenland.

It was still dark when they met that tanker and took on the planned fuel load, but this time the weather was good.

About an hour and a half later, at 8:00 o'clock local time, over Iceland, Crew S-12 of the 305th Bomb Wing began their final refueling. Twenty minutes later the tanker dropped away in bright sunlight into the cloud layer that stretched beneath from horizon to horizon.

So far during the flight, Major Kubesch had spent almost two solid hours trailing on the end of a refueling boom. Each time he refueled it meant dive, slow down, hook up, pump, breakaway, climb, and accelerate. The flight seemed like one big refueling exercise.

At London, the weather was normal: cloud cover and mist drifting up and down from 300 to 3,000 feet. Visibility was less than five miles, but no problem. The British FAI steward near London checked the B-58 through the gate by radar at 2:34 in the afternoon. The flight had taken eight hours and thirty-five minutes to travel 8,028 miles—halfway around the world by the polar route. The average speed was 938 mph.

At SAC headquarters, some questions have been answered. It is now known that the B-58 can be diverted in flight to any spot on the globe. And that if need be, it can fly there supersonically. The combat crews of the tankers and support aircraft are better trained than they were. Bases in the Far East are better able to handle the unique problems associated with B-58 support.

For the B-58 combat crews, including S-12, this has been an exciting change from the routine seventy-four-hour week of ground alert and proficiency missions.

For the free world, "Greased Lightning" has been just one more demonstration of this simple fact: The United States Air Force combat crew is the most capable and dedicated weapon ever devised.—END

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*The author, Don Smith, is a civilian employee of the Office of Information at Headquarters, Strategic Air Command, Offutt AFB, Neb.*