A BRIEF HISTORY OF THE COMBAT GLIDER IN WORLD WAR II

By JOHN L. LOWDEN

The concept of the combat glider can be traced to the outcome of World War I. Under the provisions of the Treaty of Versailles, Germany was forced to reduce its land army to a token 100,000 men and was prohibited from having an air force. Since the treaty did not prohibit the building and flying of gliders, glider-flying clubs sprang up throughout Germany. Within eight years after the war ended, German high schools were offering glider flying as part of their regular curricula. When the Nazis came to power in 1933, the young men trained in gliders helped form the core of the new German air force, the Luftwaffe.

Hitler himself perfected the strategy of landing assault teams behind enemy lines, both day and night, in engineless aircraft. (Russia pioneered in this area with cargo gliders, though its gliders as troop carriers were never used in combat. However, after the war, Russia maintained three glider-infantry regiments until 1965).

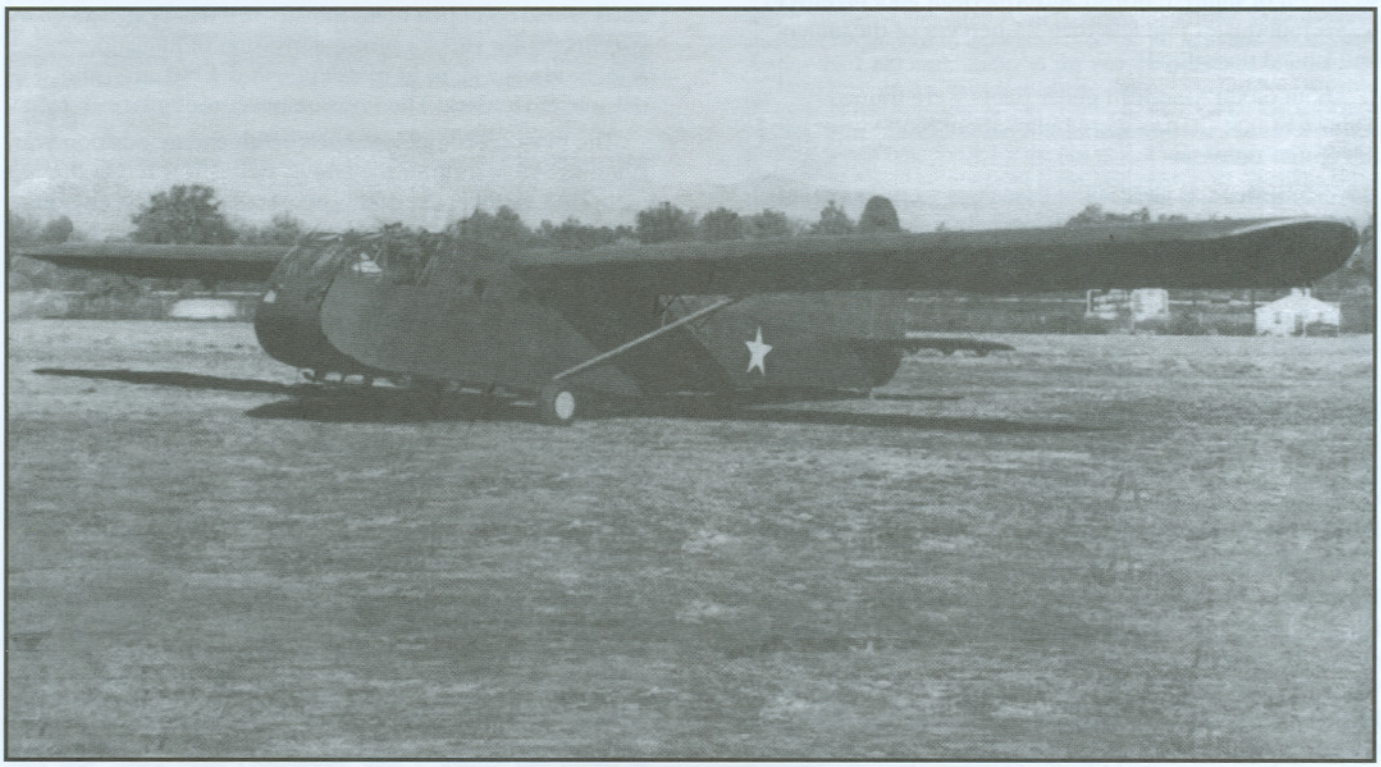
The first German combat glider, designated the DFS 230, had a wingspan of 72 feet and a fuselage 38 feet long. The first use of this aircraft took place on May 10, 1940. In the half-light of dawn, shortly after 5 a.m., ten 230s carrying a total of 78 assault troops swooped down and landed on top of a huge Belgian fort, Eben Emael, a barrier to Hitler's invasion of Belgium and Holland. Eben Emael garrisoned 800 men; was encircled by a moat; and had tank barricades, expanses of barbed wire, machine gun nests, minefields and heavy artillery. However, the roof of this heavily camouflaged fort was a meadow-like expanse 1,000 yards long and 800 yards wide. A perfect place for a glider to land.

The German gliders were towed by Junkers 52s, three-engine transports, from an airfield near Cologne. Their pilots circled to an altitude of 8,500 feet, and then flew a 45-mile course paralleling the German front lines. When the objective-20 miles behind the Belgian border - was easily within reach, the glider pilots released. Twenty minutes after landing on top of Eben Emael, the Germans had sealed the garrison inside the fort at a cost to them of six dead and 20 wounded.

Besides the gliders, a key to the success of this daring mission was a top-secret, hollow charge device which when detonated, imploded. That is, the charge blew inward, not up and out. These 100-pound explosives were placed against the steel-reinforced, concrete cupolas and turrets housing observation posts and large-caliber cannon. The tremendous blasts, each accompanied by a miniature mushroom cloud, instantly neutralized weapons and men, even those directly down in the bowels of the fort, with an inverted, volcanic shower of molten metal and concrete shrapnel.

The German armies arrived at Eben Emael the next morning, and by that afternoon the fort had been surrendered. Subsequently, Hitler used his combat gliders in Greece on April 26, 1941, and in Crete on May 20 of the same year. The Germans won the eight-day battle for Crete with the use of 13,000 glider infantry and paratroopers, but suffered over 5,000 casualties. Hitler never again used paradrops or gliders on such a massive scale.

So how does a combat glider fly? Four basis forces are at work on a powered aircraft in flight; thrust, drag, lift and gravity. Thrust opposes drag and moves the aircraft forward through the air. It is provided by the engine(s). Drag is the natural resistance of air that opposes an aircraft's forward movement. Lift is the force created by airflow over the wings that opposes gravity, the natural force that pulls the aircraft downward.



AMERICAN 15-PLACE WACO CG-4A

The same forces are at work on a glider. Thrust is created by the towplane. Drag is air resistance. Lift causes the glider to move upward against gravity. However, once the glider pilot cuts loose from the towplane, the glider was nosed down, with gravity providing the necessary thrust. (In a sailplane, the same forces apply. Even if soaring higher and higher on a thermal or rising air current, the nose of the sailplane must always be pointed down at the proper angle to maintain airspeed - to maintain the proper flow of air over the wings for lift).

Taking a page from Hitler's book, America and Britain developed their own combat glider programs. The American 15-place, Waco CG-4A and British 30-place, Airspeed Horsa gliders were first used in a major invasion (Operation Husky) on July 9, 1943 - the start of the 38-day battle for Sicily. Other major operations where Allied gliders played a significant role were: Operation Thursday (Burma: March 1944); Operation Overlord (Normandy: June 1944); Operation Dragoon (southern France: August 1944); Operation Market-Garden (Holland); September 1944; Operation Repulse (Bastogne: December 1944 - January 1945); and, on March 24, 1945, Operation Varsity (Rhine River Crossing). Six weeks after the successful conclusion of Varsity, Nazi Germany surrendered to the Allies.

During the Holland invasion, almost 2,000 CG-4As and 700 Horsas were used. This was the single largest glider-airborne operation of the war.

Operation Varsity was more costly to Allied airborne than the invasion of Normandy. By early evening of March 24, in eight short hours, our airborne forces had suffered 819 killed, 1,794 wounded and 580 missing in action. Over six dozen paradrop and glider-towing planes were shot down. Seventy glider pilots were killed and 114 wounded or injured. British and American glider-recovery teams found later that less than 25 percent of the gliders had landed unscathed.

About 6,000 American glider pilots were trained. Almost 14,000 CG-4As were build; about 3,600 were used in combat overseas.

Glider-rider and glider pilot casualties were estimated at 40 percent for some missions. Specially trained glider-assault regiments were part of the U.S. 11th, 13th, 17th, 82nd and 101st Airborne Divisions. (British glider-assault teams were assigned to Air Landing Brigades, each equivalent in strength to a U.S. regiment).

The 11th Airborne spearheaded Operation Gypsy Task Force, a glider-paradrop attach on Japanese installations on Luzon, the Phillipines. In the China-Burma-India Theater were glider units - assigned to the 1st, 2nd and 3rd Air Commando Groups - which flew British troops into battle behind the Japanese lines.

With a wingspan of 84 feet and 48 feet long, the CG-4A had much in common with the German DFS230: steel tubing framework covered with doped fabric; extensive use of stressed plywood in the wings; and spoilers on the upper wing surfaces. Commanded by a single pilot, the DFS 230 landed on a single skid centered beneath the fuselage. The CG-4A was equipped with wheels and hydraulic brakes. The pilots sat side by side.

The CG-4A could carry its own weight of 3,750 pounds which usually translated into a cargo combination of men and munitions or high-octane fuel, an artillery piece, or a jeep or baby bulldozer. The same cargo mix applied to the all-wood British Horsa, with a wingspan of 88 feet and a fuselage 68 feet long-and a tricycle landing gear. Its net weight was 8,4000 pounds; gross weight was 15,750. Unlike the CG-4A, the Horsa was instrumental for blind flying, and had two enormous flaps which worked off two interconnected, compressed-air cylinders - as did the brakes. Pilots sat side by side.

The CG-4A was towed behind the C-47, the military version of the DC-3, with a nylon tow rope eleven-sixteenths of an inch in diameter, and 350 feet long with a single glider on tow. On a double tow, the tow ropes were 350 and 425 feet long; both attached to a D-ring coupler that fitted to the towplane's tail. The gliders were positioned about 75 feet apart.

The Horsa was towed, with a hemp rope, behind the modified, four-engine Handley-Page Halifax bomber, the twin-engine Armstrong Whitworth Albemarle and the C-47.

The British also made effective use of the tank-carrying General Aircraft Hamilcar glider. With a wingspan of 110 feet and 69 feet long, this giant wooden aircraft weighed 15 tons when loaded to capacity. It was towed by a Halifax. Four hundred twelve Hamilcars were built and used in Operations Overlord, Market-Garden and Varsity.

American glider pilots were not trained to fly the Hamilcar; however, most American and British glider pilots were equally at home in the CG-4A or Horsa.

The German Me 321 glider had a wingspan of 181 feet and was 93 feet long. With a payload of 24 tons of cargo or 200 combat-equipped men, the Me 321 was designed specifically for Hitler's planned invasion of England (Operation Sea Lion) in mid-September 1940, after the debacle of Dunkirk. The invasion never took place.

The most recent glider attack on an enemy position was launched 42 years after the end of World War II. On the night of November 25, 1987, two Arab guerrillas, clinging to motorized hang-gliders with ten-foot wingspans, sailed stealthily towards northern Israel. One landed within Israel's security zone in southern Lebanon, short of Israel's northern border. He was hunted down and killed. The other guerrilla landed near an Israeli military outpost and, using an AK-47 assault rifle and hand grenades, killed six soldiers and wounded eight before he was dispatched.

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The writer of this brief history is the author of Silent Wings at War: Combat Gliders in World War II, a book in the "History of Aviation" series, published by Smithsonian Institution Press.