

# BRIEFING FILE

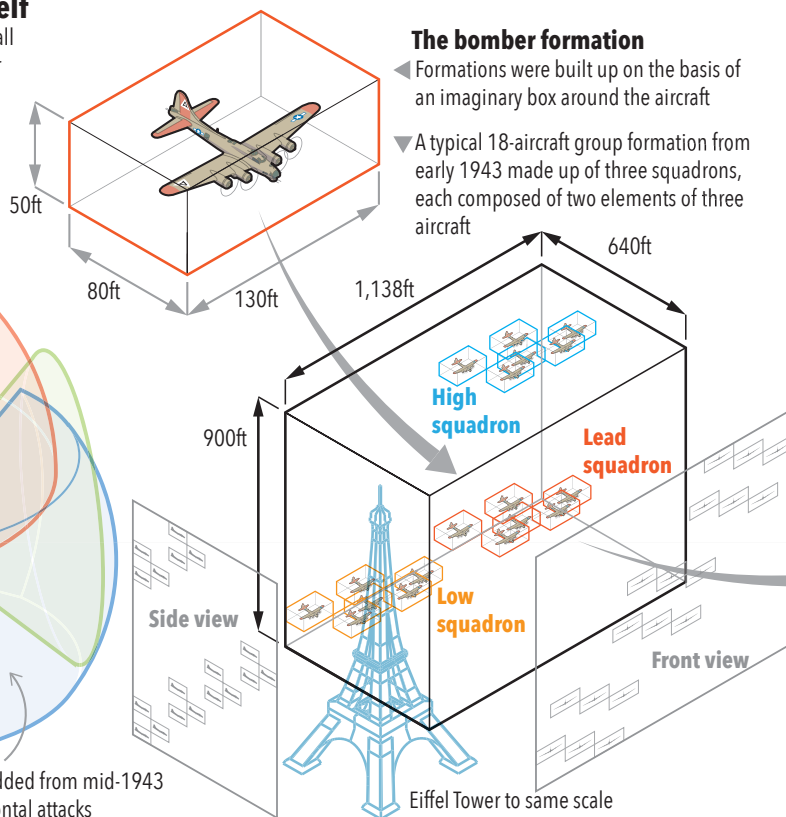
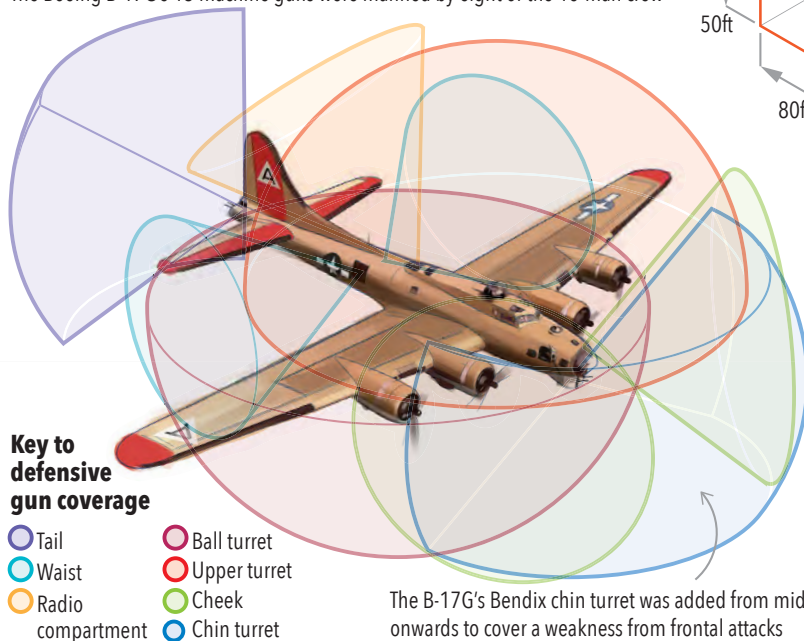
Under the skin of aviation technology and tactics

## Formation survival: how the 8th Air Force defended itself

US 8th Air Force defensive tactics changed constantly during combat in Europe, but all formations were based on organising aircraft to maximise mutual support from their defensive firepower while concentrating bomb load onto the target

### The basic unit: the heavy bomber and its defensive gun coverage

The Boeing B-17G's 13 machine guns were manned by eight of the 10-man crew



# 8th AIR FORCE FORMATION

At the end of the Great War and in the inter-war period, the idea that "the bomber will always get through" held sway. As described by Conservative leader Stanley Baldwin in 1932, it believed well-armed bombers would be able to defend themselves and reach the target.

In 1939 the RAF tried daylight bomber formation attacks with its Vickers Wellingtons, equipped with powered multi-gun turret defences, but against the Messerschmitts over the Baltic it was not a success, and Bomber Command thereafter switched mainly to night bombing. Even more determined to make daylight bomber formations work, the US 8th Air Force's effort was vastly greater, and far more complex. It used massed formations from its entry into European combat in August 1942, when they comprised 12 Boeing B-17 Flying Fortresses, until the war's end, by which time they were vast armadas built up



**The peak strength.** A tight formation of B-17Gs from the 398th Bomb Group heading to Neumünster, Germany, on 13 April 1945. NMUSAF

of 36-bomber boxes or 54-aircraft combat wings. Many refinements were made, responding to changes in the enemy's attacks and the development of improved tools and techniques. Other factors in play were that the formation had to be wieldy enough to turn safely,

and the need for the pilots to see the box they were following and forming with. The Consolidated B-24 Liberator formations were slightly different as a consequence of the poorer visibility from the type, and its more demanding handling at altitude. Forming up

(often using 'assembly ships' — see *Aircrew*, *Aeroplane* April 2009) over England took time and had its own risks, particularly in the event of inclement weather.

The intense defence mounted by each bomber's gunners made for good morale, but, unsurprisingly, the few enemy fighter shootdowns were massively over-claimed. The B-17G, shown here, had 13 .5in-calibre machine guns and the B-24 10 in a mixture of power-operated multi-gun turrets and hand-aimed and fired positions, the latter being very hard to use effectively in the rarefied atmosphere of the 25,000ft operating altitude.

The main role of the gunners was as a deterrent. Consequently the Luftwaffe was always probing for weak spots, but never attacking recklessly. From the outset the rear defences of the Army Air Forces' heavy bombers were strong. This led to the Luftwaffe adopting head-on attacks, which

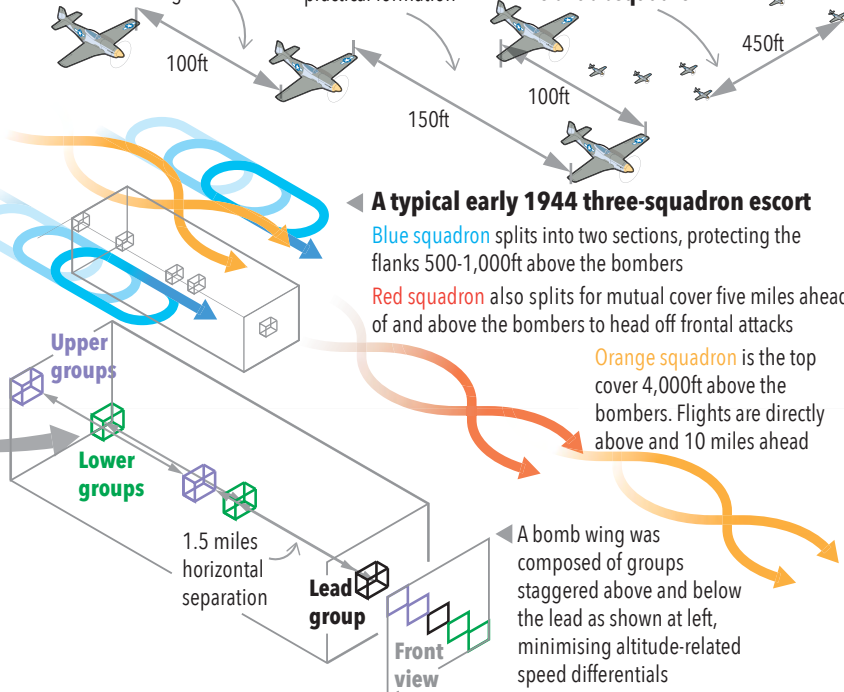
# How the US Army Air Forces protected B-17 and B-24 crews in taking the fight to the enemy

## Fighter escorts

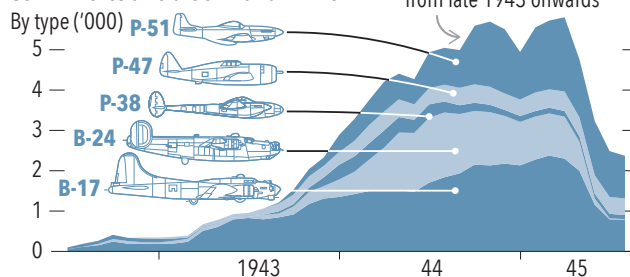
The basic fighter unit was the two-aircraft **element**: leader and wingman

Two elements made up a **flight**, an efficient, practical formation

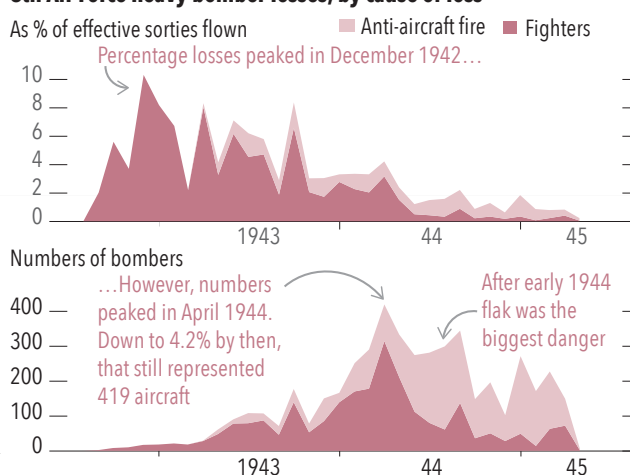
Two flights created a **section** and two sections made up a standard 16-aircraft **squadron**



## 8th Air Force aircraft on hand in ETO



## 8th Air Force heavy bomber losses, by cause of loss



# TIONS

WORDS: JAMES KIGHTLY ARTWORK: IAN BOTT

proved very effective until greater forward firepower (ultimately in dedicated nose turrets) was added to the bombers, causing another change in Luftwaffe tactics. Stragglers that dropped out of formation, or a formation that became dispersed, made it easier for enemy fighters to pick off individual bombers.

The bombers also needed to get through anti-aircraft gunfire, or flak. Little could be done about flak, except for flying high enough to make gunnery less accurate, and spacing formations widely enough to mean only one bomber — at worst — would be seriously damaged by a burst. Formations were otherwise kept as close as possible for both mutual fire support against fighters, and to ensure reasonable accuracy when bombing. After issues with individual aircraft bomb-aiming were discovered in such formations — even slight course adjustments by each aeroplane for aiming purposes caused problems

in terms of formation-keeping — the formation generally bombed on the command of its leaders, either a lead bomber crew or a pathfinder crew.

Ultimately, the best defence against fighters was to simply stop them intercepting the bombers at all. This was achieved by grinding down the Luftwaffe's capability by way of attrition against aircraft, aircrew, equipment and fuel. The escort fighters used early on could not stay with the bombers all the way to their targets, but the introduction of longer-range fighter capability, especially the North American P-51D Mustang, made that possible. But the close escort, preferred by the bomber crews, was also changed in early 1943 for more distant escort — notably ahead of the formation — and free interdiction. Ordered by Maj Gen James Doolittle, these measures stopped specific attacks massing and increased

the speed at which the Allies obtained air superiority. These three tactics meant that by 1945 the Luftwaffe was simply unable to muster effective attacks against daylight bomber formations. Desperate efforts using vulnerable

night fighters to make day attacks simply accelerated the blunting of the Luftwaffe's capability both by day and night, while the bomber formations were restructured for the last time to reduce their profile to the flak risk.

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A straggling B-17 is set upon by enemy fighters. VIA JAMES KIGHTLY