The George W. Jalonick III and Dorothy Cockrell Jalonick Memorial Distinguished Lecture Series

The George W. Jalonick III and Dorothy Cockrell Jalonick Memorial Distinguished Lecture Series was established to inform and enlighten the public about the history of flight by bringing aviation notables to the Dallas community.

Dorothy and George Jalonick III were special friends of The University of Texas at Dallas and the History of Aviation Collection. This series was endowed in their memory by George Jalonick IV and friends of the Jalonick family.

The History of Aviation Collection

The University of Texas at Dallas houses a unique resource of aeronautical history known as the History of Aviation Collection (HAC). Located on the third floor of the Eugene McDermott Library in the Special Collections Department, the core of the HAC consists of four collections:

- The CAT/Air America Archive
- George Williams World War I Aviation Library
- Admiral Charles E. Rosendahl Lighter-Than-Air Collection
- General James H. Doolittle Collection

The HAC also holds hundreds of individual collections ranging from aviation pioneer Ormer Locklear to commercial aviation. In addition, the HAC includes more than 90,000 books, magazines and newspapers.
Good afternoon! It is a great pleasure to be with you today, and to offer a perspective on the role and significance of battlefield air attack during the Second World War.

We are, alas, living in an era when another generation of young Americans are performing with a dedication and courage that is extraordinary, even in comparison with their grandfathers - and great grandfathers - who fought from the hedgerows of France to the jungles of the South Pacific and the Arctic williwaws of the Aleutians, and all points in between.

As their predecessors were able to draw upon the joint-service American airmen for battlefield air support, so, too, are our forces today able to do so. And as a certain Mr. Al Zarqawi could attest, if able to speak, the capability and reach of our battlefield attack forces has never been as lethal or as swift as in the present day.

Where did it all begin? Back in 1911, actually, during an Italian-Turkish war in Libya. But it really expanded coincident with the Battle of the Somme . . . at that point, we had the emergence of frequent, if still relatively unorganized, ground attack. It was such a disconcerting experience that German troops felt it was a form of punishment, a strafen . . . and hence the word strafing in the present day.

By mid-1917, the first organized ground attack sorties were taking place across the Western Front. Attackers distinguished between “trench strafing,” which we would consider Close Air Support today, and “ground strafing,” which we would consider battlefield air support, or, more precisely, battlefield air interdiction (BAI).

One such attacker was the Royal Aircraft Factory F. E. 2b. The French Breguet XIV B2 typified one kind of battlefield attacker, the dedicated two-seat bomber. Two were used on an American Air Service on a mission at St. Mihiel in September 1918, where, arguably, we witnessed the first use of a Joint Force Air Component Commander - Brig. Gen. William “Billy” Mitchell, as he ran nearly 1,500 Allied aircraft in combined and
joint operations against the Germans. Aircraft like the Breguet rarely
descended to strafing altitude, but dispensed, instead, bomblets and small
bombs. For example, on June 4, 1918, 120 Breguet XIV bombers dropped
more than 7,000 bombs (approximately 60 per aircraft) on German forces
in a ravine near the Villers-Cotterets forest, preventing them from massing
for an attack on Allied positions. The bombers had multiple small bomb
racks under the inner portions of the lower wings.

The Allied approach towards ground attack - specifically the British
approach, as it was the Royal Flying Corps (subsequently the Royal Air
Force after April 1918) that pioneered ground attack - was the “bomb­
loaded fighter.” With the appearance of fourth-generation fighters by mid­
1917 such as the S.E. 5a, or the Sopwith Camel, the RAF possessed
“swing role” aircraft that could capably undertake an air-to-air mission, or
an air-to-ground mission. The important point here is that these were
attack aircraft that were first designed as fighters, and thus not vulnerable
to enemy fighters as a specialized ground attack aircraft usually was.

When performance disparities between fighters and attack aircraft were
small, as in the First World War, the specialized ground attack aircraft was
not at any great disadvantage. But later, when disparities were great - in,
for example, the Second World War, the specialized ground attacker was
far more vulnerable.

Even fighters proved surprisingly vulnerable to ground fire. To give an
eample, in February 1918, the RAF lost 91 aircrew killed or missing. In
March, marking the onset of the great German offensives of 1918, the
RAF nearly tripled this, to 245 KIA/MIA, most lost on ground attack.
One S.E. 5a pilot wrote “Our low work today has been hellish. I never did
like this ground strafing.” Strafing, incidentally, is a German word, from
strafen, to punish. The Germans used it to describe Allied air attacks
against their positions as early as 1916.

The solution, the RAF believed, was to greatly armor fighters. An
armored variant of the Sopwith Camel, which perhaps should have been
named the Sopwith Flying Pig, did not enter service. Ultimately this phi­
losophy led to a dedicated British ground attack fighter, the Sopwith
Salamander, which was ready to enter service at the very end of the First
World War. The comparison I would make would be between this aircraft
and a local Dallas product, the Vought AU-1 (the F4U-7 pour les
Française), derived in the Korean war from the F4U Corsair. The German
approach was different.

The German air service, the Lufstreitkräfte, called ground attack aircratc
Schlachtfliezer, developed them as specialized types, and put them
in specialized squadrons called Schlachtsstaffeln, or Schlasta. In response to
High Command fears about large numbers of American forces entering the
war, the German Inspectorate of Flying Troops, the Idflieg, launched a
program to produce an all-metal ground attack aircraft designed by the
Junkers firm, which had flown the world’s first practical all-metal aircraft

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in 1915. This aircraft, the Junkers J I, was fitted with a 5mm chromenickel steel “bathtub” shell enclosing the crew, engine, and fuel, and had up to five machine guns, including two firing downwards.

Junkers himself was not happy with this aircraft, feeling it was too compromised by Idflieg, and by his association with Anthony Fokker which was, to say the least, very problematical. And so Junkers’ approach was to build the Junkers CI I, designed by Otto Reute. It was a two-seat derivative of the Junkers D I monoplane fighter. The significance of this aircraft went far beyond the Schlacht mission. Indeed, we have here the basis of the subsequent air transport revolution, for it was from this basic concept that Junkers eventually derived, in early 1919, the J 13, which became the F 13, the world’s first all-metal monoplane airliner, and progenitor of an immensely successful family of transport aircraft culminating in the Junkers Ju 52 of the early 1930s.

Aircraft of this type did see service very late in the war, but were used more extensively in fighting with the so-called Freikorps in the Baltikum, the Baltic region, after the war, between various factions.

In conclusion on the Schlachtflieger, I would point out that the German ground attack forces followed an offensive air doctrine emphasizing crossfront lines and both deep and close attack. Ironically, throughout the First World War, the German fighter forces fought a generally defensive war, rarely at best crossing the front lines. This was in profound contrast to the British and French, who flew offensive counter-air and fighter sweeps throughout the war, particularly after 1916.

There were many lessons learned from the Great War, and, unfortunately, this wasn’t one of them. We appreciated the armored airplane, but we hamstrung it with a triplane configuration and also with an already outdated pusher bomber configuration. The infamous GAX was tested at McCook Field and actually produced in some small numbers right after the war. It was not, in any case, a worthwhile aircraft, being slow, noisy, and a huge target. Not least of its problems, the pilot looked out of the airplane through thin eye slits, much like a medieval knight. And he had just about as much effective vision.

For virtually all air forces, the early interwar years were characterized by development of multipurpose two- or more-seat aircraft that could be applied to artillery fire control, direct attack of enemy forces, and reconnaissance. These befitted the many small wars of the interwar era, particularly those involving so-called “air control” operations such as the French and Spanish undertook in Morocco, the British in the Transjordan and Iraq, and the Italians, more infamously, during the Abyssinian war of 1935. The Italian Meridionali Ro 37 recce and attack aircraft, which flew in Abyssinia and later in the Spanish Civil War, was typical of such designs. By the mid-1930s, however, the proliferation of rapid-firing heavy machine guns and light cannon was rendering such aircraft obsolete very quickly, much as the introduction of the shoulder-fired heat-seeking missile profoundly changed battlefield air operations from Vietnam onwards.
It is worth noting that, much as Giulio Douhet greatly influenced the subsequent development of strategic bombing thought, it was Amadeo Mecozzi, another Italian general, who developed a prescient doctrine of ground attack operations. The Regia Aeronautica, the Italian air service, much as Germany earlier, developed specialized ground attack formations, the so-called gruppi di assalto.

The Spanish Civil War witnessed a profound clash in operating doctrines between the forces of the Soviet Union and the forces of Nazi Germany and Fascist Italy. They shared many similar views on the use of military power, particularly in combined arms air-armor-artillery assaults. The Soviet ground attack aircraft, the Polikarpov R-5, flew with the so-called Spanish Loyalists. Aircraft of this type played a major role in the pivotal battle of Guadalajara in 1937, which effectively saved the Spanish republic from an immediate collapse.

Although Italian airmen contributed markedly to the ultimate success of Franco’s Nationalist forces in the Spanish Civil War, it has been primarily the Germans that have drawn the greatest attention, with the deployment of the Condor Legion to Spain in 1936. The Condor Legion was, in many ways, like an air expeditionary force in the present day, with multiple capabilities across fighter, strike, recce, air transport, and special operations. In the war, it made extensive use of ground attack aircraft, both fighters used in the role, and primarily, specialized attackers such as the Henschel Hs 123 Schlachtflugzeug, after delivery to a Spanish nationalist ground attack unit. Such aircraft, and others, played a major role in shattering Loyalist forces, particularly in the Ebro offensive in July-November 1938. One Loyalist veteran referred to the sky being “black with their planes bombing and strafing every minute.”

In particular, Spain marked the emergence of the dive bomber as a specialized ground attack system. This is the Junkers Ju 87B-1 Stuka, short for Sturzkampfflugzeug, or “Diving Battle Plane,” flown with the Condor Legion’s Kampfgruppe 88 (Battle Group 88) Germany did not invent the dive bomber, rather it was inspired by the U.S. Navy, which
built upon the experience of the U.S. Marine Corps in Nicaragua, itself inspired by RAF experiments in the First World War. The Stuka very quickly proved an excellent aircraft for pin-point attacks against fortifications, shipping, and other targets requiring precise attack. It was so successful that people missed its innate vulnerabilities to opposing fighters, which the Second World War would reveal very quickly. Specialized ground attack aircraft, by the time of Spain, were already showing that they needed air supremacy as a necessary precondition for their best use. This was not the case with fighter aircraft acting as fighter-bombers.

“By 1938... Air power had become capable of taking over a large share of the functions of artillery. In particular it would take over the function of supporting tanks and motorized infantry. As a flying artillery, planes could do what guns used to do in Napoleon’s hands: blast open a breach in the enemy’s position for decisive manoeuvre.”

- Tom Wintringham, Loyalist veteran of the International Brigades

This is an interesting comment on Spanish war air power. People took away from Spain what they wished to believe, and there were others who did not see air in such a decisive role. Nevertheless, there was more truth in this statement, as the Second World War would subsequently reveal, than critics might have expected.

Spain was not, of course, the only arena of conflict in the late 1930s. China was as well, where Japan, which had moved very rapidly in developing its military aviation, explored its own doctrines on the use of aircraft. The Fiat Type I, an Italian bomber in Japanese service, was equivalent to the Italian B.R. 20. While such aircraft were used primarily to terror-bomb Chinese population centers, the Japanese did use them as well, and a range of later types, to attack Chinese military targets.

Despite popular accounts that still appear that depict the Japanese military as essentially walking all over the Chinese, quite the opposite was the case. All through the late 1930s, the Japanese found they could not decisively defeat the Chinese air force, nor defeat its army. The need for specialized ground attack led them to exploit foreign aircraft design techniques drawn from American and German engineering practice to produce innovative ground attack aircraft such as this Japanese Army airplane, the Mitsubishi Ki-51, code named “Sonia” by the Allies in the Second World War.

While hardly decisive, Japanese ground attack operations did contribute to the relative success of Japanese ground forces. During the battle of Taiyuan in Sept-Nov. 1937, for example, Japanese attack aircraft struck repeatedly at Chinese troop concentrations, supported the advance of infantry by bombing ahead of them, and harassed retreating Chinese columns. The general ability of aircraft like this to operate over China, like the ability of attack aircraft to operate relatively freely over Spain, said
more about the nature of the air war than the value or survivability of
these kinds of aircraft. Japan was not alone in this, for the Chinese operat-
ed similar specialized ground attack aircraft, for example the export ver-
sion of the Curtiss A-12 Shrike, a favorite and much-loved mount of the
U.S. Army Air Corps in the same time period.

Chinese ground attack operations were not terribly successful, thanks
in large measure to Japan’s use of fighters for defensive counter-air oper-
ations over the front. But the Japanese had far less success when they flew
against the Soviets at Nomonhan/Khalkin-Gol at the end of the decade. In
those two short and very savage actions, Japan learned first-hand that the
Russian experience in Spain had resulted in a core of air, artillery, and
armored force commanders who knew how to use and exploit combined
arms warfare.

At Nomonhan, from May through September 1939, casualties to
Japanese forces were about one third of the total deployed in battle -
approximately 20,000 out of 60,000 troops. Soviet airmen aggressively
attacked Japanese troops, flying aircraft such as the Polikarpov I-153
Chaika, and often combined air, artillery, and armor attack simultane­
ously. The local Soviet commander subsequently wrote that “The strike of our air
force and artillery was so powerful and successful that the enemy was
morally and physically suppressed and during the first hour and a half
could not even open artillery fire.” That commander, incidentally, was
General Georgi Zhukov, who was, of course, subsequently victor at the
pivotal Battle of Moscow, and a future Marshal of the Soviet Union, an
individual who was a master of combined arms warfare, particularly in
using tactical air power, artillery, and armored forces together.

The major aeronautical revolution that had taken place in the inter-
war years had resulted, at the beginning of the 1930s, in twin-engine com-
mercial high-speed aircraft having generally higher performance than
existing military machines. This was most pronounced in the United
States, and this influence swiftly translated into higher-performance light
bomber and attack aircraft, typified by the Bristol Blenheim in Great
Britain and the Dornier Do 17 in Germany. The Blenheim was remarkably
forward-looking for its day, but the pace of aeronautical development was
so swift that it was quickly rendered obsolescent, and nearly obsolete alto-
gether, by the outbreak of the Second World War. In the United States, this
trend had resulted in aircraft such as the Martin A-22, which, as the export
Model 167F, was sold to France in large numbers prior to the Second
World War, and the Douglas A-20A Havoc, shown on page 7 in desert
training exercises with U.S. Army Stuart light tanks in the Mojave Desert.

Such low-level attacks were utterly impractical for such large aircraft,
as the French would find out with their Martin 167s, the British with their
Blenheims, and, for that matter, the Germans with their Dornier Do 17s
and Junkers 88s. Note, for example, that each tank is tracking the bomber
with a machine gun. Only the much faster and agile fighter-bomber could
expect to get away with such attacks.
Once war broke out, as modern as aircraft such as these Fairey Battles might have looked, they were woefully vulnerable to light antiaircraft fire. When Battles of Britain's Advanced Air Striking Force in France in May 1940 attacked fixed targets such as bridges, they were massacred. To give several examples, on May 10, the opening day of the war in the West, 13 of 32 Battles were lost attacking German columns in Luxembourg, a 41 per cent loss rate. On May 11, 7 of 8 were lost on another attack, an 88 per cent loss rate. On May 12, five out of five - a 100 per cent loss rate - were shot down attacking bridges near Maastricht, the fortunate crew of one airplane receiving a reprimand from a German officer on the futility of attacking heavily defended targets! Nor was this all...

France's small twin-engine Breguet 693 proved equally vulnerable, despite being faster than the Battle. Five of six were lost in one raid on German road traffic near Tongres, in attacks the French termed "très coûteuse:" "very costly." Clearly, under conditions where a combatant was fighting without air superiority, the low-level attacker had to be a smaller, faster, and altogether more agile vehicle - and that argued powerfully for the fighter. In contrast the Nazis were fighting under conditions where they totally dominated the air war. In these conditions, their specialized bomber, attack, and dive bomber forces could operate with impunity. When that was coupled with an evolving combined arms strategy and an opponent who, despite some generally unrecognized strengths and material advantages, was already demoralized and incapable of dynamic reaction, the stage was set for collapse. That collapse began on May 13, 1940, at Sedan, when Heinz Guderian's XIVth Panzer Corps, comprised of three Panzer divisions crossed the Meuse.

During this crossing, German air attack played a crucial role. First, Dornier bombers attacking from level flight struck at deployed French forces, the 71st Infantry Division below Sedan, which was thus prevented from coming to the aid of forces defending the Meuse, and, especially, the 55th Infantry Division deployed on the Marfée heights, with the Marfée
woods behind. Then, Stuka dive bombers attacked French artillery emplacements, strong points, and points of resistance. Then as assault troops crossed the river, Henschel attack bombers and other attack aircraft supported them with direct fires, complementing artillery fires, and, as well, the direct fire of Luftwaffe 88mm flak cannon used in a counter-emplacement role. Other strike aircraft remained on-call, attacking targets of opportunity that appeared. It is worth noting that this is probably the single finest example of German air-land cooperation in the war, yet it was largely by accident! Guderian’s commander Generalfeldmarschall von Kleist, saw no need for anything more than a single bombing raid at the beginning of the attack, and arranged with the Luftwaffe chief of Luftflotte 3, Hugo Sperrle, for just one attack.

But the commanders of the II Fliegerkorps (Bruno Loerzer) and the tactically-oriented VIII Fliegerkorps (Wolfm von Richthofen) ignored Luftwaffe general Hugo Sperrle’s orders to limit the strikes to just one attack. French resistance, while futile, was spirited enough that, in the absence of the continuous and diverse attacks shown here, the crossing might well have been seriously delayed. By midnight, German forces held the opposite back of the Meuse, and German panzers were beginning to cross. The stage was set for the utter destruction of France six weeks later. Fortunately for the world as we have come to know it, Britain did not follow the course of France, thanks in very large measure to the men and women of the Royal Air Force. And within two years, Germany would get a taste of air-land warfare itself, in the Western Desert. Fighting here between German and British (and later American) forces was characterized by operations over great distances, in fact, operations that in many ways were more akin to the operations in the Pacific from islands, rather than the kind of flying seen in Europe. Since both sides used long mobility columns and easily located lines of communication and logistical support, both were vulnerable to air attack.

It was also a war in which the growing linkage between intelligence and reconnaissance, applied to combat strike operations, grew to great importance, foreshadowing the kind of ISR network we see in place in modern combat operations. While the Germans relied on traditional support systems such as the Stuka dive bomber, the British made extensive use of fighter-bombers, beginning with OPERATION CRUSADER in November 1941, foreshadowing future Allied practice, particularly two variants of the Hawker Hurricane fighter.

Shown on page 9 is the Hurricane Mk IIC, sometimes called the Hurribomber. With four 20 mm cannon and bombs, it was a formidable ground attacker, and a true swingrole fighter. In addition The RAF operated a dedicated anti-armor version of the Hurricane, the Mk IId with two 40 mm cannon. The Hurricane IId was a very effective anti-armor aircraft. Four of these aircraft, on a single mission, destroyed five tanks, five trucks, and an anti-aircraft gun. But as effective as these could be, it took well over a year before Britain developed an effective air-ground operating doctrine.
That it did so was a tribute to an innovative New Zealand airman, Air Vice Marshal Sir Arthur "Mary" Coningham. He:

- Established a "bomb line" beyond which RAF could operate freely without excessive coordination
- Created mobile radio-equipped Forward Air Support Links at Brigade and Division level to control comm with aircraft and also with their own HQ.
- Located an Air Support HQ co-located at Corps HQ to improve coordination

Result: Air Support cut from 2-3 hours (!) to 35 minutes

Coningham is clearly the most important figure in the evolution of Allied Air Support Doctrine, because his fingerprints and practice are on all subsequent aspects of it - for the British, and for the Americans, as well. The "bottom line" of course, is how it all worked against the Nazis.

**EXCERPTS FROM ROMMEL'S DIARY**

"Non-stop and very heavy attacks by the RAF... pinned my army to the ground."

"The possibilities of ground action, operational and tactical, become very limited if one's adversary commands the air."

"Anyone who has to fight, even with the most modern weapons, against an enemy in complete command of the air, fights like a savage against modern European troops, under the same handicaps and with the same chances of success."

I think these statements are self-explanatory. Now Rommel was seeing what was happening on the ground. What was behind the scenes was even
perhaps more interesting. There was the exploitation of signals intelligence and message traffic, the so-called Ultra Secret, which enabled Allied forces to target his supply convoys from Italy. These were savaged by British U-boats, but particularly from aircraft based at Malta and in Egypt. There was, as well, a robust aircraft supply chain delivering large numbers of aircraft into the Middle East, particularly after America entered the war. Rommel clearly realized that things had changed dramatically.

“In every battle to come the strength of the Anglo-American air force was to be the deciding factor.” - Erwin Rommel

Hence this extraordinary statement, reflecting his experience both in the Desert and at Normandy, later.

KASSELINE PASS: LESSONS LEARNED

1. Scrap FM 31-35; Replace with New Doctrine
2. Emphasize Air-Ground Training
3. Emphasize use of Fighter-Bombers, not specialized attack aircraft
4. Adapt Coningham Practices

In February 1943, America had two notable battles. In the Pacific, George Kenney’s airmen, in conjunction with the Royal Australian Air Force, destroyed a Japanese convoy seeking to resupply New Guinea in the Battle of Coral Sea. In Africa, the U.S. Army suffered a humiliating defeat at the hands of Rommel’s beleaguered Afrika Korps. At Kasserine, Major General Lloyd Fredendall’s II Corps was theoretically supported by the XIth Air Support Command but, in reality, the control procedures were so complex according to the doctrine of FM 31-35 (issued in April 1942), that there was no possibility of it ever furnishing timely air support. After Kasserine, Dwight Eisenhower had a special study team put together a new doctrinal framework which was issued by Chief of Staff George Marshall in July 1943, FM 100-20

FM 100-20: THE ARMY AIR FORCE’S “DECLARATION OF INDEPENDENCE”

“Land Power and Air Power are Co-Equal and Interdependent Forces; Neither is an Auxiliary of the Other.”

1. Gain Air Superiority
2. Prevent Movement of Forces and Supplies
3. Support Combined Arms Battlefield Operations

These are the central tenets of FM 100-20. While critics called it a “Declaration of Independence,” it was more a growing recognition of a separation that had been occurring since the time of the First World War.
The prioritization of air missions was critical, as it laid out the conditions for successful application of battlefield air power. Without control of the air, all other missions are compromised. Therefore the greatest priority was, understandably, gaining and holding air superiority.

FM 100-20 governed American battlefield air support and air operations in general through the rest of the war. It complemented Coningham’s air support pamphlet issued throughout the RAF and British Army, and no wonder: in places it has the same text, for Coningham’s pamphlet had been sent to Washington by Assistant Secretary of War Robert Lovett and reviewed by Eisenhower and others.

Although we experimented with Dive Bombers - the Vultee A-35 comes to mind, and the earlier Douglas A-24, equivalent to the Navy SBD, and then the A-36A Invader, an Allison-engine dive bomber variant of the P-51A fighter, when we actually operated these in combat in Sicily in 1943, we tended to wire the dive brakes shut and operate them instead as classic fighter-bombers. The fighter-bomber proved such a natural idea and so useful that Germany quickly picked up on it as well, first with modified Messerschmitt Bf 109 and Bf 110 aircraft and then, much more successfully, with the Focke Wulf FW 190. The armored variant of the FW 190 did not have so great a performance disparity from the FW 190 fighter that it could not be used in the counter-air role. But as good as it was, the introduction of powerful air superiority aircraft such as the superlative Merlin-engine version of the P-51 Mustang shown here, so compromised German air operations that even German fighters could no longer operate with impunity. Between the beginning of 1944 and D-day, Germany lost nearly 2,300 fighter pilots, and 25 per cent of Germany’s active duty fighter force were lost in one month, May 1944, alone. The very survival of German air forces in the West became questionable. After the spring of 1944, for example, German FW 190 ground attack aircraft were withdrawn from Italy and sent to Russia because they could not longer be expected to survive if sent to France! Thus, the Allies had such a great disparity of forces that the German ground attack forces had to be withdrawn to ensure their own survival precisely at the moment when they were needed the most.

When Eisenhower stepped ashore at Normandy, as he recognized, he had not merely air superiority, but air supremacy. Covered by such
supremacy, fighter-bombers and other support aircraft could be used to
great effect against Nazi fielded forces.
These included the Republic P-47 Thunderbolt, the finest all-round
fighter-bomber of the Second World War, a superb swing-role aircraft.
Notice the over large and "double" insignia under the wings to prevent
trigger-happy GIs from shooting down their own air cover! The P-47's

![Republic P-47 Thunderbolt](image)

British equivalent was the Hawker Typhoon, armed with 4 20 mm cannon
and either two 500 or 1,000 lb. bombs or, more typically, eight 60 lb. rock-
ets, as shown here.

In strikes before the invasion and afterwards, "classic" attack aircraft
such as the A-20 operated largely indistinguishably from medium bombers
such as the B-25 and the B-26. They were not immune to loss.

At D Day, not including bomber forces, the British and Americans had
171 squadrons of fighters furnishing cover and direct and indirect support
to the invasion forces. Immediately the presence of Allied air power
forces were felt. The Panzer-Lehr Division lost 200 vehicles in one day to
such concentrated air attacks that they called it a "Jabo-Rennstrecke": a
Fighter-Bomber Race Course. 2nd SS PZ Division was delayed reaching
the front and took heavy losses. Fuel attacks and transportation attacks on
rail and roads were highly successful. We can see the effect this has in the
comments and jottings of Rommel and his senior naval aide, Admiral
Friedrich Ruge, and other German personages.

![Hawker Typhoon](image)
GERMAN REACTION AT NORMANDY

“Our movements are extremely slow” (Ruge, June 9)

“The enemy’s air superiority has a very grave effect on our movements. There’s simply no answer to it.” (Rommel, June 10)

“...utilization of the Anglo-American air force is the modern type of warfare, turning the flank not from the side but from above.” (Ruge, mid-June)

“Where is the Luftwaffe?” (German Army Colonel, July 6)

These are but a few, and of course, Rommel himself was then removed from the fight when his car was strafed by two Spitfires! A roving RCAF Mustang reconnaissance aircraft, specially assigned to look for German staff cars, spotted his vehicle, relayed course, direction, and speed, and then two Spitfires were assigned to strafe it. Rommel was seriously injured when the car crashed, and his recovery was prolonged past the attempt on Hitler’s life. Rightly or wrongly implicated in the plot, he was coerced into committing suicide, an indirect result of Allied battlefield air attack.

The Allies were particularly good at moving armored forces through German opposition thanks to using air power to break ambushes and frustrate attacks even by large forces. Let’s see how this might work on a fairly large scale, using division-size combatant units belonging to the U.S. First Army, supported by the Ninth Tactical Air Command.

Here is a notional representation of the IXth Tactical Air Command Immediate Support System, as it functioned in the summer and fall of 1944. The tactical presentation is simplified, reduced to one American armored division and an American infantry division that are approaching a hill with a dug-in German mechanized infantry division, located ahead of the bomb line. The line of contact, what is also called the forward line of troops (FLOT) is indicated by the red-and-black checked line.

Advancing armored units had fighter pilots on rotation who served with them as forward air controllers, working as part of a Division Air Ground Coordination Party, which, in this case, is shown attached to both the armored division and the infantry division. The Corps Headquarters has an attached Corps Air Ground Coordination Party as well. Further to the rear is the headquarters element of the First Army, and the headquarters element of the Army Air Forces’ 9th Tactical Air Command.

There is a Combined Operations Center and an affiliated Combat Operations Center composed of Army G-2 (intel) and G-3 (operations) staff sitting with their TAC counterparts, the A-2 for air intelligence and the A-3 for air operations.

There is a Tactical Control Center (TCC), also called the Fighter
Control Center. And there is a Forward Director Post, which uses SCR-584 microwave radar early warning to keep track of the air situation.

As our scenario opens, the dug-in mechanized infantry division has been spotted by forward elements of the armored division, who inform the Division Air Ground Coordination Party. The Division AGCP has a Tactical Air Party Officer (TAPO) and a Division G-3 (Air) and they send a direct support request to the Army G-3 at the Combined Operations Center (COC). The Armored Division Air-Ground Coordination Party also informs the Division Air-Ground Coordination Party for the Infantry Division, and the Corps G-3 (Air) at the Corps Air Ground Coordination Party so the Corps AGCP can monitor and if necessary, intervene.

The battle staff of the Combined Operations Center consults with 1st Army HQ and with 9th TAC HQ on the direct support request. Then the Army G-3 and the Air A-3 at the COC approve it. With the request approved at the COC, the A-3 at Combat Ops relays the support request and a recommended course of action to the Tactical Air Control Center (TCC), also termed the Fighter Control Center. The Tactical Control Center relays the approved strike request to airborne “on call” fighter-bombers, as the Forward Director Post monitors the net. As the Strike Flight Approaches the Panzer Division, the Forward Director Post, using SCR-584 radar, furnishes precise guidance and navigation cues, as well as any other relevant information. Meanwhile, the Division Air-Ground Coordination Party arrange for targets to be marked with smoke and also for suppressive artillery fires to suppress enemy air defenses.

And finally, as lead the Division Air-Ground Coordination Party maintains communication and provides final cuing for the strike flight as it attacks the target. With the Nazi armored threat neutralized, the armored division and infantry division are free to exploit maneuver and engage in their own combat, advancing the Allied line. Allowing for the old Clausewitzian dictum that “no plan survives contact with the enemy,” nevertheless this was the basic system that the AAF and British generally followed in confronting the Nazis in 1944-45.

It was particularly significant in several key actions:

**TAC AIR STANDOUTS (1)**

**Operation Cobra, 24-25 July 1944**

“The digging-in of the infantry was useless and did not protect against bombing... the same happened to guns and tanks... only particularly strong-nerved and brave men could endure this strain... For me, who during this war was in every theater committed at the points of the main efforts, this was the worst I ever saw.”


Cobra, at St. Lo, shattered the German Panzer Lehr division by two days of air attacks, mostly by level-flying heavy bombers, and created a
gap in the German lines that permitted Gen. J. Lawton Collins’ 7th Corps to begin the breakout across France.

Unfortunately, due to inadequate planning and sloppy execution, there were incidents of short drops on friendly forces that killed over 100 GIs and wounded approximately 500 others, most notoriously, Lt. Gen. Lesley J. McNair, the chief of Army Ground Forces and, ironically, a staunch opponent of the growing independence of the Army Air Forces!

Of Cobra, Gen. Omar Bradley later wrote that it “had struck a more deadly blow than any of us dared imagine.”

Dwight Eisenhower, in his Supreme Commander’s Dispatch, wrote “The closeness of air support given in this operation thanks to our recent experiences, was such as we should never have dared to attempt a year before. . . .these regrettable losses were part of the inevitable price of experience.”

**TAC AIR STANDOUTS (2)**

*Battle of Mortain (6-12 August 1944)*

“The chief credit in smashing the enemy’s spearhead must go to the rocket-firing Typhoon planes of the 2nd Tactical Air Force. . . the enemy attack was effectively brought to a halt, and a threat was turned into a great victory.”

- Gen. Dwight Eisenhower

Mortain in a nutshell:
- Attempt to split Allied invasion forces
- 5 Panzer Divisions Attack at midnight
- US 30th Infantry Division besieged
- Air support critical, as Eisenhower clearly indicated.

**TAC AIR STANDOUTS (3)**

*Falaise-Argentan Pocket (6-12 August 1944)*

“The very strong low flying attacks caused high losses. . . Units of the Army were almost entirely destroyed by low flying attacks and artillery.”

- Gen. Maj. Rudolf von Gersdorff

“The movement of large vehicles during the hours of daylight was practically tantamount to their certain loss.”

- Gen. d. F-A Wolfgang Pickert

German forces were finally undone in France at the week-long collapse of the Falaise-Argentan pocket. Here combined arms air and artillery attack destroyed the German Army as a fighting force in France. 10,000 troops died, 50,000 were taken prisoner, 350 tanks, 2,500 other vehicles, and 250 artillery pieces were lost in the northern sector of the front alone.

To give some comparison, a Wehrmacht armored division typically had 160 tanks and 3,000 other vehicles. The 1st SS Panzer withdrew with
"weak infantry" and no vehicles; 2nd Panzer had on battalion, no tanks, and no artillery. 12th SS Panzer had 300 soldiers and no tanks. 21st Panzer had four battalions of troops and 10 tanks; 116th Panzer had two battalions, 12 tanks, and 2 artillery batteries. Particularly useful were:

Artillery spotters and night attack aircraft like the De Havilland Mosquito and the P-61 Black Widow were particularly feared by German forces. Artillery spotters, often doubling as rudimentary forward air controllers, kept German forces pinned in place. Night attackers removed the one sanctuary left, namely the limited night hours available for movement. (When one considers how short a European summer night is, one realizes the predicament that the German forces were in).

The bottom line is . . .

"In my opinion, our close cooperation is better than the Germans ever had in their best days."
- Gen. Omar Bradley, 12th Army Group, in a letter to Army Air Forces Chief Gen. Hap Arnold, Sept. 1944

When one thinks that Bradley, just eighteen months before, had been an unabashed critic of air power, one realizes how far he - and how far air support - had come from Italy to France. After September 1944, the only option for German ground forces in the West was to move by night; roads had signs warning that vehicle could come under attack from Allied "Jabos:" Jagdbomber, that is, fighter-bombers. When, for example, Hitler had his final planning meeting with the German general staff prior to launching the offensive that we know as the Battle of the Bulge, he made a point of mentioning that he had timed it to occur when weather would interfere with Allied air operations. Yet even there, and even before the weather broke, Allied air attack, particularly against fuel stocks, was profoundly dislocating to enemy forces.

If this is what happened in the West, what happened in the East?

TACTICAL AIR POWER ON THE RUSSIAN FRONT 1941-1945

Now a few words on the Russian campaign. When Hitler went to war in Russia in 1941, he had every expectation of a quick victory. In the first week of the war, for example, 4,000 Soviet airplanes were destroyed, 1,800 on the first day alone. German forces were very confident: one Stuka pilot recollected:

"All of us were still sure of victory, even somewhat overbearing, not knowing what kind of winter was ahead of us . . . . Our Generaloberst hovered in his Fieseler Storch, equipped with a radio-telephone, over the Russians as though they were flocks of sheep, directing single Stuka and Schlachtflieger units to targets spotted by him."
- Paul-Werner Hozzel
But thanks to many different factors, it was Nazi Germany that collapsed utterly, not Stalin's seemingly vulnerable state. In part this was because of the multi-front war Hitler had brought upon himself, in part because in Russia, unlike over Western Europe, he was simply unable to secure adequate air superiority to offset a tremendous Soviet investment in military forces. But in very large measure, it was due to the quality of Soviet equipment and forces themselves.

For example, this is the iconic Soviet ground support airplane, the powerful and heavily armed Ilyushin II-2 Shturmovik. Variants of this were armed with up to 37 mm cannon, carried heavy bombs, dozens of bomblets, rocket projectiles, or even torpedoes.

It was, without a doubt, the finest single-purpose attack airplane fielded by any nation in the Second World War, and this in large measure was due to its tremendous power and relatively streamlined design, which gave it near-fighter performance, thus reducing the classic disparity between fighters and attack aircraft that worked so much against other attack airplanes.

The only aircraft that really comes to mind that matches or exceeds this aircraft was Ed Heinemann's superlative postwar Douglas AD Skyraider of Korean and Southeast Asian fame. But the II-2 was not Russia's sole air support aircraft. Here is a relatively unappreciated design, the Petlyakov Pe-2, the Peshka. It was a dive-bomber and also an extremely effective low-level ground attacker. Complementing these were large numbers of Soviet fighters and lend-lease American aircraft such as the Douglas A-20.
and, particularly, the Bell P-39 Airacobra. A late-model P-39Q was extensively used by the Voyennno Vozdashyne Sily (VVS, the Soviet Army Air Forces) as a low-level fighter and ground attacker. Incidentally, for those aircraft buffs familiar with the P-39, this had a four-bladed, not three-bladed, prop.

The Luftwaffe operated the entire panoply of their air force that had been seen, with some interesting differences from what they did in Western Europe and North Africa. For example, they made more use of fighter-bombers, such as this Bf 109E of Schlachtgeschwader 1. The mass nature of Russian Front warfare encouraged both sides to use bomblets and cluster munitions such as these 50 kg. antipersonnel bombs shown here on this FW 190F Schlachtjager.

The Stuka dive bomber which was used in its traditional diving attack role was also used as a cannon-armed anti-tank aircraft equipped with two 37mm. cannon. Using the combination of this cannon and conventional diving attacks, Stuka pilot Hans Ulrich Rudel was credited with over 500 destroyed tanks during his Eastern Front career.

Henschel introduced the Hs 129 aircraft, which could be equipped with either a 37mm or a 75mm. cannon in a belly pack. Heavily armored, it was as effective as the Il 2 as a tank-buster, though it lacked its overall performance. The culmination of both Soviet and German ground attack doctrine and practice on the Eastern Front came at the climatic battle of Kursk, in July 1943. At Kursk, the Luftwaffe fielded approximately 1,800 aircraft, including 450 attack aircraft and 500 bombers. The Soviet Union had about 2,900, including 940 attack aircraft and 900 bombers. At least 5,500 tanks were involved in combat, approximately 3,300 on the Soviet side.

Hitler's intent was to straighten the front and preempt any possible Soviet offensive by undertaking a massive pincer attack on the Kursk salient with this result. Russia's intent was also straighten the front, by pinching the Orel salient. This set the stage for a titanic clash of armored and mechanized forces. From the outset, German forces made surprisingly slow progress against heavily echeloned Soviet defenses in depth. Where the Germans enjoyed local air superiority, their ground attack aircraft enjoyed good success. Rudel, for example, claimed 15 tanks. But where they did not, their ground attack aircraft were harassed and driven from the battle space. German Sorties Fell precipitously. German sortie rates fell from approximately 4,300 on July 5, the opening of the offensive, to 2,100 on July 6, 1,162 on July 7, 870 on July 8, and down to 350 on July 9, with the decline in German air superiority, Soviet anti-tank aircraft were able to operate with increasing assurance.

On July 7, one Il-2 attack cost a German tank division 70 tanks in 20 minutes. In another series of attacks over four hours that same day, another German division lost 240 of 300 tanks. On July 8, the German offensive ground to a halt. By July 11, by German accounts, VVS airmen were able to wander at will across the front. On July 12, the Soviet Union launched a counteroffensive in the northern sector before Orel and Bryansk, and
within a month had effectively straightened the front. The stage was set for the great sweeping Soviet offensives of 1944 which, in concert with the Allied drive from the West, would destroy Hitler's Germany.

"Again and again we return to the starting point of our conversation. Our whole military predicament is due to enemy air superiority."
- Dr. Joseph Goebbels, reporting on a conversation with Hitler, 1945

Proving that even liars do tell the truth, we have this most interesting statement from Herr Dr. Goebbels, an individual odious even in comparison with the rest of the Hitler entourage.

The air superiority that the Allies so hard-won in the skies over Nazi occupied Europe and Russia was the necessary precursor to the use of the air to attack the ground.

It was, in its own way, the fulfillment of a revolution in attack dating to the ancient world. When David fought Goliath, he hit him with an aerospace weapon, a rock. When the English bowmen stood up to the French knights at Creecy, they defeated them with another aerospace weapon, the arrow. As the Joint Force Air Component Commander, or JFACC, is the most critical figure in campaign planning, so then it was the Joint Force Arrow Component Commander.

Writing in 1945, Major General J. F. C. Fuller, one of the most brilliant, influential, and innovative military thinkers of the 20th Century, stated that at any point in time, tactics and strategy had to be based around the weapon of the greatest reach, and that, in the air power era, that meant the airplane. It constituted, in his view, the "fulcrum of combined tactics." That it did was evident in many ways, but in no more significant form that the role of air attack against land armies.

Thank you all very much.

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Jalonick Memorial Lecture 2006
Message from Erik D. Carlson, Ph.D.
Coordinator of UTD Special Collections

As Coordinator of the History of Aviation Collection, I want to express my gratitude to the Jalonick family for their support of this important lecture series.

Appreciation also goes to Dr. Larry Sall, Director of UTD Libraries, for his pioneering work in the History of Aviation Collection and continued support of its programs.

The 2006 lecture was aided tremendously by the work and dedication of the Special Collections staff - Carole Thomas, Paul Oelkrug, Thomas Allen and Patrizia Nava. Thanks to Tom Koch for public relations and printing coordination and to Aaron Lambert for technical support. Solid backing from friends of the History of Aviation Collection is also appreciated. We hope the next Jalonick lecture is as successful as this one.
Distinguished speaker Richard P. Hallion, Ph.D., center, presents one of his books to event sponsor Mary Jalonick, left, along with her daughter, Mary Clare Jalonick, at right. The presentation was made during a reception in McDermott Library’s Special Collections Dept. following Dr. Hallion's 2006 Jalonick Lecture. - Library photo

Richard P. Hallion, Ph.D.

Dr. Richard P. Hallion is Senior Adviser for Air and Space Issues, Directorate for Security, Counterintelligence, and Special Programs Oversight, the Pentagon, Washington, D.C. He is responsible for analysis and insight regarding the conceptualization, evolution, and utilization of sensitive national technological programs and related subject areas. He graduated from the University of Maryland, and subsequently from the Federal Executive Institute, and the National Security Studies Program for Senior Executives at the John F. Kennedy School of Government, Harvard University. He has worked for a number of governmental and private organizations, and has been a visiting professor at the U.S. Army War College and the National Air and Space Museum of the Smithsonian Institution. Dr. Hallion is the author and editor of numerous books, articles, and essays relating to aerospace technology and military operations, and he teaches and lectures widely.