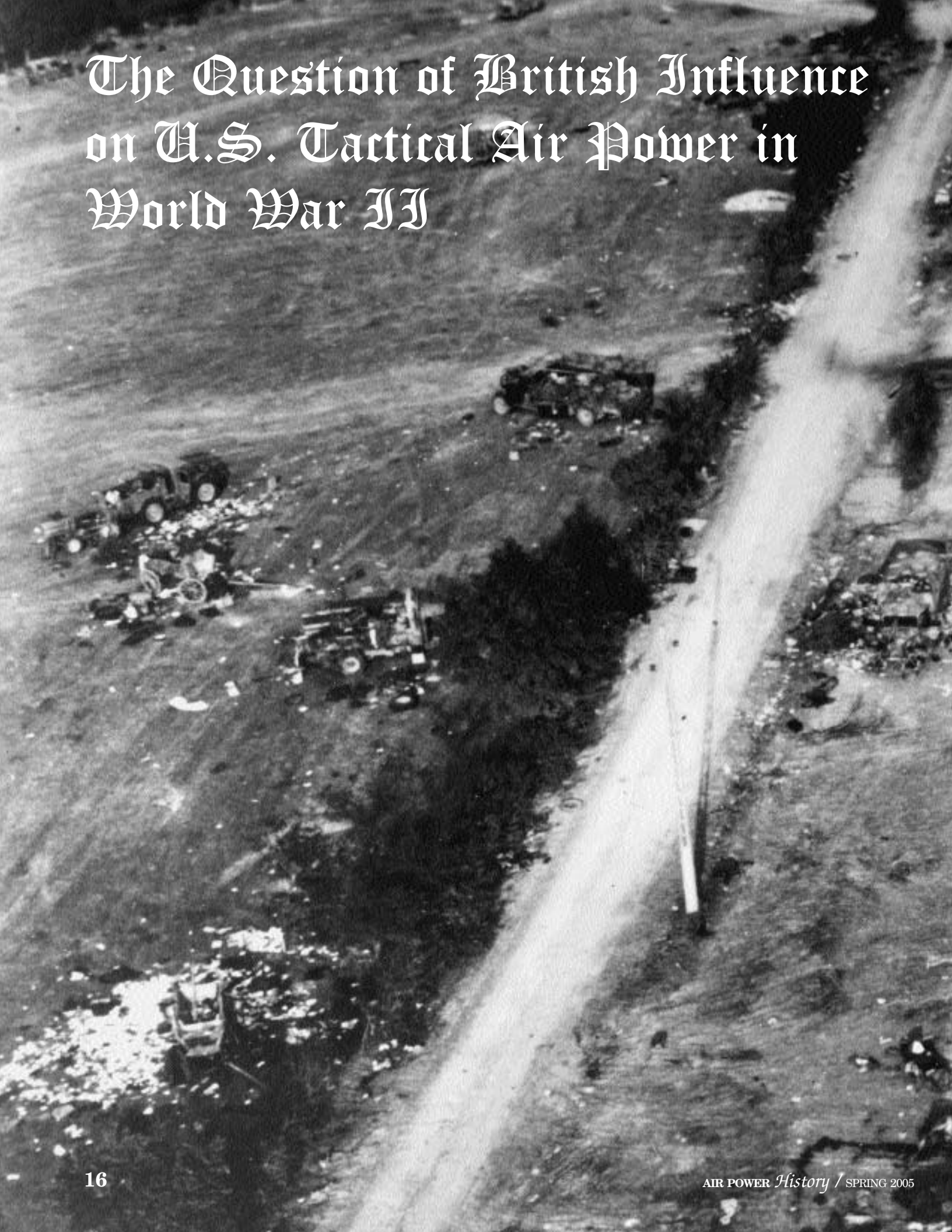# The Question of British Influence on U.S. Tactical Air Power in World War II

Paul Johnston

What was the British influence on U.S. theory and practice for tactical air power in World War II? Much ink has been spilt tracing the influences upon strategic bombing; less attention has focused upon tactical air power. Insofar as this was considered, the original conventional wisdom maintained several tenets. First, that during the interwar years a fixation upon strategic bombardment diverted attention away from tactical air power, and second, that in North Africa the U.S. adopted the British system for tactical air power, more or less *in toto*. Both of those theories have been modified somewhat by more recent scholarship. This newer work argues that while the U.S. Army Air Corps unquestionably emphasized strategic bombardment in the interwar years, they did not ignore tactical air power either. Likewise, the widespread view of a "British save" of U.S. tactical air power in North Africa has been challenged. One might call this the "U.S. nativist" school of thought—the theory that in the interwar period the U.S. independently developed all of the doctrinal ideas instituted in North Africa.

This paper will argue that while the nativist school of thought is quite correct in its specific assertions, overall it is insufficiently nuanced. There was a complex series of developments between 1940 and 1942, the record for which it is difficult to disentangle, but a careful examination of the record shows that while the U.S. had cultivated a doctrinal background for tactical air power in the interwar years, this was rather broad and abstract. When it came time to assemble an actual working mechanism for tactical air power, they were indeed strongly influenced by the British model at the working level.

The Original Conventional Wisdom

As one of the seminal histories of U.S. air power put it in the early 1950s, "the development of the heavy bombers and its doctrine of employment ... had a retarding effect upon attack, pursuit, and all other aviation activities."[1] This was the view expressed by the U.S. Air Force's own official historians and by most prominent U.S. air power historians since.[2] This is often explained on the grounds that it was only strategic bombing that could justify an independent air force.

Similarly, it was long believed that because of this interwar neglect of tactical air power, the inaugural performance of U.S. tactical air forces was poor, and only redeemed when they learned from the battle-hardened British. In North Africa the Americans stumbled into the big leagues when they first met the Afrika Korps, who soundly defeated them at Kasserine Pass in February 1942. At the time and in many arguments since, this defeat was blamed in large part upon poor employment of the available tactical air power, which had been decentralized. Shortly after Kasserine, there was a reorganization of the Air Forces in the theater, which had the effect of bringing the U.S. tactical air effort under the wing of the veteran British commander of the Western Desert Air Force, Air Marshal Sir Arthur Coningham.[3] The classic story is that "Mary" Coningham quickly brought order to the tactical air forces with his tried and tested methods[4], and based upon that experience the U.S. Army Air Forces (USAAF) published new doctrine in the form of Field Manual (FM) 100-20 *Command and Employment of Air Power*.[5] FM 100-20 has been called a "declaration of independence" by the fledgling USAAF; it set out the principles of centralized command of all air assets by a single air commander, and the absolute importance of first obtaining air superiority. All of those principles, in the original conventional view, grew from the painful experience in North Africa.

Some More Recent U.S. Scholarly Revision

The first point to be made is that rumors of tactical air power's death in the interwar Air Corps were greatly exaggerated. Debate and thought was dedicated to the tactical role throughout not only the 1920s, but also the supposedly heavy bomber obsessed 1930s. For example, a considerable portion of the instruction syllabus at the Air Corps Tactical School was in fact devoted to tactical air power, and perhaps most tellingly of all, throughout the period the Air Corps continued to order aircraft types specifically dedicated to the tactical function.[6] As one air power historian has pointed out, if the writings and theory of the time seem to have emphasized strategic roles over the tactical, this was only because all U.S. airmen took it as a given that tactical air power constituted a major portion of their bread and butter.[7] In sum, a close examination of the historical record reveals that, contrary to conventional wisdom, the U.S. Army Air Corps did not in fact ignore tactical air power or allow it to languish in the interwar period.

A second major revisionist argument has been to challenge the assumption that the Americans copied their doctrine for tactical air power from the British in North Africa. In the wonderfully titled paper, "A Glider in the Propwash of the RAF?" the distinguished U.S. air power historian David R. Mets argued most forcefully that the Americans did *not* learn their basic doctrine from the British in North Africa.[8] Mets concludes that the senior

THE DEVELOPMENT OF THE HEAVY BOMBERS AND ITS DOCTRINE OF EMPLOYMENT ... HAD A RETARDING EFFECT UPON ATTACK, PURSUIT, AND ALL OTHER AVIATION ACTIVITIES.

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American airmen all came to the war with essentially the same doctrinal tenets as those the British were espousing in North Africa. What happened, in Mets' view, was that the prestige the British had won with their victories since El Alamein lent weight to this view of tactical air power. The U.S. airmen drew upon this British reputation in order to convince their Army masters of the basic tactical air principles they already believed for their own reasons.[9]

Is the nativist school of thought correct? Doubtless in their specific assertions they are, for the U.S. had not completely ignored tactical air power in the interwar years and had inculcated the basic doctrinal tenets for tactical air power prior to their arrival in North Africa. However, it is important to distinguish between two related but separate issues: an air force's broad philosophy for air power on the one hand, and an actual system for implementing that philosophy on the other. Most of the historical debate has been focused upon the former, while ignoring the later. The American nativist school's argument boils down to the assertion that the broad philosophy contained within FM 100-20 did not have to be learned from RAF tutors. This is doubtless true, but it relates more to broad philosophy than concrete system. As the air power historian Vincent Orange observed, even after FM 100-20 was published, "communications links and procedures for setting priorities in answering calls for air support had still to be worked out."[10] The record suggests that at this more concrete level, the American practice of tactical air power was indeed strongly influenced by the British model.

What Was the British System and Where Did It Come From?

If we are to determine the British influence on U.S. tactical air power, the first thing to nail down clearly is the history of the British development of their system for air support. As we shall see, it was long and convoluted, but there are no records suggesting a U.S. influence on the British.

What would come to be called "tactical" air power was in fact the primary focus of British air experience in the Great War.[11] However, after that early start cooperation with the Army quickly deteriorated. Right from the RAF's birth in 1919, there were inter-service rivalries with the two older services that were far more pronounced and bitter than anything that had been seen before between the Army and Royal Navy.[12] A major factor at the root of this was the fervent belief of the RAF's founders that they had found a "better way" to win wars, and that, indeed, they had rendered the two older services obsolescent, if not obsolete. In the future, air power's new apostles argued that wars would be won not by massed armies or fleets, but by massed bombers, striking directly at the heart of any enemy's homeland. It has been widely noted that this sort of strategic bombing, as an instrument of state policy independent of the other two

services, was the *raison d'etre* for the RAF at its birth.[13] In consequence, until the mid 1930s, the RAF gave scant attention to air support of armies in the field.[14] Even when the British government began seriously to rearm in the second half of the 1930s, the Air Ministry steadfastly opposed War Office requests for dedicated air support.[15] Army-RAF cooperation had scarcely improved by 1939. Convinced of the strategic importance of independent bombing, the Air Ministry continued to resist any "diversion" of resources from heavy bombers.

The fall of France did not greatly change the RAF's mind, but the Army could not be completely ignored and shortly after Dunkirk, "Army Cooperation Command" was formed. However, it came last in the RAF's priorities, and as late as the spring of 1941 the Chief of the Air Staff, was still officially arguing to Cabinet that: "The Army has no primary offensive role...We aim to win the war in the air, not on land."[16]

Fortunately, work to improve interservice cooperation and air support to ground forces had been proceeding at the lower levels, at least on technical matters. In neglected Army Cooperation Command, in the far backwater of Northern Ireland, a small group of officers had been brought together under the leadership of Group Captain Wann and Brigadier Woodall. Veterans of the recent debacle in France, both were determined to do better.[17] They produced what came to be called the "Wann-Woodall" report, which outlined a system of control for air support that formed the basis of the eventual tactical air doctrine.[18] The essentials of the Wann-Woodall system was the establishment of a joint Army-RAF headquarters which would control a composite force of aircraft, and the creation of a radio network outside of the normal Army chain-of-command specifically dedicated to air support. In their original report, submitted in December 1940, they envisioned this forward control of aircraft being effected through an organization they termed a "Close Support Bomber Control," which would be co-located with the army at corps level.[19]

The first implementation of the these new ideas came in the Western Desert, far from the doctrinal squabbling at Whitehall. In early 1941, after the sobering experience of the Tobruk battles, the British leadership in the theater initiated a series of joint conferences between the army and RAF to review the problem of air support from first principles.[20] This resulted in a system similar to the Wann-Woodall proposals, which the local RAF and Army forces then reorganized themselves to actually test and implement. On September 30, 1941, this culminated in a directive on "Direct Support" which was published jointly by the RAF and British Army in the Middle East.[21] This spelled out a system whereby the sort of forward communications detachments envisioned in the Wann-Woodall report were controlled by what was now labelled an "Air Support Control" or ASC, once again at corps level.[22] These communications detachments were commonly known as "tentacles," since this was what they so resembled on the radio network orga-

ANNEXURE 'A' TO APPENDIX 7

COMMUNICATIONS FOR AIR SUPPORT CONTROL

SUPPORT AIRCRAFT   TAC/R AIRCRAFT

BDE   BDE   BDE   BDE

RES. BDE   RES. BDE

DIV. H.Q.   DIV. H.Q

CORPS H.Q.
AIR SUPPORT CONTROL H.Q.

LANDING GROUND SETS

L E G E N D

●   TENTACLES
■   A.S.C. SETS
⊕Ⓛ   F.A.S.L.
○   R.A.S.L.
⊕   2-WAY R/T TO SUPPORT AIRCRAFT
ⓒ   2-WAY R/T TO TAC/R AIRCRAFT (C-CONTROL)
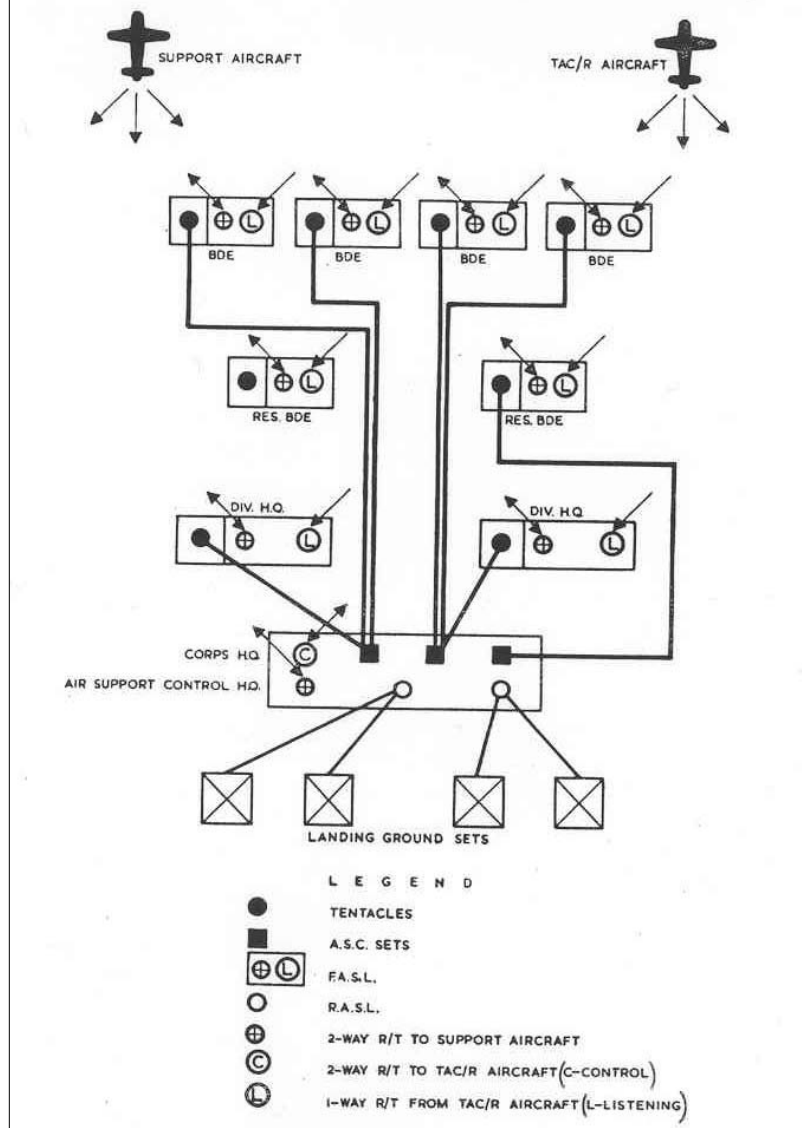Ⓛ   1-WAY R/T FROM TAC/R AIRCRAFT (L-LISTENING)

Diagram 1: The Development of the British System: Air Support Control, September. 1941 North Africa (Diagram reproduced in *Air Support*, p 219). Note how the ASC, as envisioned in 1941, worked at corps level. As seen in the main text, the eventual practice was to form a Joint Battle Room with a composite group at army level.

nization charts.[23] The cause-and-effect relationship between the Wann-Woodall report and developments in the North Africa is unclear, and given the records extant will probably remain so. One of the participants in the UK based development process has argued that the system was designed in the British Isles, based upon the Wann-Woodall report, and then lifted *in toto* to North Africa for application.[24] Most historians have concluded that while there must certainly have been influence from the Wann-Woodall developments in Britain, there was also independent parallel development in North Africa.[25] Regardless of the truth in this matter, the key point for our purposes is that there is no suggestion in the record of any influence from American theory.

By 1942, the system's final form was virtually complete, with the RAF elements operating in North Africa being organized into the Desert Air Force or "DAF". In 1943, further elaboration of this system continued, not only in the North African and Tunisian campaigns, but in Sicily and Italy as well. In Italy, a system known as "ROVER DAVID" was developed. This was a means for arranging even faster and more responsive direct air support at the front than the ASCs could provide. A senior controller was sent forward with a signals truck equipped with VHF radios that could communicate with aircraft, and was allocated immediate control of some number of aircraft. The initial controller for this was one Group Captain David Heysham, hence the term "ROVER DAVID"[26] In November 1943 the ROVER DAVID system was used during operations along the River Sangro to control the first ever CABRANK.[27] This was a system in which a package of fighter-bombers circled overhead, available to swoop down upon a target as soon as the forward controller called for support.[28] To maintain a CABRANK, aircraft were sent to replace those that expended their ordnance or ran low on fuel, in a continuous relay. All aircraft were given an alternate target, which they would attack if not directed onto a target while in CABRANK.[29] The somewhat whimsical name CABRANK arose because of their resemblance to the ranks of cabs waiting outside London clubs and hotels.[30]

The British System in its Mature Form

All of this experience by Montgomery's Eighth Army and the DAF was much studied, and in early 1944 it was distilled into the two publications *Army-Air Operations: Pamphlet No. 1—General Principles and Organization*, and *Army-Air Operations: Pamphlet No. 2—Direct Support*.[31] These represented the authoritative doctrine for the British system in its mature form.[32]

This doctrine was based upon what was known as the principle of "joint command." Under this principle, ground forces and air forces both retained separate chains of command, each with their own commanders. Both were expected, however, to cooperate in the furtherance of a single joint plan.[33]

As regards the actual practice of air power, British doctrine distinguished between "indirect" and "direct" support. Indirect support was defined as "attacks on objectives which do not have immediate effect on the land battle, but nevertheless contribute to the broad plan."[34] Typically, this involved attacking enemy lines of communication and the like by heavy or medium bombers, but fighter-bombers could be used against such targets as well. Direct support, on the other hand, was defined as "attacks upon enemy forces actually engaged in the land battle."[35] Typical targets included such things as defensive positions or other enemy forces at the front, and hostile batteries of artillery or concentrations of armor somewhat behind the front. "Direct Support" is thus somewhat broader than the modern term "close air support," which did not appear in the official British terminology of 1944.[36] Direct support was further categorized on the basis

	Direct Support	Indirect Support
Pre-Arranged	- attack of targets in the immediate area, usually by fighter bombers - requests passed up normal command channels - routinely pre-arranged for the next day at the evening air conference	- attack of deeper targets, often by medium bombers, but also by fighter-bombers - requests passed up normal command channels - routinely pre-arranged for the next day at the evening air conference
Impromptu	- attack of targets right at the front, usually by fighter bombers - requests made by radio direct from forward controllers to Composite Group level - response time of several hours to a few minutes (with a CABRANK)	- strictly speaking, all indirect support was pre-arranged, but there were a few occasions on record of it being organized for later the same day

Table 1: Summary of British Doctrinal Types of Air Support

WITHIN THE ARMY, A NEW SORT OF SPECIALIST OFFICER WAS CREATED … THE AIR LIAISON OFFICER (ALO)

of urgency, distinction being made between "impromptu" and "pre-arranged" requests for air support.[37] Pre-arranged attacks were planned through the staff process, sometimes weeks ahead of time, but routinely for the next day. Impromptu requests were originated in the heat of battle by leading army elements and sent via the special air request radio network created specifically to handle such requests.

So much for the abstract doctrine. What was the actual working system created to implement all of this? Traditional RAF organization was geared neither to close integration with the Army, nor to moving headquarters and airfields along behind an advancing front. A new organization, known as a "tactical air force" was therefore created for this purpose, and the 2d Tactical Air Force (TAF), that fought in north-west Europe was the British epitome of this system. It consisted of a mobile headquarters that could follow the army group's headquarters in the field, various groups, and a considerable service support tail consisting of everything from a field hospital to "Servicing Commandos" for repairing aircraft.[38] One group—No.2—was a light bomber formation, dedicated to indirect support. Another of the groups—No. 85—consisted of Mosquito night fighters. The heart of 2d TAF, however, were the two "composite groups," each with seven or eight wings of three to four squadrons of fighter-bombers. The actual flying squadrons of the composite groups were located at airfields as close to the front as possible. Indeed, each composite group had integral engineering units specifically for the purpose of building airfields just behind the advancing armies.

There was also a special radio network to handle the air support requests in a timely fashion. For this Air Support Signals Units or "ASSUs" were created, one for each field army-composite group pairing.[39] The backbone of the ASSUs were the "tentacles" that went forward to the leading formations. They were small detachments, normally mounted in a 1,500-weight truck, but sometimes in an armored vehicle. Equipped with army pattern radios and a small crew of three or four soldiers with a junior officer,[40] they passed the air support requests from the leading ground forces' headquarters directly back to the joint Army-Composite Group headquarters.[41] Standard tentacles did not,

however, have any radios that could communicate with aircraft. They were normally assigned to a division or brigade headquarters, never below brigade level, except occasionally in the case of reconnaissance regiments.

In accordance with the principle of joint command, each army headquarters was paired with a composite group headquarters, and these would co-locate. Thus situated, the army-composite group headquarters formed a "joint battle room."[42] It was in the joint battle room that joint army-air force consultation was routinely performed to prioritize fighter-bomber missions and issue direction. This, at army rather than corps level, was the final form of what had originally been the CSBC or ASC.

Each of the Composite Groups also had an organization known as a Group Control Center (GCC). This was the air organization that actually directed and controlled the flying aircraft. The GCC would scramble planes, and vector them to their targets, just as the static Sector Headquarters had done so famously during the Battle of Britain. The GCCs were also the organizations within 2d TAF responsible for monitoring their airspace and ensuring the maintenance of air superiority within that area.[43]

Additionally, aside from the basic tentacles, there were specialized tentacles, including VCPs (Visual Control Posts), FCPs (Forward Control Posts) and contact cars, depending upon their exact configuration and equipment. These had grown out of the ROVER DAVID system in Italy, and were essentially standard tentacles to which additional radios and personnel were added, so that they were able to communicate with overhead aircraft and call down airstrikes directly. (See glossary, pg. 30.)

Within the Army, a new sort of specialist officer was created for this system—the Air Liaison Officer (ALO). This was an officer from one of the combat arms of the Army, trained in the principles and procedures of air support.[44] ALOs were used in FCPs, VCPs and contact cars, and back at the airfields to brief the pilots on the ground situation before they took off.

So, we have seen the British doctrine and the elaborate organization for tactical air power. How was it actually done? Joint RAF-Army staffs dedicated to planning and coordinating air support existed at two levels: the paired headquarters of 21st Army Group-2d TAF, and at each paired army-composite group headquarters. At the level of headquarters, 2d TAF and 21st Army Group, the process was generally dedicated to overall direction. The heart of the organization for tactical air support lay at the army-composite group level. Direct air support was generally delegated down to this level, and it was there that impromptu requests were dealt with.

Pre-arranged air support

The center of the process for planning pre-arranged air support was the daily air conference at army-group headquarters.[45] These were large
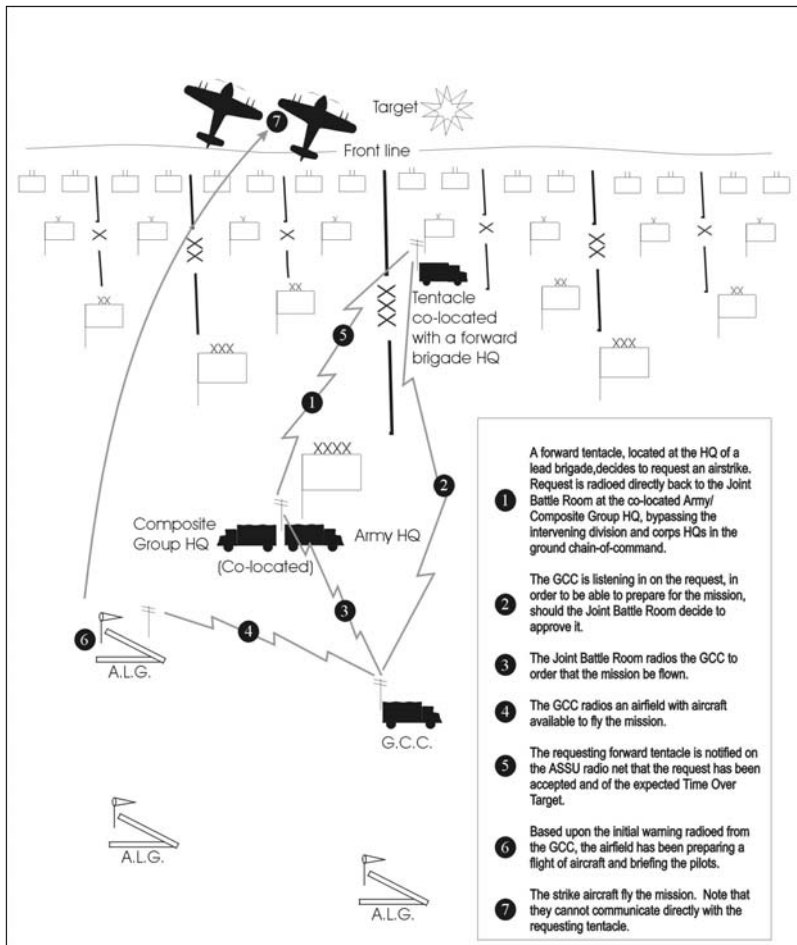
Diagram 2 (above): The British System: Impromptu Air Strikes with a Standard Tentacle. The diagram portrays the simplified lay-out of a field army on the ground, with its associated composite group in support. The headquarters of the composite group and the army are co-located, and the army has two corps up, while the composite group's Air Landing Grounds (ALGs), each typically housing a wing, are in the army's rear area.

① A forward tentacle, located at the HQ of a lead brigade, decides to request an airstrike. Request is radioed directly back to the Joint Battle Room at the co-located Army/Composite Group HQ, bypassing the intervening division and corps HQs in the ground chain-of-command.

② The GCC is listening in on the request, in order to be able to prepare for the mission, should the Joint Battle Room decide to approve it.

③ The Joint Battle Room radios the GCC to order that the mission be flown.

④ The GCC radios an airfield with aircraft available to fly the mission.

⑤ The requesting forward tentacle is notified on the ASSU radio net that the request has been accepted and of the expected Time Over Target.

⑥ Based upon the initial warning radioed from the GCC, the airfield has been preparing a flight of aircraft and briefing the pilots.

⑦ The strike aircraft fly the mission. Note that they cannot communicate directly with the requesting tentacle.

① A VCP, located at the HQ of a lead brigade, decides to request an airstrike. Request is radioed directly back to the Joint Battle Room at the co-located Army/Composite Group HQ, bypassing the intervening division and corps HQs in the ground chain-of-command.

② The GCC is listening in to the request, in order to be able to prepare for the mission, should the Joint Battle Room decide to approve it.

③ The Joint Battle Room radios the GCC to order that the mission be flown.

④ The GCC radios an airfield with aircraft available to fly the mission.

⑤ The requesting forward tentacle is notified on the ASSU radio net that the request has been accepted and of the expected Time Over Target.

⑥ Based upon the initial warning radioed from the GCC, the airfield has been preparing a flight of aircraft and briefing the pilots.

⑦ The strike aircraft fly the mission. The VCP communicates directly with the flight when they arrive in the area.

Diagram 3 (above right): The British System: Impromptu Air Strikes with an FCP or VCP. When an actual forward controller (an RAF pilot who could communicate with overhead aircraft by VHF radio), as opposed to a standard tentacle, was present, the system could work much more flexibly and responsively.

affairs, chaired by the army headquarters Chief of Staff. They were held in the late evening, after which orders for the flying wings would be issued by the group headquarters, usually by teleprinter.[46] Additionally, specific conferences would be called as necessary to produce "Air Programs" for major operations.[47]

Impromptu Request Procedure

Immediate close support in the heat of battle was provided by the impromptu system. The tentacles, often forward with the lead brigades, passed requests for air support through the ASSU radio network, directly back to group-army headquarters, without passing through the intermediate divisional and corps levels of command. The army-composite group staffs would then either authorize or deny the request.[48] The GCC, meanwhile, would also be listening in on the same net, concurrently directing the preparation of aircraft, in order to be ready should the request be approved. Thus, immediately upon authorization, aircraft could be dispatched. The forward tentacle which had initiated the request would be notified through the ASSU net that aircraft were on their way, and their estimated time of arrival.[49] If a VCP was forward in the target area, it could establish radio communications with the strike aircraft and talk them onto target. If there was no VCP or FCP present, the Army had to simply wait for the expected air strike.
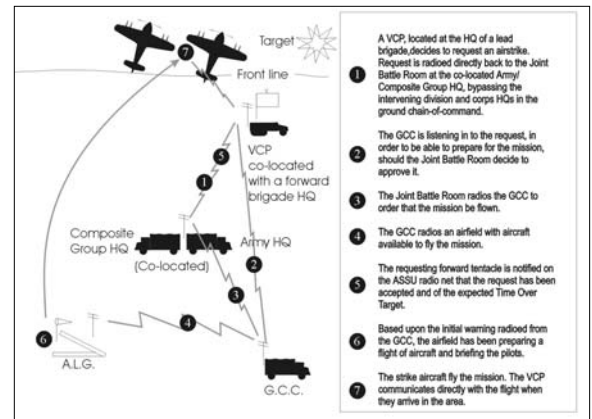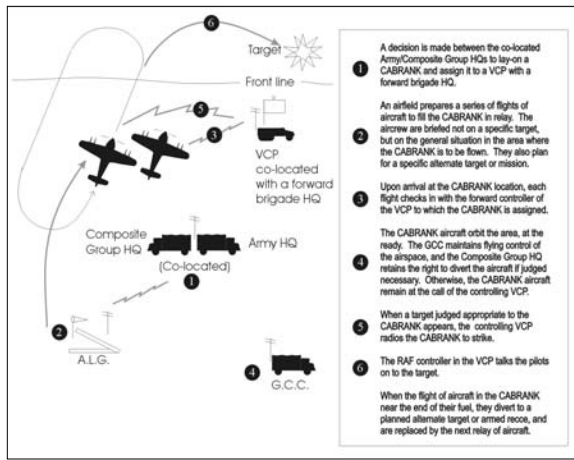
If an FCP (or VCP) was forward in the target area, it could shorten the authorization process and improve the communications between the ground formations and the aircraft overhead. FCPs could fulfill many of the roles of both the army-composite group headquarters and the GCC. Generally, the FCP would co-locate with the headquarters of the lead or priority corps within the army, and there "listen in" on the calls for impromptu air support from the forward tentacles with that corps' lead elements.[50] If the FCP commander, in close consultation with the corps commander, heard a request which he considered sufficiently important, he would "step in" and assume control of that request.[51] The FCP, which was also in communications with the GCC and all flying aircraft in the area, could direct any aircraft assigned to it to that mission. RAF pilots with the FCP would establish communications with the strike aircraft and brief their pilots on the mission over the radio.

Thus, pre-arranged attacks were staffed through the normal chain-of-command, and impromptu requests were made on the spot by front-line commanders, through the forward tentacles. However, pre-arranged and impromptu were not entirely distinct. The principal bridge between the two was the CABRANK system, which amounted to a pre-arranged placing of aircraft at a specific time and place in order to be immediately available for impromptu support.

The response time for pre-arranged air support thus varied from plans drawn up days or even weeks ahead of time, to routine requests for air support the next day. The timeliness of response to impromptu requests varied as well. Generally, impromptu requests took about one to two or three hours from request to the appearance of aircraft over target, depending upon circumstances.[52] At the other extreme, if there was a CABRANK available, aircraft could be diverted onto the target even more quickly, sometimes within minutes.

But the most common form of ground attack was not called in by any form of forward control. The most common mission type for fighter-bombers was actually "armed reconnaissance", or "armed recce" as it was commonly known. This was a mission type in which fighter-bombers patrolled a given route or area behind German lines. They would range widely, collecting valuable intelligence and attack-

Target

Front line

VCP co-located with a forward brigade HQ

Composite Group HQ

Army HQ

(Co-located)

A.L.G.

G.C.C.

1. A decision is made between the co-located Army/Composite Group HQs to lay-on a CABRANK and assign it to a VCP in a forward brigade HQ.

2. An airfield prepares a series of flights of aircraft to fill the CABRANK in relay. The aircrew are briefed not on a specific target, but on the general situation in the area where the CABRANK is to be flown. They also plan for a specific alternate target or mission.

3. Upon arrival at the CABRANK location, each flight checks in with the forward controller of the VCP to which the CABRANK is assigned.

4. The CABRANK aircraft orbit the area, at the ready. The GCC maintains flying control of the airspace, and the Composite Group HQ retains the right to divert the aircraft if judged necessary. Otherwise, the CABRANK aircraft remain at the call of the controlling VCP.

5. When a target judged appropriate to the CABRANK appears, the controlling VCP radios the CABRANK to strike.

6. The RAF controller in the VCP talks the pilots on to the target.

When the flight of aircraft in the CABRANK near the end of their fuel, they divert to a planned alternate target or armed recce, and are replaced by the next relay of aircraft.

ing any targets of opportunity, with bombs, rockets or guns.[53] This was the mission type that led to so many shot-up German columns on the Norman roads, and it came to be perhaps the most important mission type of the campaign. The RAF firmly believed that the deeper and more free-ranging armed recce missions were a far more effective and worthwhile utilization of tactical air power than close support missions at the front, and devoted the majority of their sorties to this mission type.[54]

The Evolution of the U.S. System

So, if that was the British system, how does the U.S. system compare? As we shall see, the history of the development of the U.S. system for tactical air power is more difficult to piece together, but several things are clear. First, as we saw above, it is clear that the U.S. did not ignore tactical air power or allow it to languish in the interwar period—unlike the RAF who really did ignore tactical roles. Secondly, while there is no particular evidence indicating U.S. influence on either of the key points from which the British system derived (the Wann-Woodall report and the conferences in North Africa), there is clear documentary evidence of British influence on the US.

As with the British, tactical air power had strong roots in U.S. practice, going back to the First World War. In that conflict, the U.S. air arm was employed mostly in tactical roles.[55] This experience was captured after the war by officers such as William "Billy" Mitchell, Edgar Gorrell, and William Sherman, all of whom by 1920 had produced various works that codified the wartime experience.[56] Reflecting the Great War experience, they all placed the Air Service firmly in tactical support of the ground forces. In 1922 the War Department published TR (Training Regulation) 440-15, *Fundamental Principles for the Employment of the Air Service*, which explicitly directed that ground commanders retained command over support aviation.[57]

After that spurt of development in the early 1920s came the long, slow interwar years. While there was comparatively little development in this period, as noted above new types were introduced, and in 1935 TR 440-15 was updated somewhat. But in 1939, the outbreak of the war in Europe truly

focused minds. The U.S. Army was frankly dazzled by the close cooperation between the panzers' and the "stuka" dive-bombers, seen so dramatically in Movietone News clips. The Air Corps quickly contacted the U.S. Navy for help with a crash dive-bomber program, and took other steps to re-energize the tactical air power program.[58] On April 15, 1940, a new manual was published, FM 1-5 *Employment of the Aviation of the Army,* which was short and prescribed few specifics.[59] However, the Air Corps was in close contact with the British, to follow the developments there growing from the Wann-Woodall Report. The North African strand of British development also reached the Americans; a copy of the British "Directive on Close Support Bombing" of December 6, 1940, was "strongly" endorsed by U.S. Army Air Corps commander Gen. Henry H. "Hap" Arnold.[60] In April 1941, General Arnold visited the UK to see for himself how the new British system for close air support worked.[61] He had been preceded in 1940 by then Brig. Gen. Carl A. "Tooey" Spaatz, who had spent an extended stay in Britain, primarily to observe fighter air defense operations, but he was also probably exposed to the Wann-Woodall report and ongoing development of tactical air power as well.[62]

By this time, U.S. tactical air power doctrine had entered a period of intense development, as was U.S. rearmament generally. The year 1941 was dominated by a series of large scale maneuvers designed to test new ideas, both of mobile warfare on the ground, and tactical air warfare from above, very obviously strongly influenced by events in Europe and North Africa. In fact, it would appear that at Arnold's behest the basis for the organization tested in these manoeuvres was the British "Directive on Close Support Bombing" of December 6, 1940.[63] The manoeuvres began in February with exercises by the IV Corps under Maj. Gen. Benedict with the 3d Bombardment Group (Light) in support, commanded by [then] Maj. Gen. Lewis Brereton. This resulted in the "Benedict-Brereton" Report, and on 29 August this was translated into Training Circular (TC) No. 52, which formed the basis for further manoeuvres at Fort Knox, Louisiana and finally South Carolina, in which trials were extended up to the army level of command. All of this culminated in the publication of Field Manual 31-35 *Aviation in Support of Ground Forces* (FM 31-35), in April 1942.[64]

These trials, based in large part upon British practical experience, meant that by the time the U.S. entered the war after Pearl Harbor, the lessons of the British ASC system for tactical air power had been fully digested. Tellingly, the term "ASC" does not appear at all in FM 1-5 (April 1940), and while it is unclear from the records extant exactly when it was imported into U.S. use, it is clear that it first appears in the historical record in British use in North Africa and was then imported to the U.S.[65] FM 31-35 (April 1942), officially enshrined ASCs in U.S. doctrine (using that very term).

Thus, it is true that the U.S. entered North Africa with doctrine for tactical air power that was

not greatly altered by experience there or by the subsequent publication of FM 100-20. However, the doctrine in FM 31-35 was clearly influenced by the British model, going back to the ideas of the Wann-Woodall report, the 1940 "Directive on Close Support Bombing" that Arnold endorsed, and the ASC concept, which had been imported from the RAF Middle East practice.

FM 31-35 outlined the system with which the U.S. entered the fighting. This was later augmented by the much more famous FM 100-20, which was published in 1943 and reflected (or claimed to reflect) the experience in North Africa.[66] However, both were rather abstract and neither spelled out a great deal of specifics. FM 31-35 is 65 pages, but this includes an index, appendices, and a great deal of secondary material on communications procedures and auxiliary missions such as photo reconnaissance. Less than a dozen pages are devoted to general principles and the primary issue of ground attack, including what guidance it provides on targeting and mission types.[67] FM 100-20 is even shorter—the entire publication is only 14 pages from cover to cover and it addresses (however briefly) everything from strategic bombers to the administrative and logistic support provided by Air Service Commands. Perhaps in consequence of this brevity, U.S. doctrine (or at least, U.S. *officially published* doctrine) lacked a clear systemization of tactical air power into categories such as direct and indirect support, or pre-arranged and impromptu, as found in British doctrine.[68] What the written U.S. doctrine did focus on was the contentious issue of command arrangements, and some prescriptions for prioritization of operations.

FM 31-35 had rather little to say about targeting, or what role tactical air power might play in the campaign, other than to note that targets should generally not be within the range of the ground forces' own weapons, and that "the most important target … will usually be … the most serious threat to the … supported ground force."[69] Final authority for target selection was expressly given to the supported ground force commander.[70] FM 100-20, on the other hand, introduced a clear hierarchy of priorities for tactical air power. The top priority was to be gaining and maintaining air superiority; secondly deep interdiction meant to isolate the battle area; and finally as the last priority, close air support.[71]

As regards organization, FM 31-35 specified that at the top end of the organization, all available air power in a theater should be centralized within one "air force," but that tactical air power would normally be grouped into what it termed "air support commands," which would be "habitually attached to or support[ing] an army in the theater."[72] Within these Air Support Commands, were to be ASCs. FM 31-35 placed them at corps level, or occasionally down to armored divisions.[73] At the bottom end of the chain, air support parties (or "ASPs") were to be found at corps and divisional level with infantry formations, or down to regimental level in armored (and cavalry) formations.[74] These ASPs were defined as "highly mobile groups composed of one or more air support officers and necessary personnel and equipment to transmit air support requests … and to operate communications with aircraft in flight."[75] Air Support Commands were thus analogous to Composite Groups in size, structure and role. ASPs were analogous to the British forward tentacles, albeit with the significant technical difference that they were able to communicate directly with overhead aircraft.

Development did not stop there of course. Indeed, in Italy the USAAF further copied British practice when they instituted the ROVER JOE system, which as the name makes clear was explicitly based upon the RAF system of ROVER DAVID.[76] More significantly, the command and control system spelled out in FM 31-35 was modified for the eventual OVERLORD campaign in North-West Europe. The ASC function was elevated to the army headquarters level.

The U.S. System in its Mature Form

The eventual American system was not as explicitly articulated in doctrine as the British. What was formally articulated appeared in the two key publications FM 31-35 and FM 100-20 we have already seen. However, neither prescribed a great deal of specifics, and in fact some of the specifics in FM 31-35 were superceded in eventual practice. For the OVERLORD campaign, what FM 31-35 had termed "Air Support Commands" were known as Tactical Air Commands, universally known as "TACs."[77] More substantively, FM 31-35 prescribed that ASCs[78] should exist as an intermediate level of command for air support requests between the ASPs at the front and the Air Support Command (or TAC as they were eventually known) at army level. As mentioned, FM 31-35 described ASCs as placed at corps level, and that they would be able to action requests from the forward ASPs without further reference to the Air Support Command-TAC at army level. In subsequent practice, the ASC function was merged with the TACs at army, although the doctrine for them contained within FM 31-35 was never formally rescinded. The Standard Operating Procedures for the TACs in northwest Europe prescribed a system in which immediate call requests from the ASPs at the front went straight to the TAC-Army headquarters. In fact, not bothering with formal doctrine represents a feature of U.S. practice; by 1944 they worked straight from SOPs.

For the actual OVERLORD campaign, the USAAF formed a tactical air force to support the land campaign—the Ninth Air Force, commanded initially by Lieutenant General Brereton, subsequently by Maj. Gen. Hoyt S. Vandenberg. It consisted of about a hundred squadrons of combat aircraft, its primary components being a Bomber Command of mediums and several TACs of fighter-bombers, plus the associated servicing organizations required to support such a force. The TACs consisted of twenty to thirty squadrons of fighter-

bombers, and were "paired" with ground formations at the army level. The Ninth Air Force itself was paired with 12th Army Group, and IX TAC was paired with 1st Army. XIX TAC was paired with 3d Army. Pairing in this fashion did not extend lower down the chain of command.[79]

Gen. Omar Bradley's 12th Army Group headquarters and Brereton's Ninth Air Force headquarters were co-located. The various army and TAC headquarters were, as a matter of principle, co-located and between them they formed what was initially termed an Air Support Control Center, and subsequently a Combined Operations Center. This was analogous to the Joint Battle Room in the British system, and this was the level at which requests for air support arrived, were jointly considered by the ground and air staffs, prioritized, and orders issued.

Each TAC also had an organization dedicated to flying control of its aircraft, the Tactical Control Center (TCC). It received an air picture from mobile radar units deployed just behind the front lines, and maintained radio control of all aircraft in its area. TCCs were manned with USAAF personnel, and were not co-located with the joint army-TAC headquarters.

Below army level, the Americans employed the ASPs conceptually described in FM 31-35.[80] ASPs were permanently attached to every Army formation headquarters, right down to divisional level, but they were manned from Ninth Air Force personnel. Most significantly, the actual ASP officer, or "ASPO," was a tour-completed fighter-pilot. All ASPs were equipped with VHF radios for communication with aircraft, but they varied in size and configuration.(See glossary, pg. 30.)

The actual flying squadrons of the TAC were based in forward strips as close behind the front as practicable. Also at the airfields were "Ground Liaison Officers" or GLOs. These were liaison officers from the ground forces who were responsible for monitoring front-line developments through army ground forces channels. Before the pilots took off for missions, the GLOs would brief them on the ground situation.[81]

Just as the British distinguished between pre-arranged and impromptu missions, so did the Americans, although—as noted above—this was not actually articulated in their formal doctrine. Perhaps as a result of this, there is a sometimes confusing welter of terms in the contemporary documentation. Pre-arranged missions are variously referred to as "planned," "pre-planned" or "request" and impromptu missions as "immediate request," "emergency call" or simply "call" missions. The IX TAC Standard Operating Procedures for ASPs, as of August 3, 1944, actually differentiated between three categories of air support.[82]

A Planned Mission is a mission which will be flown on a day or days subsequent to the day of request.

A Request Mission is a mission which will be flown during the current day's operations but which is not

ASIDE FROM
REQUEST
MISSIONS, BY
1944, THE
USAAF WAS
PRACTICING
ARMED
RECCE, JUST
AS WAS THE
RAF

an Immediate Request Mission.

An Immediate Request Mission is a mission which will be flown as expeditiously as possible.

Planned missions were normally requested up the ground chain of command until they reached the Army-TAC level, and were then considered at a daily air conference held every evening. These meetings were large affairs, conducted jointly by the army headquarters operations staff with the TAC headquarters, at the end of which flying orders for the next day were drawn up and disseminated to the flying squadrons by teletype.[83]

Requests for immediate support, generally known as "call" missions, were passed directly from the ASPs to the Combined Operations Center.[84] There, a decision was made in consultation with the Army G-3 (Air), TAC A-3 and their staffs as to whether the target merited allocation from available resources, and whether it fit within the Army's concept of operations. If accepted, the TCC would be ordered to scramble aircraft. Alternatively, aircraft already airborne in the area could be redirected. In either case, the TCC was responsible for the flying control of all aircraft in the TAC's area.[85] Upon arrival over the target area, the strike aircraft would "check in" with the requesting ASP, and receive final guidance.[86] This was of course a significant advantage for U.S. ASPs over standard British tentacles, as the latter could not communicate directly with the overhead aircraft. As regards the response times, this obviously varied with circumstances. Brig. Gen. Elwood "Pete" Queseda, the commander of IX TAC, estimated that his aircraft could fulfill an immediate request mission in 60 to 80 minutes.[87] Other accounts suggest that the response time was often somewhat more.[88] Overall, it would seem fair to say that in ideal circumstances an air strike could be delivered in about an hour, but that often, of course, circumstances were less than ideal and it took a couple of hours or so to get bombs on target.

Aside from request missions, by 1944, the USAAF was practicing armed recce, just as was the RAF. This represented something of a wartime innovation in that interwar U.S. theory had stressed that all attack missions should be planned, since it would be inefficient and wasteful to send out missions on speculation.[89] In the event however, a considerable portion of Ninth Air Force's sorties were devoted to this mission type.[90]

The other major innovation of the campaign was what came to be termed "Armored Column Cover" or sometimes simply "Column Cover." This was a system whereby an ASP was mounted in an actual Sherman tank and travelled with the leading armored columns. Fighter-bombers were then kept in orbit overhead, in direct communication with this tank mounted ASP, and thus available for immediate attack of close targets or to conduct armed recces forward from the column's position. The procedure was for the flight lead to check-in by radio with the ASP controlling them, usually one of

An ASP, located at the HQ of a lead regiment, decides to request an airstrike. Request is radioed directly back to the Combined Ops Center at the co-located Army/TAC HQ, bypassing the intervening division and corps HQs in the ground chain-of-command.

The TCC is listening in to the request, in order to be able to prepare for the mission, should the Combined Ops Center decide to approve it.

The Combined Ops Center radios the TCC to order that the mission to be flown.

The TCC radios an airfield with aircraft available to fly the mission.

The requesting ASP is notified on the air support radio net that the request has been accepted and of the expected Time Over Target.

Based upon the initial warning radioed from the TCC, the airfield has been preparing a flight of aircraft and briefing the pilots.

The strike aircraft fly the mission. As they arrive in the area, they check in by radio with the requesting ASP, for last minute update. After flying their strike they pass an immediate update directly to the ASP.

A decision is made between the co-located Army/TAC HQs to lay-on Armored Column Cover and assign it to an ASP with an advancing CC. The ASP is normally located with the CC HQ or with the HQ of the lead tank battalion.

An airfield prepares a series of flights of aircraft to fill the Column Cover in relay. The aircrew are briefed not on a specific target, but on the general situation in the area where the Column Cover is to be flown.

Upon arrival at the armored column's location, each flight checks in with the controlling ASP, and then flies armed recce out to approx 35 miles infront of the column, remaining in radio contact with the ASP.

The TCC maintains flying control of the airspace, and the TAC HQ retains the right to divert the aircraft if judged necessary. Otherwise, the Column Cover aircraft remain at the call of the controlling ASP.

When a target judged appropriate to the Column Cover aircraft appears, the controlling ASP radios the aircraft to strike.

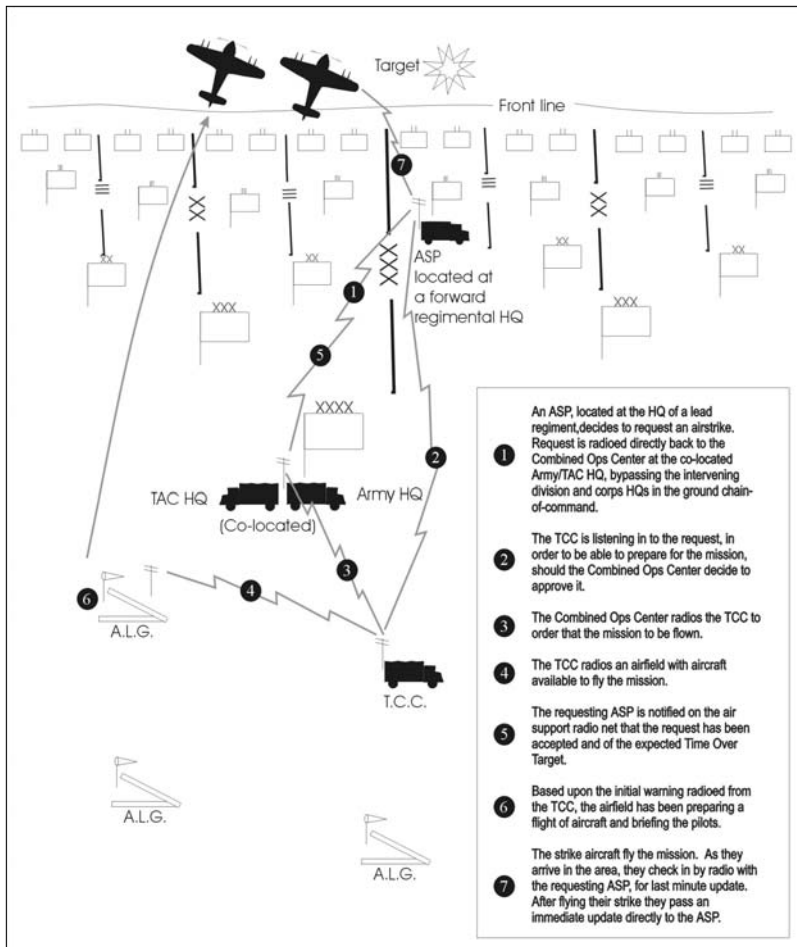The controller in the ASP talks the pilots on to the target.

Diagram 5 (above): The US System: Immediate Call Missions. The diagram portrays the simplified layout of a field army on the ground, with its associated TAC in support. The headquarters of the TAC and the army are co-located, and the army has two corps up, while the TAC's ALGs, each typically housing a group, are in the army's rear area. Compare with Diagram 2.

Diagram 6 (above right): The US System: Armored Column Cover. The epitome of the US system, armoured column cover allowed not only extremely rapid response, but offensive reconnaissance in direct support of the advancing troops. It was normally controlled from a tank mounted ASP with the advancing CC.

the special tank mounted ASPs at the tactical headquarters of a CC. The flight would then reconnoitre up to 35 miles ahead of the column, staying in radio contact with the ASP, thereby providing immediate air reconnaissance information to the CC, and attacking any German forces the CC commander wished. Typically, a flight could stay on station for about an hour before fuel considerations would require them to break-off. If no call mission was requested of them during that time, they would then proceed on an armed recce mission to find a target on which to expend their weapon load.[91]

Comparison

So where does all of this leave us? Are the two systems as similar as one would expect if one had been influenced by the other? Let us look first at the differences. Essentially, these were to be found in two areas: the more abstract doctrine and the greater technical resources inherent in the U.S. system.

The principal doctrinal differences between the U.S. and British lay first of all in the more fully articulated nature of the British doctrine, and secondly in the more rigidly doctrinaire prescription for targeting priorities laid out in FM 100-20. The comparative paucity of formally promulgated U.S. doctrine has already been commented upon.
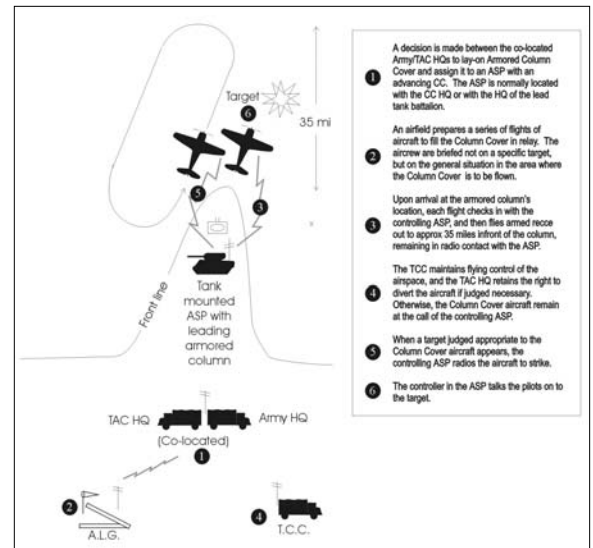
Really, they had no published equivalent to the two British pamphlets *Army-Air Operations*. The U.S. terms for pre-arranged and impromptu air support do not even appear in FM 31-35 or FM 100-20. But the more significant doctrinal difference between the U.S. and Britain lay in FM 100-20's rather rigid insistence upon arranging targeting in a strict hierarchy: air superiority first, deep interdiction second, and close air support only third.[92] In fact, so rigid was this prescription that the term "phases" came to be used to describe them.[93] In the event, this prescription was not really followed by Ninth Air Force—they pursued multiple efforts more or less simultaneously.[94] Indeed, it has been suggested that FM 100-20 was really more a product of the bureaucratic wars in Washington than the shooting wars in Europe and the Pacific.[95]

One of the greatest differences between the two systems lay in the nature of the forward control elements. In the British system, the forward controllers were part of the ASSUs, which amounted to a centralized pool of forward controllers held at army level. Tentacles, VCPs and FCPs were then farmed out to formation headquarters along the front for short durations, as required. U.S. ASPs, on the other hand, were permanent parts of every corps and divisional headquarters. Most strikingly of all, standard British tentacles had no means of communicating with aircraft overhead, whereas each and every U.S. ASP was capable of this. In essence, every U.S. corps headquarters had what amounted to an FCP, and every divisional, CC and some regimental headquarters had what amounted to a VCP. Another difference was that in the British system the ASSUs and forward tentacles were manned with Army personnel (with the exception of any actual controllers in FCPs and VCPs), whereas in the U.S. system all of the ASP crews came from Ninth Air Force personnel.

There was one other striking difference between the two systems, and that was the American innovation of the system of armored column cover. A great deal of folklore surrounds the development

RAF	USAAF
2nd TAF paired with 21st Army Group	9th Air Force paired with 12th Army Group
- paired with an Army Group	- paired with an Army Group
- commanded by an Air Marshal (Lieutenant General equivalent)	- commanded by a Lieutenant General
- approx 85 sqns of combat aircraft	- approx 100 sqns of combat aircraft
Composite Groups	Tactical Air Commands (TACs)
- paired with Armies	- paired with armies
- commanded by an Air Vice Marshal	- commanded by a Brigadier General
- 25-30 squadrons of fighter-bombers	- 20-30 squadrons of fighter-bombers
Combined Operations Center	Joint Battle Room
- formed between Composite Group and Army headquarters' staffs	- formed between TAC and Army headquarters' staffs
- served as the focal point for accepting/rejecting air support requests	- served as the focal point for accepting/rejecting air support requests
Group Control Centre	Tactical Control Center
- control element to coordinate defence of airspace and control aircraft in flight	- control element to coordinate defence of airspace and control aircraft in flight
Forward tentacles, including FCPs and VCPs, with corps, division or brigade headquarters, occasionally down to the level of battalion headquarters	ASPs with corps, division, CC/Infantry Regiment headquarters, occasionally down to the level of battalion headquarters
Daily Planning Conference	Evening Air Conference
Pre-arranged missions	Pre-planned missions
Impromptu missions	Call missions
Armed Recce	Armed Recce
CABRANK	Armored Column Cover
Response Times:	Response Times:
- routine requests typically for next day	- routine requests typically for next day
- impromptu requests approx one to two hours	- call requests approx one to two hours
- with CABRANK, as little as a few minutes	- with Armored Column Cover, as little as a few minutes

Table 2: Side-by-Side Comparison of British and US Systems

of armored column cover; it is almost always attributed to the personal invention of either IX TAC commander General Queseda, or even to Bradley himself.[96] These claims are often accompanied with folksy stories of how the initial tank to be converted into an ASP kept getting turned back from IX TAC because everyone believe it had to be an error that an air formation was requesting a *tank*.[97] Certainly, the decision to mount an SCR 522 radio in a Sherman tank was a field expedient developed for Operation COBRA. However, the innovation of putting an ASP into a Sherman tank—while clearly an excellent idea—was not logically necessary for the system of armored column cover. A standard ASP in a truck or jeep could perform the same function, i.e. the close control of a dedicated flight of fighter-bombers. In fact, this is exactly what was done with the earlier "veeps," as jeeps with VHF radios were known.[98] Furthermore, there is a clear relation between armored column cover as practiced with such success from shortly after COBRA and the RAF's pre-existing CABRANK system, of which all of the senior U.S. commanders—both Queseda and Bradley in particular—were fully aware. Even the mounting of an ASP in a Sherman was not without precedent. The British mounted their VCPs in armored vehicles, usually half-tracks but sometimes tanks, and the first British use of a VCP was on July 18, a full week before COBRA.[99]

Many of the more breathless accounts of

armored column cover describe the tank mounted ASPs as being in "the lead tank in each armored column."[100] This is both inaccurate and misleading. In fact, the standard practice for tank mounted ASPs was for them to be attached to a Combat Command (CC), where they were normally located with that CC's headquarters; when they went "forward with the lead columns" it was to a tank battalion's headquarters.[101] That is quite far forward enough for it to have been logical and prudent to mount the ASP in a Sherman, but it is not quite the very point of the advance—it is in fact three or four echelons of command back from the point tank.[102]

To be fair, armored column cover was more than a simple copy of the CABRANK system—it was a legitimate improvement upon RAF practice. Armored column cover was not only more frequently employed by the USAAF than CABRANK was by the RAF (which probably reflects the greater material resources available to the Americans), but it was also far more flexible. Armored column cover aircraft ranged ahead much more freely and aggressively than CABRANKs, who tended to orbit behind their forward controller.

Notwithstanding these differences, by the summer of 1944 the Anglo-American forces had a remarkably uniform organization and practice for tactical air power. Second TAF of the RAF and Ninth Air Force of the USAAF were much more similar to each other than the ground forces of the U.S. Army were compared with the British Army, or even than the Eighth Air Force was with Bomber Command. The British and American doctrine may have been expressed somewhat differently, but in practice they operated essentially the same way. Overall, the similarities are strikingly exact, as a side by side comparison shows (see box). These similarities are too exact to be coincidence—either one was influenced by the other, or both were developed together.

Conclusions

The American development of a working tactical air power system went through a complex development process, with various influences across the Atlantic at different times. It is not now entirely possible to untangle the full cause and effect in this process. As air power historian David Mets has argued, much air power theory in that era was "corporate knowledge," common among the leading airmen of both Britain, the U.S., and other nations, but not necessarily written done in a way that allows modern scholars to dole out academic credit.[103] Nevertheless, a careful examination of the record—in particular the chronology of key developments—makes it clear that while the U.S. had cultivated a doctrinal background for tactical air power in the interwar years, this was rather broad and abstract. The actual working mechanism for tactical air power in the USAAF was developed in the rush to mobilize during 1941 and 1942. Cause and effect during that concentrated period are difficult to pin down from the records extant.

Date	US	Remarks
WW I	US Air Service goes to war with AEF	Their primary experience is in what would later be termed "tactical air power."
23 Dec 1918	"Provisional Manual for Operations of Air Service Units" by "Billy" Mitchell	These manuals were essentially a codification of wartime practice, which was that tactical air power was subordinate to ground formation commanders.
June 1920	"Notes on the Characteristics, Limitations, and Employment of the Air Service" by Gorrell, (published as an *Air Service Information Circular*)	
1920	"Notes on Recent Operations" by Sherman, (published as an *Air Service Information Circular*)	
1922	"Fundamental Doctrine of the Air Service" drafted by school (which was then located at Langley).	This document, never actually officially endorsed, suggested centralization of air assets rather than distributing them under the command of various ground formations along the front.
1922	Training Regulation 440-15 *Fundamental Principles of Employment of the Air Service* (TR 440-15)	This, rather than the school's proposed "fundamental doctrine" (above), was formally adopted as official doctrine. It represented an orthodox interpretation based upon wartime practice.
15 October 1935	Revised TR 440-15 *Employment of the Air Forces of the Army*	
15 April 1940	Field Manual 1-5 *Employment of the Aviation of the Army* (FM 1-5)	Compromise document that had little long term effect.
6 December 1940	British directive on Close Support Bombing – subsequently endorsed by General Arnold and used as basis for trials in 1941 manoeuvers.	Describes system for air support, including the "Air Support Control" (ASC)
February-June 1941	Large scale manoeuvers to trial, amongst other things, such new theories as armored warfare and tactical air power.	- 3d Bombardment Group (Light) (Commanded by Brereton) - IV Corps (Commanded by Benedict)
July 1941	Brereton/Benedict reports on results of these trials.	
29 August 1941	Training Circular No. 52 (TC 52)	Based upon Brereton/Benedict Report
August 1941	Fort Knox manoeuvers	
September 1941	Louisiana manoeuvers	Further refinement of principles.
November 1941	South Carolina manoeuvers	
9 April 1942	Field Manual 31-35 *Aviation in Support of Ground Forces* (FM 31-35)	Based upon Brereton/Benedict report and the 1941 manoeuvers. Officially enshrined the ASC idea.
June 1942	First contingent of USAAF arrives in Western Desert	Commanded by Bereton, this force is initially mixed in with the RAF.
8 November 1942	TORCH – combined US/British invasion of N.W. Africa begins - XII Air Support Command and RAF 242 Group provide air contingent.	The TORCH air forces are decentralized (due mainly to geographic dispersion), but otherwise generally follow the dictates FM 31-35.
14-24 January 1943	Casablanca Conference.	Decision made to reorganize the British and American air forces in N. Africa.
18-22 February 1943	US defeat at Kasserine pass.	This defeat was often blamed upon an "incorrect" decentralization of air power, probably unfairly.
18 February 1943	N. African air forces reorganized into NATAF (North African Tactical Air Force)	The RAF's Desert Air Force (DAF) added to NATAF on 23 February, Coningham appointed commander. He centralizes and prioritizes targeting to emphasize air superiority.

However, we do know where the British system came from, and the fact of the matter is that there is no evidence of U.S. influence upon the early work by the British in the Western Desert, much less upon the Wann-Woodall report. It is recorded, on the other hand, that the U.S. sent observers to Britain—very senior ones—in that same time period, specifically to learn how tactical air power was developing. This can clearly be seen in the documented flow of information from Britain to U.S. circles, in particular copies of the Wann-Woodall report, the British "Directive on Close Support Bombing" of December 6, 1940 and Arnold's letter to Marshall recommending endorsement of the British practice. Admittedly this is all circumstantial, but it is very suggestive, and it is all one way—Britain to the U.S. Also circumstantial, but equally compelling, is the linguistic evidence. The very term "ASC" originated with the British (apparently in North Africa) and was carried from there back to the US, where it formed the basis for much of the air power trials in the 1941 maneuvers, and subsequently the doctrine in FM 31-35. Even more telling was the later U.S. adoption of the British expression "armed recce", rather than "armed recon."[104]

Another key point is the way in which American practice in OVERLORD represented some extemporization from the formal doctrine promulgated in FM 31-35. The British, it should be noted, had explicit formal doctrine for the final form that Anglo-American tactical air power took in North West Europe. Significantly, the USAAF did not, but rather relied on SOPs. And the effect of those SOPs was to modify the official doctrinal prescriptions of FM 31-35 to bring U.S. practice into congruence with the official British doctrine (not the other way around).

A final point that perhaps bears mentioning is that this process of borrowing working practice from the British is exactly what those senior U.S. airmen who were there describe as having happened.[105] Even if the nativist school can convincingly argue that much of the original story of post-Kasserine reform was originally spread for interservice rivalry reasons, that cannot completely discount such frank admissions from respected senior airmen.

It perhaps bears repetition at this juncture that what we are really talking about here is the *concrete system* for executing tactical air power—not the broader *abstract principles*. The U.S. nativist school of thought is quite correct to point out that senior U.S. airmen were fully conversant with those broader and more abstract principles—almost certainly more so than the RAF had been at the start of the war. However, a concrete system to effect those broader and more abstract principles had to be developed. In this regard, there must have been some concurrent development going on. Nevertheless, the flow of influence was clearly from Britain to the U.S.

May 1943	Unnumbered booklet *The Air Force in Theaters of Operations: Organization and Functions* Includes the pamphlet "The Air Support Command"	Not widely distributed.
		- introduced 3 "phases":
		  I – neutralization enemy air force
		  II – isolation of battlefield
		  III – close support of ground forces

10 July 1943	HUSKY – invasion of Sicily begins.	
21 July 1943	Field Manual 100-20 *Command and Employment of Air Power* (FM 100-20)	Short book mainly concerned to emphasize that all air forces in a theatre should be under a single air commander who is not subordinate to ground commanders, and that the first priority for this air commander should be gaining and maintaining air superiority.
3 September 1943	Invasion of Italian mainland	
late 1943 / early 1944	ROVER JOE system developed by US tactical air forces in Italian campaign.	Based upon RAF system of ROVER DAVID. The "rover" system clearly presages both CABRANK and Armored Column Cover.
early 1944	SOPs developed within 9th Air Force for OVERLORD campaign	Diverge somewhat from the official doctrine of FM 31-35, but do correspond with official British doctrine.
July 1944	Armored Column Cover with tank mounted ASPs introduced.	A system such as this was never envisioned in pre-war theory, but the US Army was immensely satisfied with it.

Table 3 (begins left and continues above) : Chronology of Developments in US Tactical Air Power Theory and Practice

An Army ground controller at his post.

This leads to an interesting irony. In the interwar years, the RAF almost completely ignored the tactical role for air power, whereas the Americans did not. As some recent U.S. historians have demonstrated, the U.S. Army Air Corps did take its tactical responsibilities seriously and devote some considerable attention to battlefield applications of air power, something the RAF manifestly did not do. Nevertheless, when war came, it was the British (who had not contemplated the matter in the interwar years) who developed an effective system for applying air power in tactical roles. The Americans (who actually had thought about the issue in the interwar years) wound up heavily influenced by the British system at the practical level. If that strikes some American historians as an uncharitable interpretation of events, it can be put another way. When war broke out, the Americans already had a full doctrinal background for tactical air power theory, whereas the British were forced to play catch-up in a crash course from the Germans. Nevertheless, catch-up they did, and when they went on to develop a working machinery for applying tactical air power against an enemy army in the field, the Americans followed their developments with interest and wisely chose to learn from them, rather than "reinvent the wheel." Given the monumental challenge faced by the comparatively small Army Air Corps of 1941—mobilizing a massive force of citizen soldier-airmen in a short period of time—that was doubtless a wise decision. ∎

Forward Control: Predecessors of the modern Forward Air Controller (FAC—a term that had not yet been coined in 1944) were the various sorts of forward controllers used by the British and Americans in late World War II.

The British:
By end of the North-West Europe campaign the British had a variety of forward control types. All belonged to the ASSU itself, constituting a central pool of forward control parties that were then temporarily attached to leading Army headquarters.

Standard Tentacles: These were small detachments, normally mounted in a fifteen hundred weight signals truck, but sometimes in an armored vehicle such as a White Scout car. Equipped with two "Canadian Number 9" type wireless sets, they had an effective radio contact range of about 40 kilometres. Three or four soldiers and a junior officer provided the crew. One of the tentacle's radio sets was to receive the latest air reconnaissance reports, and the other was to tie into the ASSU network and pass back air support requests. Standard tentacles did not have any radios that could communicate with aircraft. Nor could they communicate with the airfields or GCC. Tentacles were not attached below brigade level, except occasionally in the case of reconnaissance regiments.

FCP: Each Army/Composite Group had one Forward Control Post or FCP. The intent was to form a special team which could focus airpower even more quickly and closely on a critical sector of the front than the normal control procedure could provide. There was only one FCP within each Group/Army, and it was deployed to the corps headquarters deemed to be the priority for air support. FCPs were much larger than all other types of forward tentacles, generally consisting of approximately 10 personnel all ranks, mounted in at least two primary vehicles, either heavy trucks or M14 half tracked vehicles, plus usually a trailer and a jeep. The FCPs were equipped with both army type radios for the ASSU net, and VHF radios to speak with aircraft. Included within the FCP's staff were both RAF pilots and an Army officers in fairly senior rank. The RAF representative was a wing commander or group captain (lieutenant colonel or colonel) and experienced fighter-bomber pilot; the army representative was generally a major. Together, the pilot and Army officer were to advise the local ground commander (i.e. generally the corps commander) on the optimal employment of air support. Unlike the ordinary tentacles, with their VHF radio an FCP could talk directly with overhead aircraft, for a range of about 30 to 40 kilometres, allowing it to control aircraft overhead and talk them directly onto targets. Usually, the FCP could also communicate directly with the GCC and even the airfields, allowing it to call directly for aircraft.

VCP: Visual Control Posts or VCPs were an innovation introduced part way through the Normandy campaign, the first one being employed in Operation GOODWOOD on 18 July. Essentially a normal tentacle augmented by a fighter-bomber pilot and army officer with a VHF radio for communication with overhead aircraft, as the name implies they were meant for directing air strikes onto targets under the VCP's direct observation. The intent was for the RAF pilot to "talk" the strike pilots onto the target "using the language one pilot would use to another." There were three VCPs in each Army/Composite Group , but they were not entirely successful, apparently because in practice they were seldom able to adopt positions that gave good observation of targets. In consequence, VCPs

came to be employed as de facto miniature FCPs, normally sited with the headquarters of leading divisions or brigades. VCPs consisted of a tank or White Scout car rigged with the required radio sets, and a total of five personnel all ranks.

Contact Car: A later innovation was the contact car. They were very similar to a VCP, being essentially a normal tentacle augmented with a VHF radio for communication with overhead aircraft. Coming with the VHF radio was an RAF wireless operator and an RAF pilot. However, unlike the VCPs and FCPs, in the case of contact cars this pilot was normally a reconnaissance pilot (as opposed to a fighter-bomber pilot). Reconnaissance pilots were used because the primary role of contact cars was not to direct air strikes, but rather to facilitate liaison between reconnaissance aircraft and leading Army elements; they also served to keep the RAF accurately informed about the location of the forward most friendly troops.

The Americans:

Corps ASPs: Integral to every US corps headquarters was a large ASP equipped with a lieutenant colonel ASPO, a dozen enlisted men to serve as radio operators, map plotters, clerks and driver/mechanics. In practice the lieutenant colonel's position was sometimes filled by a major. There was also meant to be a captain assistant to the ASPO, but this was never filled in any of the TACs during the campaign. Corps level ASPs were assigned a generous amount of communications equipment, including an SCR 399 type radio and a teletype. Transport included a two and a half ton truck for the radios, a "Veep" (jeep with VHF radio) and several ordinary jeeps and tents.

Divisional ASPs: The ASPs at divisional level were smaller, consisting one officer (meant to be a major, in practice sometimes a captain) and five to eight enlisted men. The officer was an ASPO, i.e. former fighter-bomber pilot, and his five troops were radiomen, technicians, and driver/mechanics.
Infantry divisions' ASPs consisted of an SCR 522 VHF radio mounted in a jeep and an SCR 522 VHF radio and SCR 399 mounted in the back of a two and half ton truck. Below the level of the divisional headquarters, infantry divisions had no other ASPs, with the exception of some arrangements made for the beach assault on D-Day itself. For that special day, ASPs were assigned to each of the Regimental Combat Teams in the assault. Throughout the rest of the campaign, in infantry divisions the ASPs normally operated at the divisional headquarters location, although the jeep mounted radio was sometimes sent forward for specific missions.
Armored divsions' ASPs varied widely in establishment, from a low of only the same two radio sets as an infantry division, to a high of 14 radio sets. In some cases this was achieved in part by detaching pilots and technicians on a temporary rotating basis from IX TAC, which created a de facto two additional ASPs for the division in question. These additional ASPs normally worked with each "Combat Command" (CC) , sometimes even with the lead tank battalions. During the campaign itself, it was decided to mount some of these ASPs in armored vehicles, so as to be better able to accompany advancing armored columns. This was first done for Operation COBRA, and it subsequently became standard practice to maintain ASPs mounted in either half tracks, armored cars or actual Sherman tanks, fitted with standard VHF 522 radio sets, to work with armored division CCs.

1. T. Greer, *The Development of Doctrine in the Army Air Arm, 1917-1941* (Air Force Historical Study No. 89, 1953) p. 67.

2. Wesley Frank Craven and James Lea Cate (editors) *The Army Air Forces in World War II* Vol. 1 *Plans and Early Operations, January 1939 to August 1942* (Washington D.C.: Office of Air Force History, 1948 reprinted in 1983) pp. 36-37 and 69-71; Lee Kennett "The U.S. Army Air Forces and Tactical Air War in the Second World War" pp. 458-466 in *The Conduct of the Air War in the Second World War* edited by Horst Boog (Oxford: Berg Publishers, 1992) p. 460; and Richard Hallion, *Strike from the Sky: The History of Battlefield Air Attack, 1911-1945* (Washington D.C.: Smithsonian Institution Press, 1989) pp. 172-74.

3. More recent scholarship makes it clear that the reorganization of the tactical air forces was not due to Kasserine, and that in fact the reorganization had been decided upon *before* that battle. The point here is that classically the reorganization was *ascribed* to the defeat at Kasserine.

4. Coningham's nickname was "Mary," a corruption of "Maori", an allusion to his New Zealand roots. See Vincent Orange, *Coningham: A Biography of Air Marshal Sir Arthur Coningham* (London: Methuen, 1990), reprinted by the [US] Center for Air Force History, 1992.

5. Field Manual 100-20 *Command and Employment of Airpower*, originally published 21 July 1943 by U.S. Government Printing Office, Washington D.C. A photo-reproduction of the entire original publication, cover to cover, is available in *Air power and Ground Armies: Essays on the Evolution of Anglo-American Air Doctrine 1940-1943* edited by Daniel R. Mortensen (Maxwell AFB Ala.: Air University Press, 1998), pp. 167-82.

6. Most notably the A–8-A–12, A–17 and then the A–20. The success of the attack aviation types of that era in their design role is another issue.

7. Garner Johnson, "Forgotten Progress: The Development of Close Air Support Doctrine Before World War II" *Air Power History* (Spring 1999, pp. 45-65) pp. 52-53.

8. David R. Mets "A Glider in the Propwash of the RAF?" in *Airpower and Ground Armies: Essays on the Evolution of Anglo-American Air Doctrine 1940-1943* edited by Daniel R. Mortensen (Maxwell AFB, Ala.: Air University Press, 1998, pp. 45-91).

9. *Ibid*, p. 75.

10. Vincent Orange, "Getting Together", pp. 1-44 in Mortensen, *Airpower and Ground Armies*, p. 38.

11. See for instance John Slessor's account in *Air power and Armies* (London: Oxford University Press, 1936).

12. H. Montgomery Hyde, *British Air Policy Between the Wars 1918-1939* (London: Heinemann, 1976), p. 490. See also Powers, *Strategy Without Slide-Rule*, p. 158.

13. Brian Bond, *British Military Policy Between the Two World Wars* (Oxford: Oxford University Press, 1980) p. 2; Max Hastings, *Bomber Command* (London: Michael Joseph, 1979) p. 40; Higham, *The Military Intellectuals in Britain*, pp. 175, 196; R.J. Overy, *The Air War, 1939-1945* (New York: Stein and Day, 1981) pp. 12-13; Malcom Smith *British Air Strategy Between the Wars* (Oxford, 1984) pp. 50, 55-56, 74, 304.

14. *Ibid* p. 167.

15. Montgomery Hyde, *British Air Policy Between the Wars*, p. 323.

16. COS(41)83(0) "The Air Program" 21 May 1941, PRO CAB 80-58, quoted in W.A. Jacobs "Air Support for the British Army, 1939-1943" *Military Affairs* (Volume XLVI, No. 4, December 1982, pp. 174-82) p. 175.

17. An official account of this is given in the originally classified report by the Air History Branch, *Air Support, The Second World War 1939-1945: Royal Air Force* (Air Ministry: Air Publication 3235, 1955) (hereafter cited as AHB, *Air Support*). See also Shelford Bidwell and

Dominick Graham, *Fire-Power: British Army Weapons and Theories of War 1904-1945* (London: George Allen and Unwin, 1982)*,* pp. 264-65,; and Richard Townsend Bickers *Air War Normandy* (London: Leo Cooper, 1994) pp. 150-67.

18. A copy of the Wann-Woodall Report is reprinted in full in the War Office narrative "Army Air Support", (PRO WO 277-34 Appendix C, 1945). See also "Close Support by Bomber and Fighter Aircraft" (PRO AIR 39-140, 1940-41); and Ian Gooderson, *Air Power at the Battlefront: Allied Close Air Support in Europe 1943-1945* (London: Frank Cass, 1998), pp. 24-25.

19. AHB, *Air Support*, pp. 26-28.

20. Lord Tedder, *With Prejudice* (London: Cassell, 1966), pp. 124, 127-28, 138-43; and Sir Maurice Dean, *The Royal Air Force and Two World Wars* (London: Cassell, 1971), p.212.

21. The directive is reproduced in full as an appendix to AHB *Air Support*, pp. 209-20. Archival copies of the original can be found in PRO AIR 41-25.

22. At this point, the ASC, like the originally envisioned Close Support Bomber Control, was located at the corps headquarters level. AHB, *Air Support*, p. 28. Eventually, this control function would come to rest at the army headquarters level.

23. Bidwell and Graham *Fire-Power*, p. 265.

24. Charles E. Carrington, Soldier at Bomber Command (London: Leo Cooper, 1987), p. xiii.

25. For instance, the, eminent British historian John Terraine, in his forward to Carrington's *Soldier at Bomber Command*, notes his disagreement with Carrington on this point, p. ix. Terraine's own *The Right of the Line: The Royal Air Force in the European War, 1939-1945* (London: Hodder and Stoughton, 1985), pp. 351-52 gives his own interpretation of the matter.

26. Richard Townsend Bickers, *Air War Normandy* p. 150-153; Peter C. Smith *Close Air Support: An Illustrated History 1914 to the Present* (New York: Orion Books, 1990) pp. 97-98.

27. Gooderson, *Air Power at the Battlefront*, p. 87.

28. AHB, *Air Support*, p. 149.

29. British War Office, *Air Support and Air Reconnaissance, Aspects of Combined Operations in North West Europe, June 1944–May 1945,* an immediate post war report prepared by the British Army, found in PRO AIR 37-881, (hereafter cited as WO, *Air Support and Air Recce*), Appendix H to Chapter 3, paragraph 5.

30. It has to be said that the British were much better at coining terminology than the acronym-loving Americans.

31. British War Office, *Army-Air Operations: Pamphlet No. 1–General Principles and Organization*, (26-GS Publications-1127), 1944 and *Army-Air Operations: Pamphlet No. 2–Direct Support* (26-GS Publications-1181), 1944.

32. Most of the actual writing and editorial work on the two publications was done not by the RAF but by an Army officer, Lt. Col. Charles E. Carrington. He worked with both Army Cooperation Command and then as the Army Liaison Officer to Bomber Command, and became one of the behind the scenes facilitators of tactical air power. His memoirs, *Soldier at Bomber Command*, offer an illuminating look behind the scenes of the development of air support doctrine in Britain. He was also an interesting figure in his own right, an Oxford graduate and a Cambridge don, probably best known as the author of the two Great War works *Soldier From the Wars Returning, A Subaltern's War* and a fine biography of Kipling.

33. Hq No. 84 Group, memo "Organization of Staffs and Operations Rooms at R.A.F. Composite Group and Army Headquarters" no date, probably late 1944, copy in PRO AIR 2-7870.

34. The wording is that of Air Vice Marshal W.F. Dickson, "Address to Headquarters 1st Canadian Army"

June 7, 1943, National Archives of Canada, Record Group 24, Volume10671, file 215C1.093.

35. WO, *Army-Air Operations:* (1) *General Principles and Organization*, p. 8.

36. "Direct Support" included not just close support, but also that air power applied behind the enemy's lines but still within the general battle area. This makes the 1944 British conception of "direct support" equivalent in modern terms to a combination of Close Air Support (CAS) and Air Interdiction (AI) targets to a depth of approximately the enemy army-army group rear areas (what until recently NATO doctrine called "Battlefield Air Interdiction" or "BAI".)

37. WO, *Army-Air Operations:* (2) *Direct Support*, p. 12.

38. For an account of some of these unsung efforts, see J. Davies and J.P. Kellet, *A History of the RAF Servicing Commandos* (Shrewsbury: Airlife Publishing, 1989). Christopher Shores, *Second Tactical Air Force* (Reading: Osprey Publications, 1970) also gives a brief overview of the myriad ground support that it took to put 2d TAF in the air.

39. 1st Canadian Army Headquarters, memo "Organization and Employment of 1 Canadian ASSU" 8 March 1944, National Archives of Canada, Record Group 24, Volume 10671, file 215C1.093(D2).

40. WO, *Air Support and Air Recce*, Chapter 4, p. 4, paragraph 5.

41. *Ibid*; also WO, *Army-Air Operations (1) General Principles and Organization*, p. 22.

42. Or, alternatively, they could coordinate their separate staffs by constant telephone, meetings and mutual visits—both methods were tried. The memo "Organization of Staffs and Operations Rooms at R.A.F Composite Group and Army Headquarters" (PRO AIR 2-7870) thoughtfully compares these two methods, and comes to the sensible conclusion that separate operations rooms are best when the Air Force must fight its own campaign for air superiority, but that a single joint operations room is best in conditions of friendly air superiority.

43. WO, *Army-Air Operations (2) Direct Support*, p. 1.

44. To avoid possible confusion, it should perhaps be noted that in modern U.S. terminology an "ALO" is an Air Force officer detached to the Army, whereas an Army officer working with the Air Force is a Ground Liaison Officer or "GLO." In Second World War British parlance, ALOs were Army officers working with air support. They were generally junior officers from the combat arms who had been given a short course in air support doctrine and procedures.

45. Although meant to be held daily, in practice it usually met only approximately every other day. WO, *Air Support and Air Recce*, Chapter 3, paragraph 12.

46. *Ibid*, Chapter 3, paragraphs 12-14.

47. *Ibid*, Chapter 3, paragraph 14. This Army report somewhat sardonically notes that "RAF representatives with the necessary powers of decision were not always forthcoming."

48. *Ibid*, Chapter 3, paragraph 16.

49. WO, *Army-Air Operations (2) Direct Support*, p. 2.

50. WO, *Air Support and Air Recce*, Appendix H to Chapter 3, paragraph 3.

51. *Ibid*.

52. Memo, "Report on Visit to 84 Group on the 28th July, 1944", (PRO AIR 2-7870), quotes one hour. Of this, about 15 minutes were taken by flying time. Headquarters, British 51st (Highland) Division, memo "British and American Methods of Air Support", 7 March 1945, (PRO WO 205-546), which reflected actual experience, suggests it was often two or three hours.

53. WO, *Air Support and Air Recce*, Chapter 3 p. 10. See also Gooderson Air power at the Battlefront, pp. 199-201 for an examination of the tactic of armed recce.

54. For instance, an RAF "Operational Research" study undertaken in July 1944, "confirms the overall effectiveness of widespread armed recce in confusing and delaying the enemy's supplies, at the same time inflicting serious losses when targets have actually been located and attacked." ("RP and F-B effectiveness 22 Jun-7 Jul" noted in 8 July entry of 84 Group *Operations Record Book*.) In fact, armed recce has been singled out, at the time and ever since, as 2d TAF's single most effective form of air attack. Ian Gooderson devotes a chapter of his book to a detailed analysis of armed recce's effectiveness, coming to the conclusion that armed recce was of far greater value to the Allied war effort than close support (Gooderson, *Air power at the Battlefront*, Chapter 8). See also Richard P. Hallion "Battlefield Air Support A Retrospective Assessment" *Air power Journal* Spring 1990 p. 11; or his book *Strike from the Sky* (Washington: Smithsonian Institution Press, 1989) and John Terraine, *The Right of the Line: The Royal Air Force in the European War, 1939-1945* (London: Hodder and Stoughton, 1985), pp. 658-662. As regards mission apportionment, the records extant in the archives do not facilitate a definitive answer, but the author estimates that about 40 percent of 2d TAF's fighter-bomber sorties were consumed by defensive fighter missions, 35 percent by armed recce, 15 percent by pre-arranged missions, and 10 percent by impromptu close support. Discounting the defensive fighter sorties in order to focus purely on the effort allocated to the various types of ground attack missions, the figures become roughly 60 percent armed recce, 25 percent pre-arranged, and 15 percent impromptu. (Conclusions from the authors unpublished MA thesis *2d TAF and the Normandy Campaign: Controversy and Under-Developed Doctrine*, Royal Military College of Canada: Kingston, Ontario, 1999).

55. John F. Shiner, *Foulois and the U.S. Army Air Corps 1931-1935* (Washington, D.C.: Office of Air Force History, 1983) p. 11.

56. Maurer Maurer (ed.) *The U.S. Air Service in World War I*, Vol II: *Early Concepts of Military Aviation* (Washington, D.C.: Office of Air Force History, 1978) p. 267. William Sherman published his thinking in a book *Air Warfare* (New York: The Ronald Press Co., 1926), recently reprinted (Maxwell AFB Ala.: Air University Press, 2002)

57. *Ibid*, p. 51.

58. Gary Robert Lester, *Mosquitoes to Wolves: The Evolution of the Airborne Forward Air Controller* (Maxwell AFB Ala.: Air University Press, 1997) p. 8.

59. Field Manual 1-5 *Employment of the Aviation of the Army*, (US Army Air Corps, 15 April 1940). For descriptions of it see W.A. Jacobs, "Tactical Air Doctrine and AAF Close Air Support in the European Theater, 1944-1945" pp. 35-49 *Aerospace Historian* (Vol. 21 No. 1, Spring 1980), p. 38; Greer, *The Development of Doctrine in the Army Air Arm*, pp. 112-15; and in particular Daniel Mortensen *A Pattern for Joint Operations: World War II Close Air Support, North Africa* (Washington D.C.: Office of Air Force History, 1987) pp. 6-7.

60. Lester, *Mosquitoes to Wolves*, pp. 8-9.

61. U.S. Army Hq, "Notation on Brief of Meeting", April 17, 1941, Reel 32, item 1344, George C. Marshall papers, George C. Marshall Research Library, Lexington, Virginia.

62. For an account of this, see Carl A. Spaatz, "Leaves from My Battle of Britain Diary," *Air Power Historian* (Spring, 1957, pp. 66-75).

63. See note 60 above.

64. Field Manual 31-35 *Aviation in Support of Ground Forces*, originally published 9 April 1942 by U.S. Government Printing Office, Washington D.C., Archival copy available in file K170.13-31-35, Bolling Air Force Base.

65. See notes 20-22 above.

66. FM 100-20 did not *supersede*, FM 31-35 as is some-

times mistakenly thought. The preamble to FM 100-20 states that it replaces FM 1-5 (FM 100-20, p. 1). FM 31-35 is later explicitly cited as an amplifying reference that remained valid (FM 100-20, p. 3).

67. The chapter break down of FM 31-35 is as follows:
Chapter 1, General, 2 pages;
Chapter 2, Combat Aviation (meaning all forms of ground attack by tactical air power),
5 pages (and this includes a section on intelligence);
Chapter 3, Observation Aviation and Photography, 13 pages;
Chapter 4, Air Transport, 10 pages; and
Chapter 5, Signal Communication, 21 pages.

68. See note 37 above, and Table 1 in the text.
69. FM 31-35, pp. 10-11.
70. *Ibid*, p. 11, final sentence of paragraph 31.
71. FM 100-20, pp. 10-11.
72. FM 31-35, p. 1.
73. FM 31-35, pp. 12-13.. This of course reflected the original British practice, still current at the time of FM 31-35's writing, of placing CSBCs-ASCs at corps level. As explained in note 22 above, this function eventually came to rest at army level.
74. *Ibid*, pp. 48-49. Note that U.S. "regimental" level corresponds roughly to the British "brigade" level.
75. *Ibid*, p. 2.
76. Headquarters, Mediterranean Allied Air Forces, "Close Support of the Fifth Army" Tab D, (available from Maxwell AFB: Air University, 1945); Terraine, *The Right of the Line*, pp. 595-96.
77. This name change was apparently driven by USAAF concern that the word "support" in the name appeared to make it too subservient to the ground forces. See Jacobs, "Tactical Air Doctrine and AAF Close Air Support in the European Theater, 1944-1945", note 31.
78. Air Support Controls should not be confused with Air Support Commands. ASC stood for Air Support Control.
79. W.A. Jacobs "The Battle for France, 1944" in *Case Studies in the Development of Close Air Support* edited by B.F. Cooling, (Washington D.C.: Office of Air Force History, 1990 pp. 237-293), p. 238.
80. Later the term "Tactical Control Parties" or "TCPs" was also used.
81. Each fighter-bomber group had two such GLOs, Colonel E.L. Johnson, "Information Regarding Air-Ground Joint Operations" Headquarters First U.S. Army, G-3 Air Section, memo dated 16 July 1944 (copy on file at the archives USAF Aerospace Studies Institute declassified EO 11652), p. 36.
82. Hq, IX Tactical Air Command, "Standard Operating Procedure for Air Support Parties", memo number 20-2, 3 August 1944, (copy on file at the archives USAF Aerospace Studies Institute, declassified EO 11652). Note that these were simply SOPs, not formal doctrine.
83. Lt Col W.S. McCrea, Headquarters European Theater of Operations, U.S. Army, Immediate Report No. 1 (Combat Observations), "Close Air Support Within 12th Army Group" original file no. 370.2 (G-3), 20 Nov 44, p. 3.
84. Jacobs "The Battle for France", p. 260.
85. *Ibid*; see also Johnson, "Information Regarding Air-Ground Joint Operations", diagram on p. 43.
86. Jacobs, "The Battle for France", p. 260.
87. David N. Spires, *Patton's Air Force: Forging a Legendary Air-Ground Team* (Washington, D.C.: Smithsonian Institution Press, 2002) p. 59.
88. Headquarters, British 51st (Highland) Division, memo "British and American Methods of Air Support" 7 March 1945, (PRO WO 205-546).
89. Jacobs, "Tactical Air Doctrine and AAF Close Air Support in the European Theater, 1944-1945" p. 43.
90. Gooderson, *Air Power at the Battlefront*, p. 200.
91. Armored Column Cover description from Johnson,

"Information Regarding Air-Ground Joint Operations", p. 1-11 and Kenn Rust, *The Ninth Air Force in World War II* (Fallbrook, California: Aero Publishers Inc, 1970), p. 105.
92. FM 100-20, p. 10-11.
93. In fact, FM 100-20 does not use the term "phases", but rather "priorities." The term "phases" appears to have entered the USAAF lexicon via the otherwise generally forgotten publication *The Air Force in Theaters of Operations: Organization and Functions*", which was an unnumbered series of booklets. One, titled "The Air Support Command" was published in May 1943, and it included an explanation of the three-tiered priority using the term "phases." See Daniel R. Mortensen "The Legend of Laurence Kuter: Agent for Air power Doctrine" in *Airpower and Ground Armies*, (pp 93-145), pp. 118-119. By the end of the war the term was clearly widespread, the very title of the Ninth Air Force official after-action report on close air support, AAF Evaluation Board Report "The Effectiveness of Third Phase Tactical Air Operations" (Dayton, Ohio: Wright Field, 1946)–"third phase" meaning the third priority which was close support.
94. See the AAF Evaluation Board Report "The Effectiveness of Third Phase Tactical Air Operations in the European Theater."
95. See for instance Mortensen, "The Legend of Laurence Kuter" p. 138.
96. General Bradley claims personal credit for the idea in an unconvincing anecdote in his autobiography: Omar Bradley *A Solider's Story* (New York: Henry Holt and Company, 1951) p. 337. For a more recent account of the story, see Spires, *Patton's Air Force,* p. 67, which even uses the very word "folklore".
97. W.F. Craven and J.L. Cate *The Army Air Forces in World War II* Volume III *Europe: Argument to V-E Day, January 1944 to May 1945* (Washington: USAF Historical Division, 1948) pp. 238-39.
98. At least one report noted that, in some divisions, the ¼ ton vehicle (i.e. a jeep) was "still preferred for all ASPO's [sic] operating with armored units." Headquarters AAF Evaluation Board, "Report of Tactical Committee: Study of doctrine, organization, tactics and techniques of AAF" London, England, September 26, 1944, p. 3.
99. British Air History Branch narrative, *The Liberation of North West Europe* Viol IV *The Breakout and the Advance to the Lower Rhine, 12 June to 30 September 1944*, (copy in PRO AIR 41-67), p. 47. Of course, this does not mean that the British invented it first or that the U.S. must have copied it from them. But it does illustrate that the idea of mounting forward controllers in a tank was not as original as some of the storytelling would have one believe.
100. Spires, *Patton's Air Force*, p. 67.
101. McCrea, "Close Air Support within 12th Army Group", p. 3.
102. Those levels of command being: platoon (three or four tanks); company (three or four platoons); battalion (three or four companies plus support elements); and CC (three or four battalions plus artillery and service support).
103. Mets "A Glider in the Propwash of the RAF?", p. 52.
104. "Recce" (pronounced "rek-ee") being the British abbreviation for reconnaissance, as opposed to the American "recon". "Recce" (vice recon) is exactly the term that appears in the contemporary USAAF documents, for instance the AAF Evaluation Board Report "The Effectiveness of Third Phase Tactical Air Operations in the European Theater, 4 May 1944 to 8 May 1945".
105. For instance William W. Momyer, *Air Power in Three Wars* (Washington D.C.: Government Printing Office, 1978), or more contemporaneously, Brig. Gen. Laurence Kuter, "Air-Ground Cooperation in North Africa" *Air Force Magazine*, (July 1943), p. 5.