

The Luftwaffe's Agility: An Assessment of Relevant Concepts and Practices

Dr Joel Hayward¹

A study of the Royal Air Force's worthy aspiration to increase its agility would be incomplete without at least some analysis of the air force that seems to embody exactly that quality: the Luftwaffe of 1939 to 1945.

It is fashionable among modern warfighters to lavish praise on the Wehrmacht; the army, air force and navy of the Nazi state. Laudatory analysis of the Wehrmacht's operational art seems an inherent component of books and articles that attempt to explain the theory and practice of jointery, the manoeuvrist approach, and the expeditionary nature of today's armed conflict. Commenting harshly upon the fixation that modern western warfighters seem to have with the Germans, Daniel P. Bolger lamented that "Maneuverists have a bad case of what may be called, to borrow from a sister social science, 'Wehrmacht penis envy.'" These devotees, Bolger writes, "love the Panzers, the Stukas, and the *Sturm und Drang* with the enthusiasm of any twelve-year-old boy who has yet to learn about Kursk, Omaha Beach, or Operation Cobra, let alone Bergen Belsen."²

Yet the fashion is not without foundation or merit. The Wehrmacht worked for a wicked regime and its frequently weird strategies, but nonetheless excelled at war's operational level. It performed so marvellously at that level that it took the combined weight of the Soviet Union, the United States, the British Empire and others to end its existence. Modern warriors will indeed learn much from studying Wehrmacht warfighting.

This short study of Luftwaffe attributes and habits is unrelated to the fad. Even if no-one else bothered to study the Wehrmacht I would feel compelled to highlight its instructional value for modern air forces as they face unforeseen challenges in the ambiguous strategic environment left after the Cold War's end and the War on Terror's beginning.

"The Agile Air Force" is the overarching theme of this conference and its proceedings. "Agility" is a quality highly desired by those air officers and strategists who want to keep the RAF very efficient and effective as it serves Her Majesty's Government in both the pursuit of security and the conduct of an ethical foreign policy. According to British military doctrine, "agility" has four attributes: robustness, responsiveness, flexibility and adaptability.³

¹ Dr Joel Hayward is Head of Air Power Studies, King's College London at the Royal Air Force College.

² Daniel P. Bolger, "Maneuver Warfare Reconsidered," in Richard D. Hooker, Jr., *Maneuver Warfare: An Anthology* (Novato, CA: Presidio, 1993), p. 27.

³ *Jt HLOC, Capping Paper*, para. 2, as articulated in *Future Air and Space Operational Concept*, p. 2.

While I agree with this doctrinal definition, I see agility as something more fluid and intangible than its four dry descriptors suggest. Agility is an organic quality; the ability of a living thing to move swiftly, seamlessly and skilfully through various complicated and sometimes dissimilar motions. It might seem as though I am describing a decathlete; someone who competes in ten running, jumping and throwing events to prove himself the best all-round athlete. It is certainly true that the decathlete is agile according to the doctrinal description: he is responsive, robust, flexible and adaptable.

Yet an even more accurately analogous activity might be the “tumbling” of a gymnast. Throwing himself through a long, tortuously difficult and variously paced set of somersaults, twists, rolls and other contortions the gymnast’s greatest challenge is to use the momentum and kinetic energy generated to carry him through the routine whilst constantly and instantly repositioning his centre of gravity so that he doesn’t unbalance, trip and sprawl headlong. *That* is true agility.

Using the four attributes of agility ascribed in doctrine as a loose framework, I will analyse the Luftwaffe’s agility in order to determine the nature and scope of that almost organic quality. I will try to shed at least a little light on the Luftwaffe’s unusual ability to throw itself rapidly in and out of distinct activities in all phases and at all levels of war, to maintain very high tempo, and yet somehow to keep its balance.

Robustness

When Hermann Göring assumed command of the brand-new Luftwaffe in 1935 he and his senior commanders immediately commenced developing it into a physically resilient force with men and machines capable of enduring long periods of high stress in a variety of environments. Rather than choosing to create separate, essentially mono-functional commands as the Royal Air Force did in 1936⁴, the Luftwaffe formed huge self-contained, multi-functional operational commands called Luftflotten (Air Fleets).

Each Luftflotte comprised all types of air combat units (reconnaissance, transport, fighter, ground-attack, dive-bomber, and bomber) as well as ground-based signals and flak units. The transfer of the latter from the Army to the Luftwaffe, in order to protect airfields and to aid in the air superiority battle, greatly strengthened the physical toughness of each Luftflotte.⁵ This mutually supporting integration of aircraft and anti-aircraft artillery was years ahead of its time.

⁴ With Fighter Command, Bomber Command, Coastal Command, Training Command and later Ferry (finally renamed as Transport) Command.

⁵ The best treatment of the integration of flak artillery into the Luftwaffe is still Horst-Adalbert Koch, *Flak: Die Geschichte der deutschen Flakartillerie, 1935-1945* (Bad Nauheim: Podzun, 1954).

A Luftflotte was immense, growing throughout WWII to become the air equivalent of an entire German army group. It was nonetheless capable of being deployed in full to any European and Mediterranean theatre of operations, where it would partner an army group. Or it could be deployed in subordinate, army-sized commands called Fliegerkorps (Air Corps). Each Fliegerkorps was itself a smaller version of its parent; self-contained and fully multi-functional, capable of undertaking — either sequentially or simultaneously, cooperatively or independently — virtually the entire range of air missions from air superiority to reconnaissance, close air support, interdiction and independent bombing. Fliegerkorps were, in that sense, not entirely dissimilar to the Expeditionary Air Wings that the RAF is currently creating.

Each Luftflotte possessed one or more partnering Luftgau (Air District). These Luftgaue were administrative organisations designed to manage the fleet's principal training, procurement, supply, repair and maintenance affairs, as well as the creation and upkeep of fuel depots, main operating bases and deployed airfields. Without direct daily responsibility for those time-intensive administrative matters the operational commanders were able to concentrate far more exclusively on their key task: defeating the enemy in battle.⁶

During wartime the Luftgaue served as the logistical lifeline between the Reich and the various highly mobile in-theatre Luftflotten and Fliegerkorps, which were sometimes fighting over one thousand miles outside the Reich's pre-war borders. Up until inexorable Soviet victories began to crush the Wehrmacht in 1944 the system worked well. During periods of fluid combat and fast manoeuvre the Luftgaue worked under great pressure, but generally managed to keep air units repaired, maintained and operating from often hastily constructed airfields right behind the Army's forward lines at what was, by WWII standards, an extraordinary daily sortie rate.

The ability of the Luftgaue hastily to create adequately functioning airfields on rough strips of pasture or steppe, for instance, allowed various widely separated Fliegerkorps to loan whole wings to each other at relatively short notice when opportunities or crises emerged. During three days in mid-May 1942, for instance, Luftflotte 4 frenetically transferred over 360 fighters, dive-bombers and bombers 300 miles north from the Crimea to the Kharkov region to blunt an unexpected massive Soviet offensive.⁷ Aircraft flew into airfields that had been hurriedly transformed from empty steppes and rough crop fields. Thanks to the exhausting work of highly mobile Luftgau "special staffs"⁸, and associated air, army and Reich Labour Service battalions, they

⁶ Karl-Heinz Völker, "Daten zur Gliederung und Organization der Luftwaffe," *Wehrwissenschaftliche Rundschau*, 4, April 1967, pp. 113-114; Joel Hayward, *Stopped at Stalingrad: The Luftwaffe and Hitler's Defeat in the East, 1942-1943* (Lawrence, KS: University Press of Kansas, 1998. 2001ed.), pp. xi-xii.

⁷ Bundesarchiv-Militärarchiv [hereafter: BA-MA] N671/9: Dr. Wolfram Frhr. von Richthofen, Generalfeldmarschall. Persönliches Kriegstagebuch [hereafter: Richthofen TB]: Band 9: 1.1.-31.12.1942, entry for 12 May 1942.

⁸ Luftgaustäbe zur besonderer Verwendung.

were each able to fly up to eight combat sorties per day throughout the rest of May.⁹ They had a huge impact. A relieved Generaloberst (Colonel-General) Franz Halder, Chief of the Army General Staff, noted in his diary that the force of the Soviet attack had apparently “been broken by the efforts of our Luftwaffe.”¹⁰

Responsiveness

Although both doctrine and wartime necessity tied the Luftwaffe to army cooperation to a greater degree than that experienced by the RAF and the USAAF, the Luftwaffe generally proved both sensitive to minor fluctuations within and around the battle-space and able to react quickly when opportunities or crises emerged. Even during the pre-war years the Luftwaffe emphasised, and validated during war games, the importance of keeping the optimal ratio of specialised short and medium-range reconnaissance aircraft at more than ten per cent of all combat types.¹¹ During the first three and a half years of war, in particular, the Luftwaffe possessed proportionately far more reconnaissance aircraft than did the Red Air Force, its greatest foe, and RAF tactical commands. When Barbarossa started on 22 June 1941 reconnaissance aircraft composed eighteen per cent of the Luftwaffe’s total fleet.¹²

Under Luftwaffe command but assigned to army formations and their tactical control¹³, short-range reconnaissance units routinely provided the Army with a pleasing quantity and quality of information in a highly timely fashion, thus enhancing the operational tempo and flexibility of both services. After the Battle of Kharkov in May 1942, for example, Generaloberst Ewald von Kleist, GOC of the First Panzer Army, profusely praised Fliegerkorps IV’s “tireless” reconnaissance fliers, who gave him “a clear picture of the enemy at all times” and allowed him to operate with notable dexterity.¹⁴

⁹ Joel Hayward, “The German Use of Airpower at Kharkov, May 1942”, *Air Power History*, Vol. 44, No. 2 (Summer 1997), pp. 18-29.

¹⁰ Franz Halder, *Kriegstagebuch: Tägliche Aufzeichnungen des Chefs des Generalstabes des Heeres, 1939 – 1942* (Stuttgart: Kohlhammer, 1965), Volume 3, p. 442.

¹¹ For a basic breakdown of the Luftwaffe’s composition, strength and serviceability rates in all theatres throughout the war see Williamson Murray’s classic, *Strategy for Defeat: The Luftwaffe, 1933-1945* (Maxwell AFB: Air University Press, 1983). For a thorough assessment of the Luftwaffe’s composition, strength and serviceability rates in Russia see my own *Stopped at Stalingrad*.

¹² BA-MA RL 2 III/713: Vortrag über die Einsatzbereitschaft der fliegenden Verbände, Stand: 21.6.1941, GenSt. Gen.Qu. 6. Abt. (I) vom 24.6.1941.

¹³ United States Air Force Historical Research Agency [USAFHRA] 512.625-3: Br. Air Intelligence, A.I.3.E., Army Cooperation in the GAF: The Duties and Responsibilities of Reconnaissance Units, 29.7.43.

¹⁴ BA-MA RL 10/473a: Generalkommando des IV. Fliegerkorps, Adj. IIa., Gefechtsstand, 1. Juni 1942, gez. von Kleist.

Moreover, because medium-range reconnaissance units (mainly flying Do17s) remained under Luftwaffe command, and were bound less tightly to army units than their short-range brethren, they were free to roam far behind the battlefield without too many army accusations that they were not doing “their job”. Some covered truly long distances. To maximise the reach and survivability of dangerous long-range observation and photographic reconnaissance missions, the Luftwaffe operated numerous squadrons of permanently converted bombers, including Ju88s and He111s. It even often sent regular bombers in routine squadron service out on “non-kinetic” reconnaissance missions (to use today’s parlance) when brief pauses in operational activity permitted.¹⁵

In order to ease and speed the gathering, interpretation and dissemination of information the Luftwaffe developed a decentralised network of highly mobile photo labs, radio interception units, intelligence cells and telephone and wireless signals teams spread out across many airfields in each Fliegerkorps operational area. Flexibility was the buzz-word. The system had to be immediately responsive. Delays were not tolerated. After the war the US War Department observed that, in order to keep this system highly effective, the Luftwaffe expanded its signals service proportionately throughout the war more than any other arm or element.¹⁶ At least during the first four years this resulted in impressive flexibility.

Intelligence assessments went immediately and directly to local combat squadron and wing commanders (as well as to higher authorities, of course) so that they could respond immediately as tactical circumstances demanded and opportunities emerged without having to wait for intelligence, guidance and orders to filter down through the chain of command.

This pattern appears to reinforce a common perception among today’s manoeuvrists that German army, air and naval commanders habitually employed the highly decentralised, tempo-enhancing command concept known as *Auftragstaktik*, or “mission command”.¹⁷ According to this concept:

- The commander should trust his well-trained subordinates to respond to changing circumstances responsibly, creatively and with initiative in his absence because of the subordinates’ far more intimate and immediate situational awareness.
- To ensure that the subordinates’ decisions and actions conform to overall objectives, the commander should ensure that they always

¹⁵ Cf. BA-MA RL 8/86: Fliegerführer Süd, Tageseinsatz-Meldungen, 24 February 1942.

¹⁶ U.S. War Department Technical Manual TM-E 30-451: *Handbook on German Military Forces*, 15 March 1945, p. X-II.

¹⁷ Explanations of *Auftragstaktik* (lit. “task-tactics”) are now common in works on manoeuvre warfare, but a reliable place to start is still Robert Leonhard, *The Art of Maneuver: Maneuver-Warfare Theory and AirLand Battle* (New York: Presidio, 1991), pp. 113-116.

know *what results he intends* (usually defined as the condition or position he wanted the enemy to be in after the engagement).

- Orders at all levels should be short, simple, easily understood and non-prescriptive.

We should not exaggerate the degree to which the German military habitually employed Auftragstaktik. Even during the successful campaigns of 1939 to 1942 only a minority of Wehrmacht officers understood, liked, or (as the quality of staff training decreased during wartime) were adequately taught to practice the concept effectively. Then, as overwhelming enemy strength began to crush the Wehrmacht after 1943, creative offensive actions petered out, thereafter replaced by reactive defensive operations.

Yet, like the German Army, the Luftwaffe did decentralise operational and tactical command relationships, and permit the spontaneous, initiative-driven seizure of opportunities, to a greater degree than its Soviet, American and British counterparts. Decision-making generally occurred at the lowest possible level in the command chain, and even the Luftwaffe Operations Staff directed in May 1941 that it might often be necessary to by-pass various levels in order to maintain tempo and initiative.¹⁸ Colonel Robert Pötter, a bomber commander in Russia, summarised his experience of effective Auftragstaktik within the Luftwaffe: "We were told what we had to do, but not how to do it."¹⁹

This command style enhanced both responsiveness and flexibility, at least in the years before war-weariness set in. In 1945 the U.S. War Department expressed grudging praise that "German tactical doctrines stress the responsibility and the initiative of subordinates."²⁰ A mistaken belief that the German forces "were inflexible and lacking in initiative has been completely destroyed in this war, in which aggressive and daring leadership has been responsible for many bold decisions." While it mentioned the German Army especially, the War Department's assessment equally applied to the Luftwaffe, which was unsurprising in light of the fact that the battle-space integration of the Army and the Luftwaffe, at all levels (in minor engagements, large battles and vast campaigns) exceeded most Allied efforts. For example, army regiments and divisions and local Luftwaffe wing-sized commands often swapped reconnaissance information and other intelligence directly. Without much (if any) involvement from their parent divisional, corps and Fliegerkorps headquarters, they sometimes closely coordinated their almost-spontaneous, collaborative exploitation of emergent opportunities or response to threats or crises.

¹⁸ BA-MA RH 27-18/4: Oberbefehlshaber der Luftwaffe Führungsstab, Ia 1440/41 geheim, Taktisches Merkblatt für die Führung von Nahkampfverbänden, 8.5.41.

¹⁹ Lonnie Ratley, "A Lesson of History: The Luftwaffe and Barbarossa," *Air University Review*, Vol. 34, No. 3 (March-April 1983), p. 57.

²⁰ *U.S. War Department Technical Manual TM-E 30-451: Handbook on German Military Forces*, 15 March 1945, p. IV-I.

This practice had the potential to create innumerable small and unconnected air efforts, with individual units fighting their own battles without much coordination. Such a situation would obviously have dissipated the enormous effect that air power can generate when concentrated.²¹ Yet this seldom happened. Fliegerkorps and Luftdivision commanders may not have initiated all operations, but they and their staffs attentively monitored them as the information flow permitted and, when necessary, coordinated or reshaped them to create the desired focus and effect.

The Luftwaffe always took pride in its responsiveness, especially when joint operations were involved. It did not want — and seldom got — accusations that it failed to cooperate in a timely fashion or with appropriate actions at the desired place. Generalfeldmarschall Albert Kesselring was so determined that his partnering army in Russia would get full and timely support that he told his Luftflotte 2 staff and commanders that they were to consider the Army's wishes as orders issued by him.²² Kesselring's desire to provide full and timely cooperation was not unusual. Common practice based on doctrine — including the keystone *Conduct of the Air War* published in 1935²³ — ensured that, alongside the prosecution of some independent air missions, the Luftwaffe and the Army worked together rather well. In close consultation on a daily basis, ideally from co-located headquarters²⁴, operational commanders and their staffs from both services ironed out minor conceptual differences, meticulously coordinated the integration of their forces and identified joint Schwerpunkte (lit. "heavy points").

To create these focal points they carefully chose the geographical position in each theatre or sector that they jointly considered to be the optimal place to unbalance the enemy force's centre of gravity through synchronised attack.

Variations of this practice existed within the Soviet and other Allied forces, of course, and the RAF's Tactical Air Forces of the war's final two years spring quickly to mind. Yet the Germans were unusually flexible in the way they scrutinised and amended their Schwerpunkte repeatedly each day during periods of high tempo or unusual fluidity. During the June 1942 Battle of

²¹ For a Luftwaffe Generalmajor's discussion of this potential weakness, see: US Department of the Army MS #B791a: "The Collaboration between the Army and the Luftwaffe: Support of the Army by the Luftwaffe on the Battlefield." Translation by Charles E. Weber of the PW Report of General Karl Heinrich Schulz, 12 December 1947.

²² Horst Boog, *Die deutsche Luftwaffenführung, 1935-1945: Führungsprobleme, Spitzengliederung, Generalstabsausbildung* (Stuttgart, Deutsche Verlags-Anstalt, 1982), p. 196.

²³ *Luftwaffe Dienstvorschrift 16: Die Luftkriegführung* (Berlin, 1935). The best, although not complete, translation of this important document is provided in James S. Corum and Richard R. Muller, *The Luftwaffe's Way of War: German Air Force Doctrine 1911-1945* (Baltimore: Nautical and Aviation, 1998), pp.118-157.

²⁴ BA-MA RH 27-18/4: Oberbefehlshaber der Luftwaffe Führungsstab, Ia 1440/41 geheim, Taktisches Merkblatt für die Führung von Nahkampfverbänden, 8.5.41.

Sevastopol, for instance, Field Marshal Erich von Manstein, GOC Eleventh Army, and Generaloberst Wolfram Freiherr von Richthofen, GOC Fliegerkorps VIII, oversaw their joint battle in total harmony and usually from shared command posts. With intelligence gained mainly by Richthofen's air reconnaissance squadrons, they constantly switched their Schwerpunkt from place to place as the battle ebbed and flowed. Their Schwerpunkt on 3 June was the defensive line facing the 30th Army Corps south of Sevastopol, on 4 June the line facing the Rumanians in the east, and on 5 June that facing the 54th Army Corps in the north. On 6 June it was again the line facing the 30th Army Corps.²⁵

Flexibility

At the tactical and operational levels the Luftwaffe routinely demonstrated acceptable, and sometimes excellent, flexibility when it encountered unexpected or heavy stresses that might have confounded or broken more rigid air forces. At the heart of its warfighting flexibility lay a spirit of "ad hocery," a perception among Luftflotte and Fliegerkorps commanders that, when particular needs demanded, they could fragment, transform and reassemble their command structures as they saw fit without having to argue a case to do so with the Luftwaffe's strategic-level authority, the Oberkommando der Luftwaffe (High Command of the Luftwaffe).

Particularly during tough defensive battles it was not uncommon for a Fliegerkorps or Luftdivision commander to select a skilled, tough and trusted lieutenant-colonel or colonel and have him create a new air combat group with the sole task of blunting an enemy advance or regaining the initiative. Often named after that "heroic" officer to enhance its focus, cohesion and élan the makeshift formation would get its own airfields, supporting infrastructure and logistics networks. It would fight furiously until its mission at the new Schwerpunkt ended, perhaps in a week or a month, whereupon its component squadrons would return to their original wings, or be reassembled into another ad-hoc formation.²⁶

Sometimes these ad-hoc formations were vast and hardly of a minor tactical nature. For example, when it became clear to Richthofen on 25 January 1943 that elements of the retreating German Seventeenth Army faced encirclement in the Taman Peninsula, he ordered Generalleutnant (Lieutenant General) Martin Fiebig, GOC Fliegerkorps VIII, to throw together a huge temporary airlift command to protect and supply that army while it evacuated it, bit by bit, back to the Crimea.²⁷ True to form, Fiebig worked feverishly to create this new command. He ordered Luftgau administrators, pioneer battalions and signals

²⁵ BA-MA N671/9: Richthofen TB: Band 9, entries for 3-7 June 1942.

²⁶ Cf. *ibid.*, entry for 2 January 1943; USAFHRA 168.7158-335: Gruppe Stahel, Gef. Qu., den 20.12.1942, Bericht über den Zustand der Truppe am 20.12.1942.

²⁷ USAFHRA 168.7158-335: Tagebuch Generalleutnant Fiebig, 25.11.1942-2.2.1943, Fiebig TB, entry for 25 January 1943.

teams to create and equip new airfields and expand existing ones. He began skilfully plucking reconnaissance, fighter, bomber and transport squadrons from various wings throughout Fliegerkorps VIII's vast theatre — thinning those wings by one squadron each — and assembling brand-new wings and groups from them. Within days he created a full command, Lufttransporteinsatz Krim (Air Transport Mission Crimea), which immediately began its main missions, protected by its own fighters. It proved highly effective, evacuating no fewer than 50,000 German troops within a month and carrying a daily average of 500 tons of fuel, ammunition and rations across to those who remained. On some days the ad-hoc command evacuated 5,000 men and carried across 700 tons of supplies.²⁸

All the examples of Luftwaffe flexibility presented here relate to the joint battlespace involving both the Army and the Luftwaffe. That is understandable. Joint warfighting was the Luftwaffe's bread and butter. Critics might argue, therefore, that the Luftwaffe was ever only as flexible as the army it partnered, and was not *independently* flexible. That is a fair criticism, as far as it goes. Yet it ignores the fact that the Luftwaffe understood its role very well, and although its operational commanders occasionally fumed about the lack of independent missions — army-friendly Richthofen himself once hissed that the Luftwaffe was “the Army's whore”²⁹ — they applied an incontestable logic: to enhance *their own* flexibility they needed to enhance *the Army's* flexibility. They applied this logic with commendable commitment, and raised the flexibility of the joint effort as a result.

Adaptability

In its preferred environment of joint air-land warfighting the Luftwaffe demonstrated significant flexibility, as shown above, and it continued to do so in that environment and others until it permanently lost the one overriding condition that had always permitted it: air superiority. The Luftwaffe lost this in Italy in August 1943, in the west and above the Reich several months before D-Day, and in the east several months thereafter.

Agility routinely enhanced Luftwaffe performance, but it could not do much in what became a non-winnable war of attrition in the air. No amount of agility could prevent the loss of air superiority or negate the disastrous consequences of that loss. During its prodigious struggle to adjust and respond to the constantly changing and ever worsening Combined Bomber Offensive, the Luftwaffe in the west tried almost everything and virtually recreated itself by adapting old methods and equipment when it could, and adopting entirely new ones when it could not. It vastly expanded and

²⁸ BA-MA N671/10: Richthofen TB: Band 10, entries for 9 and 28 February and 11, 12 and 14 March 1943; BA-MA RL 8/59: Lufttransporte VIII. Fliegerkorps, Januar und Februar 1943.

²⁹ USAFHRA 519.619-7 14 August 1945: HQ US Strategic Air Forces in Europe (Rear) Office of the Historian, AAF Sta 390, APO 413, US Army, Questionnaire on GAF Doctrine and Policy: Answers by Gen. Maj. von Rohden (PW) and Col. Kriesche (PW) to Questions Submitted by Major Engelman.

improved its integrated air defence network of Freya (and later Würzburg) radar stations, ground control intercept stations, spotlights, flak batteries, radar-equipped night-fighters and super-fast day fighters. To coordinate the Reich's air defence battle the Luftwaffe created a new air fleet, Luftflotte Reich — its first mono-causal, mono-functional air fleet — in February 1944. The Luftwaffe also ceaselessly experimented with, introduced and refined a range of improved aircraft, new armaments and bolder and more imaginative tactics.³⁰ But this time the Luftwaffe was fighting a foe that, because of its virtually unlimited resources, great resolve, high morale and equally marvellous adaptability, it could neither outnumber nor outclass.

The fact that the United States produced four-fifths as many planes in 1944 alone as Germany had throughout the entire previous five years was bad enough³¹ (and Britain and the Soviet Union also had large production rates), but the intractable offensive-mindedness of Wehrmacht and Luftwaffe air power thinking worsened the situation considerably. Even when the rapid manufacture of fighters for defensive counter-air battles above the Reich became a desperate priority during 1943 and 1944, German factories continued to churn out thousands of bombers (which took far more raw materials and factory floor space) for offensive joint battles around the Reich's shrinking perimeters, particularly in the east.³²

These production figures should not disguise what lay at the crux of the attritional air war, which was not Germany's ability to produce sufficient airframes, but something that agility could never address: the Reich's impossibility of training pilots and aircrews to a competitive level in sufficient quantities. At the beginning of the war the Luftwaffe's pilots had spent slightly more time in basic and operational training than their RAF counterparts. When war bogged down in 1943 and acute fuel and air combat attrition began to bite, the Luftwaffe's training programme attempted to adapt by compressing and streamlining courses and paring down tuition in all non-essential skills, but still could not meet the Luftwaffe's output demands. By the time of D-Day it gave its new pilots barely half the basic training hours and only one-third the hours in operational aircraft that the RAF gave its own. The USAAF's pilots received even more than the RAF's.³³ Luftwaffe fighter trainees, to highlight this disparity, received only 30 hours in operational training, RAF fighter

³⁰ Luftwaffe efforts to adapt to its greatest challenge are strongly analysed in Richard R. Muller, "Losing Air Superiority: A Case Study from the Second World War," *Air & Space Power Journal*, Vol. 17, No. 4 (Winter 2003), pp. 55-66.

³¹ John H. Morrow, Jr., "The German Aircraft Industry in the First and Second World Wars: A Comparison", in Horst Boog, ed., *The Conduct of the Air War in the Second World War* (New York: Berg, 1988), p. 47.

³² National Archives and Records Administration, Microfilm T321/10/4746765: Luftwaffenführungsstab Ia/Flieg. Nr. 9592/44 g.Kdos. Chefs. (T), Studie über die Flugzeuglage der Kampfverbände, 5 May 1944.

³³ Williamson Murray, "Attrition and the Luftwaffe," *Air University Review*, March-April 1983, Vol. 34, No. 3, pp. 66-77.

trainees got around 80, and USAAF trainees got around 160 hours.³⁴ By mid-1944, when the Allied campaign was inflicting appalling attrition on Luftflotte 3 and Luftflotte Reich, the Luftwaffe had no choice but to man their fighters and bombers with fewer and fewer skilled pilots. It was an impossible situation.

The Luftwaffe's loss of air superiority along most fronts by 1944 devastated the Wehrmacht's joint warfighting, which was based around "reconnaissance pull," one of the key ingredients in implementing Auftragstaktik and maintaining tempo. In the German system attacks tended to move in directions identified by forward air and ground units, not by commanders in the rear who might have felt tempted to push their forces forward along pre-selected routes. Reconnaissance units constantly watched the enemy and probed for undefended or lightly defended gaps in the enemy line that potentially led to the enemy rear. The whole force then, upon orders from forward commanders, followed the "pull" of the reconnaissance units and smashed through the gaps to achieve penetrations and hopefully a breakthrough.

Yet in the months following the Normandy landings, ferocious Allied air power robbed the Luftwaffe of its ability to function as "the Army's eyes". Almost everything that the Luftwaffe put into the sky got shot down — except for the stunning and almost invulnerable Arado Ar 234 jet bomber-reconnaissance plane, very few of which existed.³⁵ Both the German Army and the decreasing number of Luftwaffe support forces became tactically and operationally blind, thus denying them any flexibility and useful ability to employ initiative. The Luftwaffe reconnaissance units responded with characteristic adaptability, experimenting with new flight tactics and dispersal, camouflage and deception procedures, but nothing made much difference. Reconnaissance units could not fly, and ground-attack aircraft, also flying at great risk against overwhelming air strength, therefore accomplished very little. The Luftwaffe itself reported that its ground-attack aircraft "no longer afforded any decisive support to the land forces, and the heavy losses incurred rose ultimately to a level out of all proportion to the successes achieved."³⁶

Conclusions

This short assessment focused only on aspects of the notable agility that the Luftwaffe revealed as it prosecuted warfare within the deficient conceptual framework that Nazi politicians and strategists, including airmen, created for their armed forces. The paper demonstrated that the Luftwaffe commonly operated with what can only be described, by the norms of the period, as effective agility. During its years of gain and even into its years of loss the Luftwaffe constantly monitored the battle-space, quickly assimilated and acted

³⁴ Murray, *Strategy for Defeat*, pp. 312, 314.

³⁵ Alfred Price, *The Last Year of the Luftwaffe: May 1944 to May 1945* (London: Greenhill, 2001), pp. 63-65.

³⁶ USAFHRA 512.621 VII/14, 15: Generalstab 8. Abteilung, [Historical Office of the Luftwaffe General Staff] "Development of the German Ground Attack Arm and Principles Governing Its Operations up to the End of 1944," 1 December 1944.

on information, and flexibly applied force. It coped well with high-tempo operations, adapted quickly to changing circumstances and flexed without breaking under enormous stresses. It is beyond the scope of this paper to catalogue and critique the reasons for the Wehrmacht's eventual failure, or even to explain its lack of emphasis on independent "strategic" air campaigning and maritime aviation. It is sufficient to note only that, among the Wehrmacht's many weaknesses and failings, the Luftwaffe's agility could not be counted. That does not mean that agility, despite being a potent force multiplier, could rectify fatal strategic flaws. The Germans learned a hard lesson, one worth reflecting upon: that if a nation fights the wrong war against the wrong foe then its military agility will do nothing more than delay defeat.