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# ***Gliding off to war: the use of gliders as weapons in World War II***

an address<sup>1</sup> to the Institute on 26 August 2010 by  
**James Oglethorpe**



*As an unforeseen legacy of the Versailles Treaty, the prohibitions imposed on German air-power gave the Luftwaffe impetus to develop combat gliders which provided Germany with a potent weapon at the outbreak of World War II. Subsequent extraordinarily rapid research and development undertaken by the Allies, coupled with their increasing control of the skies, permitted the Allies to dominate glider-borne warfare later in the war. By 1945, the combat life of the silent aerial cargo transporter came to an end, to be replaced by the newly developing helicopter platforms.*

This paper outlines the development of glider warfare during World War II. It details the most notable instances of the operational use of gliders and the reason they quickly disappeared from military inventories after the war.

Only in World War II were gliders used as assault weapons – neither before nor after. Nonetheless, during their time, military gliders were quite an important weapon. For instance, nearly 14,000 gliders of the standard American design (the “Waco” CG-4A) were produced between 1941 and 1944. The Waco featured a wood and steel-tubing structure, with canvas exterior skin. It had two pilots and a flip-up nose section, allowing rapid unloading. It provided seating for up to 13 troops, or equipment loads such as a jeep or small howitzer.

Gliders were cheaply mass-produced from non-strategic materials. Many different businesses, such as piano factories, successfully adapted to manufacturing gliders during the War. A glider could effectively double the load-carrying capacity of its towing aircraft, at a small fraction of the cost. In military operations, gliders

could be landed on a wide range of unprepared field surfaces behind enemy lines, which allowed enormous tactical flexibility. Compared with parachute troops, glider (or “air-landing”) troops arrived into battle already organised, accompanied by their heavy equipment. Air-landing troops also required less training than paratroopers and the chance of injury (especially in training) was lessened (although still significant). Gliders also arrived silently, parting their tow-planes up to 20 kilometres away, which provided a crucial surprise factor in several assaults.

## **Advent of the Military Glider**

In the 1920s and early 30s, the *Treaty of Versailles* had placed very onerous terms on Germany prohibiting German military aircraft manufacture. In response, Germany instituted extensive pilot-training on gliders instead. This encouraged a nationalistic youth “gliding” culture, and Germany became the world leader in glider technology-development and record-setting.

A young woman named Hanna Reitsch, a naturally-gifted glider pilot, rose through the German glider-training organisation at the end of the 1920s. She attained prominence in German sports-gliding from 1931, when she achieved her first world record. Amazingly, Hanna was to go on setting world gliding records up until 1979.

She later played a key role in the acceptance of troop-carrying gliders into the Luftwaffe inventory. As a result of her connections with top-ranking Luftwaffe officials, Hanna was recruited as a test pilot. In 1937, she flew a major demonstration of the prototype DFS-230 troop-carrying glider and successfully delivered eight personnel armed with machine-pistols at the feet of senior Luftwaffe observers who were key decision-makers. This resulted in an immediate mass-production order for the DFS Company and the DFS-230 went on to feature in all of Germany’s glider assaults in World War II.



Cut-away of a United States ‘WACO’ CG-4A standard glider, which had two pilots and carried up to 13 personnel  
[Photo: Cradle of Aviation Museum, Garden City NY]

<sup>1</sup>Attended by 56 members and guests

## Gliders Open a Hole in the Western Front

Until 1940, most nations paid little attention to Germany's glider development. Even within the Luftwaffe, the assault gliders had uncertain support. This was all to change on the opening morning of Germany's invasion on the Western Front.

At dawn on 10 May 1940, 42 German gliders silently captured three bridges and a vital "impregnable" fort in Belgium, Fort Eben Emael. As with the French "Maginot Line" forts, Belgian Fort Eben Emael had been envisioned as the perfect emplacement for defending against a World War I-style infantry assault. It was carved into solid rock and protected by sheer cliffs fronted by canals. The fort's powerful artillery turrets dominated the nearby road bridges, which provided the only route across the intersecting major navigation canals in southern Belgium.

Unfortunately for the Belgians, times had changed. The German gliders were able to land their troops and demolition charges easily onto the roof of the fort. They quickly neutralised the gun turrets and captured the fort. Today, the museum in the old fort displays a restored DFS-230, commemorating this important moment in military aviation history.

This successful combat use of gliders by the Germans propelled the Allies to embark on glider production. It also convinced the remaining Luftwaffe sceptics that gliders had an important role to play. On both sides, this new-found enthusiasm for combat gliders was to lead to massive, and in some cases, bizarre, new projects as the war progressed. Although Germany's airborne forces played no further part in the 1940 collapse of Belgium, Holland and France, the world was now aware of a new "war winning" assault weapon.

## Late 1940 - Giant German Tank-Carrying Gliders

Following the Luftwaffe's failure to subdue the Royal Air Force in the "Battle of Britain" in September 1940, the Germans hurriedly made alternative preparations for producing enormous invasion gliders. These were expected to carry fully-equipped units of over 100 infantry troops, or full-sized battle tanks and other heavy weapons such as artillery, towing vehicles and ammunition. They envisaged silently landing 20,000 troops, with their heavy weapons, in southern England, capturing intact airfields which would then receive massive reinforcements.

The Luftwaffe hastily sought two competing glider designs, the Junkers Ju322 *Mammut* ("Mammoth") and the Messerschmitt Me321 *Gigant* ("Giant"). Hasty production during the winter of 1940-41 was designed to manufacture the required 200 invasion gliders, each with a wingspan approaching that of a modern jumbo-jet.

Despite Junkers' best efforts, their *Mammut*

programme ended up as a mammoth-sized disaster. Junkers had been directed to use only wooden construction, despite the fact that they had actually been leading exponents of *metal* aircraft design for the preceding 25 years! Junkers faced incredible production challenges; they had no design experience with wood, no suitable workforce and no wood-working equipment. Everything had to be organised under enormous pressure.

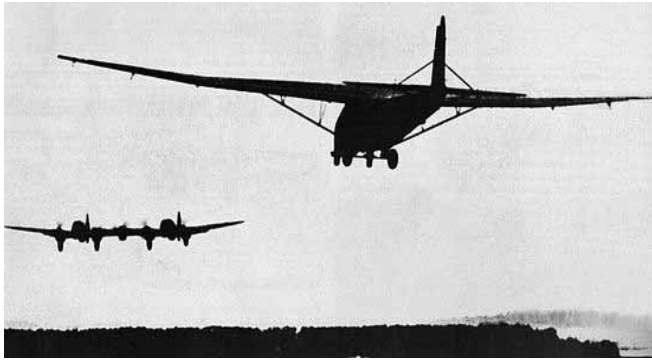
A testament to Junkers' proficiency was the development of a prototype in five months, while at the same time another 90 gliders were nearing completion. However, the prototype proved unairworthy. The four-engined Junkers Ju90 tow-plane, one of the very few aircraft in Germany with anything like the requisite power to become airborne, was nearly thrown to the ground at take-off. The *Mammut* test-pilot immediately released the tow, keeping it stable long enough to enable a forced-landing. The *Mammut* project was cancelled and all the production gliders were broken up for firewood: at a cost of 45 million Reichmarks.

Meanwhile the Messerschmitt Me321 *Gigant* programme progressed. The Messerschmitt Company had been directed to use a steel-tubing structure for their glider, a technology they well understood. Ultimately, 200 Me321 *Gigants* were built, but Messerschmitt too had a tow-plane problem – no single aircraft in the Luftwaffe was sufficiently powerful. Much of the prototype testing was therefore done using an arrangement of three Messerschmitt Bf110 twin-engined fighters, called "*Troika-Schlepp*" or "triple tow". With the addition of take-off rockets under the wings of the giant glider, the triple-tow could *just* do the job, but exceptional airmanship was required and many accidents occurred during testing. One accident was by far the world's worst aviation disaster up until that time, with 129 fatalities. The Me321, fully-laden with troops, lost control after failure of the rockets on one wing, and dragged down all three tow-planes with it.

Hanna Reitsch tested the Me321 on its fifth prototype flight. She found it tremendously heavy and exhausting to fly. Eventually, cockpit size was increased to allow two pilots to apply their strength.

Finally, the Germans created a sufficiently-powerful tow-plane by joining together two bombers to produce a five-engined, twin-fuselaged aircraft called a Heinkel He111Z ("*Zwilling*", or twin).

Ironically, the Me321 glider was not used for an airborne assault, although attacks on Malta and a few other possibilities were proposed. The *Gigants* were employed in Russia as cargo-troop carriers. Eventually, each Me321 glider was fitted with six engines of its own, to become the Me323 transporter, called "the sticking-plaster bomber" in reference to its cheap canvas skin.



A five-engined, twin-fuselage Heinkel He111Z towing a Messerschmitt Me321 'Gigant' glider  
[Photo: Imperial War Museum, London]

### **Greek Tragedy – The Corinth Canal Bridge 26 April 1941**

As part of Germany's lightning invasion of Greece, six DFS-230 gliders captured a strategic choke-point where the Corinth Canal cuts through a narrow, rocky, isthmus linking the northern and southern parts of the country. Their objective was to cut off the Allied retreat across the only bridge spanning the deep canal cutting. They then needed to keep the bridge intact for the pursuing German forces to cross. While this glider assault was successful, the bridge was later demolished by Allied gunfire detonating the pre-prepared demolition charges.

### **Crete – Germany's Pyrrhic Victory**

After the Greek debacle, many of the surviving Allied troops, including large numbers of Australians and New Zealanders, were evacuated south onto the island of Crete. In response, the Germans planned a powerful air and sea assault on Crete. The Allied commanders, alerted to the German invasion plan by code-breaking, concentrated their defence around three key airstrips.

The German invasion of Crete opened on 20 May 1941. A small group of German DFS-230 gliders spectacularly over-ran the New Zealand anti-aircraft guns at Maleme airfield. However, without heavy weapons, the German airborne troops had great difficulty capturing a complete airstrip from which to be reinforced. Fighting raged around the various airfields for between two and ten days. The Germans were finally victorious, but their losses on Crete were over 400 aircraft, representing half the German transport fleet, and over 4000 killed. As a result, Hitler *forbade* any further German airborne assaults. This became a telling impediment in his invasion of Russia.

Despite Hitler's disillusionment with the Luftwaffe Airborne, they had impressed Winston Churchill. Even before the battle for Crete was over, on 27 May 1941, Churchill ordered the construction of a British: "...Airborne Division on the German model ...".

### **Allied Operation Husky Disaster – Sicily 9/10 July 1943**

By 1943, gliders had entered the Allied arsenal. Their first major operational test was the Allied invasion of Sicily, *Operation Husky*. Two-thousand British air-landing troops were embarked in 144 American-made gliders. The American CG-4A Waco was renamed the "Hadrian" by the British Army. Unfortunately, strong winds, darkness and flak caused chaos within the air-fleet. Seventy-eight gliders were released too early and ditched into the sea with the loss of around 250 air-landing troops. Nonetheless, a handful of glider troops captured the Ponte Grande Bridge, their key objective, and the Sicily invasion went ahead unimpeded.

### **Gran Sasso – the Freeing of Mussolini 12 September 1943**

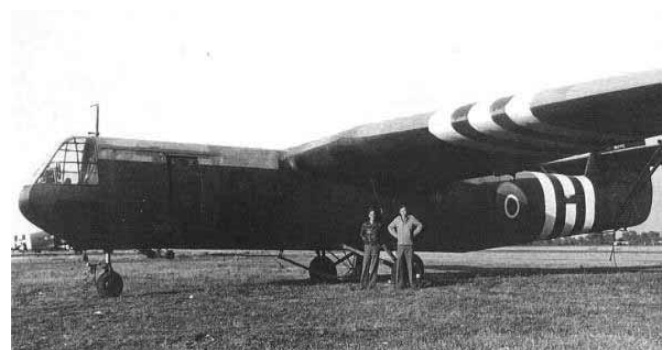
Italy surrendered and joined the Allied side, in co-ordination with the Allied amphibious invasion of Salerno on 3 September 1943. Just before the Italian surrender, the long-standing Italian dictator, Mussolini, had been deposed and confined in a mountain-top hotel at Gran Sasso, in the very centre of Italy.

As part of their efforts to re-establish fascist control over the Italian peninsula, the Germans decided to liberate Mussolini. They successfully assaulted the Gran Sasso hotel by surprise with DFS-240C gliders, which used retro-rockets for braking within the small area around the hotel.

### **"D-Day" – 6 June 1944**

The Allied Normandy invasion in 1944 had required years of planning; this gave gliders an important role in the rapid establishment of the Allied beach-heads. Six separate American airborne operations were carried out on D-Day. Five hundred gliders carried a total of 95 howitzers, 290 vehicles, 238 tons of cargo, and 4,021 men into France.

The British launched over 300 gliders on D-Day. The most spectacular episode was when five large gliders (British "Horsa" design, each with capacity for 28 troops) daringly captured the vital "Pegasus Bridge", which anchored the left flank of the British beach-head, within a few minutes.



A British 'Horsa' glider, which could carry up to 28 personnel  
[Photo: Imperial War Museum, London]

### **Arnhem – A Bridge Too Far – September 1944**

After the Allied breakout from Normandy, the pace of advance was generally so fast that many planned airborne operations did not come to fruition. The next focus for the Allied glider forces, now massively expanded, emerged as German resistance began to stiffen near their own border. At the same time, the Allied advance began to falter at the end of the long, thin, supply routes that still stretched back to the Normandy beaches.

A highly ambitious plan was conceived to cross the Rhine, break through onto the north German plain, and end the war before Christmas. The project, code-named "Operation Market Garden", became the biggest airborne assault in history. *Market Garden* aimed to capture an 80km-long corridor through Holland, which included six major water crossings where bridges had to be secured intact. Sixteen hundred American gliders were launched. Britain also dispatched 600 gliders to capture the furthest bridge, the Rhine crossing at the Dutch town of Arnhem.

To improve the safety of the operation, this was planned to be the first daylight airborne attack since the German effort in Crete in 1941. Sadly, limited availability of Allied transport aircraft meant that the air-drops had to be run over multiple days. Once the initial element of surprise had been lost, the German flak exacted a heavy toll on the slow low-flying transports.

American reporter Walter Cronkite arrived in a glider during *Market Garden*. He remarked: "...As a way to go to war: march, swim, crawl; anything. But don't go by glider!"

There was also an element of bad luck for Market Garden – the German units in the drop-zones turned out to be of much better quality than expected, and Allied ground forces were unable to follow-up fast enough. Almost all of the bridges were captured, with the vital exception of the final bridge at Arnhem; one bridge too far.

### **The Battered Bastards of Bastogne – "Battle of the Bulge", 26-27 December 1944**

As the winter of 1944 closed in, the Allied advance in Belgium and Holland had slowed almost to a halt. In the bitterly-cold and stormy Christmas season, the Allies were unexpectedly confronted by a major German panzer attack through the hilly Ardennes forests in southern Belgium. Ironically, this was the same German tactic that had shocked the Allies back in 1940. The United States defenders surrounded at the key cross-roads town of Bastogne were replenished by the deployment of 60 gliders containing ammunition and medical supplies.

### **Festung Europa ("Fortress Europe")**

By 1945, the Germans too were resorting to gliders to supply encircled troops. Some desperate re-supply

missions were flown into the narrow streets of cities besieged by the Russians, such as Breslau and Budapest.

### **Final Graduation – Operation Varsity – the Rhine Crossing, 24 March 1945**

By 1945, Allied glider assaults had become more professionally organised to allow the massed crossing of the Rhine in March 1945 to proceed relatively smoothly employing 1300 Allied gliders. Since adequate numbers of tow-planes were now available, the glider force achieved all of their objectives within one day. Some of the largest British gliders ("Hamilcar" design) even carried light tanks (M22 Locusts), although these did not play a large part in the battle.



A British 'Hamilcar' glider unloading an M22 'Locust' tank  
[Photo: Imperial War Museum, London]

### **Messerschmitt Me163 – the Ultimate Expression of Germany's Glider Fascination**

In the final years of the war, Germany developed another military glider. The Me163 point-defence fighter was launched with short-lived rocket propulsion and designed to be recovered as a glider. It could achieve very high speeds, even while gliding, due to its brilliant tail-less swept-wing design. This aircraft broke the World Speed Record by a large margin. Indeed, the overall concept of the Me163 had a similarity to the modern-day Space Shuttle.

Yet the Me163 had little influence on the course of World War II. Its lightweight skid-landing technique caused many accidents – not to mention the occasional explosion of the remaining dregs of rocket fuel. The pilots wore rubber suits to prevent being accidentally *dissolved* by fuel spills, and the peroxide fuel itself was highly perishable and increasingly unavailable by 1945.

### **The Colditz Prisoner-of-War Escape Glider**

Colditz Castle near Leipzig housed a high-security prisoner-of-war camp composed of repeated allied absconders. Despite intensive surveillance, some

Kenyan and British prisoners managed to secretly design and build a two-seater glider in the attic of the castle. The glider was ready to fly when the castle was liberated by American forces in April 1945. In 1999, a replica was constructed using authentic wooden bed-boards for the structure and varnished cotton bed-sheets for the skin: it flew without difficulty.

### Burma 1945

The war in Europe was over. In Burma, however, gliders were extensively used for occupying small jungle clearings behind Japanese lines. This allowed rapid construction of Allied airstrips, even overnight, which could then mount an all-round defence and protect the Allied eastern advance.

Mules were also flown in by glider to work clearing the airstrips. Apparently they made reasonable passengers. One unusual side-effect was that all the mules had their larynx surgically removed, to lessen excessive noise in the jungle.

Another problem presented itself as to how to recover the used grounded gliders, since there was insufficient runway length to allow a normal tow-off. An enterprising solution was to “snatch” the glider using a hook from a very low-flying C-47 cargo plane. These “snatches” were often done at night in the jungle clearings using only two small lamps to illuminate the waiting glider tow-rope.

### The Glider Pilot

One may wonder what sort of man would want to crash-land an un-powered, flimsy wooden crate into a battle zone. Jackie Coogan flew gliders in Burma. He had been a Hollywood child-star with Chaplin in the roaring twenties (*The Kid*, 1922). Before he joined up, Jackie married the global sex-symbol Betty Grable. He was later photographed in his glider-pilot uniform making a concrete impression of his wife’s famous legs in Hollywood Boulevard. The impression is still there. In the 1960s, Jackie played “Uncle Fester” in *The Addams Family* TV comedy, where he often electrified light bulbs using only his mouth. *That’s* the sort of man who became a glider pilot!



A ‘snatch’ of a Waco CG-4A by a C-47  
[Photo: United States Army Air Force]

### The Last Samurai

Huge numbers of gliders were assembled by the Americans for their planned invasion of Japan, *Operation Olympic*, which was scheduled for October 1945. Thankfully, this was not required. In fact, the last operational use of gliders over Japanese waters were of Japanese manufacture. The Japanese developed a manned glider-bomb, the *Okha*, launched from a mother-plane beyond the defensive range of its target, usually a naval ship. The pilot then made a suicide glide towards his target, boosting his speed in the final phase with a rocket motor. It was a frightening weapon, but ultimately a futile gesture.

### The End of Military Glider History

After World War II, gliders remained in military inventories for a few years, but they were never again used in military operations. Despite all the hard-won expertise gained with gliders during the war, the helicopter, another product of wartime inventiveness, completely replaced the glider’s role of delivering troops and ordnance into unprepared landing sites behind enemy lines. Even so, helicopters have never been able to match the low-cost and ease-of-production of gliders, nor the tactical surprise of a “silent approach”.

**The Author:** James Oglethorpe is an industrial engineer with a masters degree in business administration. His early career was with Qantas. Later, he worked as a consulting engineer for more than a dozen major international airlines, designing airline reservations and airport systems. Since 1996, James has run his own consultancy business, designing computer systems and business processes for companies in transport, banking, insurance, telecommunications, education and government services. He has always been interested in history. In 2007, he had a paper published in the United States *Journal of Military History*, which debunked an historical fraud involving Australian prisoners-of-war. James also maintains the Internet website for No 3 Squadron RAAF Association, which attracts an average of 300 readers each day from around the world. He originally researched this paper following a request from the Southern Cross Gliding Club in Camden.

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