



# LINGUISTS GET THEIR WINGS: AIRBORNE VOICE INTERCEPT OPERATORS IN WORLD WAR II

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B-24s from the 392d Bomb Group.

Allied victories in North Africa during 1942 and 1943, created a dilemma for British and American signals intelligence (SIGINT) collectors. As German and Italian forces withdrew from the African continent, the Allies lost the ability to collect the tactical voice communications of Axis ground and air units. This capability loss left the Allies virtually blind to moves being made by German and Italian forces as they fell back to the European continent. Unaware of to where or in what force sizes the Axis forces were dispersing across the Mediterranean complicated planning for future Allied operations. Desperate to regain the insight the tactical voice communications intelligence (COMINT) provided, the Allies looked for innovative ways to reestablish collection. For the first time in history, this included placing German- and Italian-speaking soldiers and airmen on aircraft flying near – and over – enemy territory to listen for enemy voice communications. This first use of airborne linguists was the genesis of a program that continues to provide high-value tactical and strategic intelligence to warfighters and decision makers today.

Airborne SIGINT collection began during the Battle of the Beams in 1940, when the British explored ways to identify, locate, and develop countermeasures to the Knickebein radio guidance system the Germans were using to direct *Luftwaffe* bombers. To find the signal, the Royal Air Force (RAF) formed the world's first airborne electronic intelligence (ELINT) collection outfit – the Blind Approach Training and Development Unit (BATDU).<sup>1</sup> Using Avro Anson aircraft outfitted with American-made Hallicrafters S-27 ultra-high frequency/very-high frequency (UHF/VHF) radios, on June 19, 1940, the BATDU conducted history's first airborne ELINT mission flown in combat.<sup>2</sup> During its third operational sortie on June 21, 1940, the BATDU successfully collected the Knickebein signal and located its origin. The BATDU accomplishment proved the concept of airborne SIGINT collection. Using data collected by BATDU, the British developed countermeasures that helped minimize Knickebein's effectiveness. Though narrowly focused on Knickebein, BATDU's success planted the seed for future airborne intercept operations.

British use of airborne linguists began in the summer of 1942. During missions flown from RAF Kabrit in Egypt, the RAF placed linguists on No. 162 Squadron's ELINT-equipped Vickers Wellington aircraft to search for and collect the voice communications of *Luftwaffe* night fighters.<sup>3</sup> Initially conceived as a way to track *Luftwaffe* activity, the linguists quickly became valued for their ability to advise aircrews of the locations, origin, and intent of enemy aircraft. After a year of experimentation and success in the Mediterranean, the British decided to expand the program to the United Kingdom. On June 17, 1943, officials from the Air Ministry, the British "Y" Service, and No. 192 Squadron discussed the possibility and brainstormed ideas.<sup>4</sup> After some debate regarding the dangers of putting untrained airmen on bombers over enemy-held territory, the group dedicated two German-speaking linguists to the effort. The next day, Wing Com-



Orbit location for the first voice intercept flight on June 20, 1943.

mander R. K. Budge, the commanding officer of the RAF “Y” Service, dispatched Flight Officer Ludovici and Sergeant Clark to No. 192 Squadron at RAF Feltwell in Norfolk to begin operational testing.<sup>5</sup>

Ludovici and Clark outfitted a No. 192 Squadron Handley Page Halifax with two S-27 receivers and on June 19, the linguists flew a forty-minute orientation flight to familiarize themselves with air operations and to flight test the S-27.<sup>6</sup> On the following day the Halifax took off from

RAF Feltwell, crossed the English coast, and established an orbit over the North Sea approximately one hundred miles northwest of the Dutch coast.<sup>7</sup> From that position, the linguists intercepted voice communications of *Luftwaffe* fighters and their ground controllers operating in the 38.2 to 42.6 megahertz frequency range.<sup>8</sup> Initially targeting the *Luftwaffe* fighter control bases at Schipol and Leeuwarden in Holland, the airborne linguists discovered they could hear air activity from deeper inside occupied Europe; the abundance of *Luftwaffe* communications taught them the need to prioritize targets so they would not be overwhelmed by the sheer volume of enemy activity.<sup>9</sup>

The RAF next arranged to have the Halifax listen in on *Luftwaffe* reaction tactics during an American VIII Bomber Command daylight bombing mission.<sup>10</sup> On June 25—only five days after the first experimental sortie—the British Halifax accompanied B-17s of the 306th Bombardment Group on a mission to Hamburg, Germany.<sup>11</sup> As the attacking force approached the German shoreline, the Halifax peeled off and established an orbit about seventy-five miles north of the coast.<sup>12</sup> From there, the airborne linguists were able to hear the reacting *Luftwaffe* fighters as they attacked the B-17s. These initial linguist missions

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The S-27D Hallicrafters UHF-VHF receiver.

showed the value of having an intercept capability in the bomber formation. On this first foray, Ludovici and Clark learned *Luftwaffe* airborne intercept tactics, techniques, and procedures (TTPs) and were able to pass that information to intelligence officers and aircrews upon their return to England.<sup>13</sup>

Eager to obtain similar intelligence, the Americans followed the British lead and began programs of their own. By at least August 1943, Lieutenant General Carl Spaatz, then commander of the Northwest African Air Forces (NAAF), had ordered German-speaking linguists to fly on Mediterranean-based B-24 ELINT aircraft.<sup>14</sup> In October 1943, Major General James Doolittle, then commander of Twelfth Air Force, began placing linguists on B-17s during bomb raids into Italy and Germany.<sup>15</sup> Additionally, the Combined Operational Planning Committee (COPC) asked the Americans to investigate the possibility of conducting collection from Great Britain-based B-17s and B-24s.<sup>16</sup> In a September 25, 1943, letter to the Air Ministry, Brigadier General Orvil Anderson, Chairman of the COPC, formally requested VIII Bomber Command support.<sup>17</sup> In response, VIII Bomber Command commander, Lieutenant General Ira Eaker, petitioned Air Vice Marshal Frank Inglis—the RAF Assistant Chief of Air Staff for Intelligence—for assistance in equipping VIII Bomber Command bombers for airborne COMINT collection.<sup>18</sup> Attesting to the anticipated intelligence gain the Allies expected from the added capability, Eaker speculated that the recording of *Luftwaffe* communications “should give us useful knowledge of the disposition, tactics, and control of the enemy fighter force.”<sup>19</sup>

Within a week, the Air Ministry and VIII Bomber Command met to devise a plan. Unlike the NAAF and Twelfth Air Force tactic of adding linguists to the crew, VIII Bomber Command’s preferred method was to install voice

recorders on the bombers; Command officers worried that putting non-aircrew personnel over enemy territory would create vulnerabilities in both crew integrity and operational effectiveness.<sup>20</sup> Beginning in the fall of 1943, VIII Bomber Command planned for a series of operational tests to prove the feasibility of their idea. Underlining the high demand for all types of equipment, the two types of recorders deemed suitable by the Air Ministry—the General Electric magnetic reel-to-reel wire recorder model B.20 and the Amertype recorder-graph “Commando” model—were not available in the United Kingdom and had to be ordered from the United States.<sup>21</sup> To expedite the equipment delivery, Eaker communicated the requirement directly to the commanding general of the United States Army Air Force (USAAF), Henry “Hap” Arnold.<sup>22</sup>

In December 1943, having grown impatient from the equipment delay, VIII Bomber Command borrowed a B.20 recorder and two receivers from the British.<sup>23</sup> Attesting to the urgency of the requirement, rather than wait for professional installation by scientists and engineers from the American-British Laboratory-15 (ABL-15), airmen improvised an installation to ensure the equipment tests could begin.<sup>24</sup> After completing the makeshift installation, the airmen conducted three test flights to help prepare for the upcoming series of official experiments. During these flights, they learned that aircraft engine noise interfered with the recorders and that screening of the aircraft engines would be essential for future tests and operations.<sup>25</sup>

In February 1944, the new equipment from the United States began arriving. With the assistance of ABL-15, Eighth Air Force installed two captured German Funkgerät 16 VHF transceivers and two B.20 recorders onto one of its B-17s.<sup>26</sup> On February 20, 1944 the COMINT-configured B-17 flew an operational mission over Germany to test what Eighth Air Force called Plan A



Linguist Edward H. Bubolz of the 95th Bomb Group - Killed in Action.



Linguist Alvin G. Bader of the 303d Bomb Group - Killed in Action.

(recorders only) and Plan B (the use of an airborne intercept operator (linguist) to manually tune *Luftwaffe* frequencies during the mission).<sup>27</sup> The results of this operational test were definitive. Plan A limited the number of collected frequencies as there was no airborne operator to tune to active frequencies during the mission. Also, Plan A did not account for the simple fact that equipment often malfunctioned; without an airborne operator monitoring the equipment to fix problems, far too many missions would have been unproductive. Plan B also had problems. The airborne operator had difficulty using the equipment due to the extreme cold—cold hands struggled with the dials on the radios and the connection cables between the receivers and recorders grew brittle and snapped. Despite these challenges, the test operator determined Plan B to be the best course of action.<sup>28</sup>

Eighth Air Force proceeded with Plan B, and on 15 March 1944 Major General Doolittle—then commander of Eighth Air Force—ordered his three bombardment divisions to implement airborne voice intercept operations.<sup>29</sup> In a detailed memorandum, Eighth Air Force outlined the technical aspects of airborne COMINT collection and provided precise instructions to the bombardment divisions. Details as specific as the frequency range to be collected and instructions for the post-mission processing of the intercepts were included. Doolittle's order also identified the ten German-speaking linguists who would comprise the initial Eighth Air Force airborne intercept cadre. Within three weeks of the order, Doolittle's bombardment divisions began flying with linguists on board their B-17s and B-24s.<sup>30</sup>

Meanwhile, at Fifteenth Air Force Headquarters in Bari, Italy, intelligence professionals and operators discussed airborne voice intercept operations. At a March 1944, meeting, one of the earliest airborne linguists, Sergeant Kurt Hauschildt, described the methodology used by

the airborne linguists.<sup>31</sup> Using only paper and pencil to take notes during flight—no recording or playback ability was installed on the Fifteenth Air Force aircraft at the time—the airborne linguists identified the number and origin of reacting *Luftwaffe* fighters. The linguists used this information to inform the bomber formation when enemy fighters were airborne and could also determine the approximate range of the reacting German fighters based on the signal strength of the monitored frequency.<sup>32</sup> When combined with the linguists' knowledge of the *Luftwaffe* reaction TTPs, the information gave the bombers enhanced situational awareness allowing them to better prepare for the reacting fighters.

The linguists' understanding of *Luftwaffe* tactics saved lives and aircraft. As the Northwest African Strategic Air Forces (NASAF) operational research section—and flight experience—had determined, the Germans preferred to attack bombers that had detached from the main formations. From intercepted communications, airborne linguists knew when German fighters were trailing the groups waiting for stragglers; the linguists used this information to warn the aircrews to tighten their formations.<sup>33</sup> The NASAF Director of Operations, Brigadier General Charles Born, confirmed the tactical value stating his pilots had been impressed by the value of airborne COMINT and preferred flying with the “German-speaking fellas” onboard.<sup>34</sup>

In addition to protecting the aircraft in which they were flying, the linguists' awareness of *Luftwaffe* activity provided American fighter aircraft an asymmetric advantage. First Lieutenant Roger Ihle, a B-24 airborne electronic warfare officer, stated, “We had these German speaking boys we had monitoring all of the aircraft frequencies of the Germans, so when they heard the Germans starting to scramble, why, they told the [American] fighters what was happening.”<sup>35</sup>



Airborne Linguist Technical Sergeant Jakob Gotthold.

Though the tactical value the linguists provided was important, their contribution to the assessment of the *Luftwaffe's* order of battle was also significant. At the same Fifteenth Air Force meeting where Sergeant Hauschildt reviewed tactical airborne intercept operations, the group also discussed its strategic value. British Flight Lieutenant J. D. Simmonds believed that NASAF had not historically appreciated the strategic value of airborne intercepts but felt the sharing of information between Fifteenth Air Force and the RAF's No. 276 Wing had started to change opinions.<sup>36</sup> NASAF and RAF intelligence analysts began using the linguists' logs to calculate *Luftwaffe* order of battle and reactor base locations. This knowledge enhanced the Allies' overall understanding of German operational and strategic strength and provided a quantifiable method to measure the effectiveness of the overall strategic bombing campaign.<sup>37</sup>

During the same meeting, Brigadier General Born and the NASAF director of intelligence, Colonel Young, lobbied for an expansion of the airborne linguist program. After much discussion, the meeting attendees agreed that two linguists would accompany each mission and that four aircraft from each bomb group would be outfitted with the S-27 receiver.<sup>38</sup> The group also discussed the need for additional German linguists. Colonel Young mentioned a previous higher headquarters offer of one hundred German speakers, but Flight Lieutenant Simmonds advised him to be cautious, stating that the success rate of prospective linguists to that point had been poor and that to successfully complete the qualification process an airborne linguist had to be "thoroughly fit physically, quick on the uptake, and at the same time reasonably phlegmatic."<sup>39</sup>

Back in the United Kingdom, after the initial training build-up and implementation, the Eighth Air Force used as many as twelve linguists per mission spread across its



Airborne Nisei linguists receive Air Medals.

three bombardment divisions.<sup>40</sup> While the intelligence the linguists collected was similar in both air forces, Eighth Air Force did not allow its linguists to share information outside the aircraft in which the linguist was flying; Eighth Air Force worried the Germans would intercept the interplane communications and discover the new airborne COMINT capability.<sup>41</sup> As early as November 1, 1944, airborne linguist Technical Sergeant Jakob Gotthold made recommendations for the development of an interplane signaling system, but the USAAF did not incorporate his idea before the end of the war.<sup>42</sup>

Despite the benefits, airborne COMINT in the European theater was hamstrung by the lack of S-27 receivers and a shortage of trained personnel. The topics were discussed at length in a January 1945, meeting of Eighth Air Force commanders and directors of intelligence. Colonel Edmundson pointed out that only four of the one hundred S-27 receivers his group requested had arrived, with the other ninety-six having been given to the Navy.<sup>43</sup> In the same meeting, Colonel Samuel Barr added that the lack of trained linguists was his biggest problem.<sup>44</sup> Faced with the same hazards and appalling attrition rate as every other aircrew member, any loss of a linguist hurt particularly bad. Sergeant Gotthold also highlighted these problems in a summary of airborne COMINT in November 1944. To mitigate the aforementioned concerns, Sergeant Gotthold recommended the use of recorders on all sorties and lobbied for the creation of a comprehensive training program to ensure standardization across the airborne linguist program.<sup>45</sup>

Even with the problems, the innovative linguists ensured airborne voice collection continued having tactical and strategic impact.<sup>46</sup> An Eighth Air Force report sent by Major Herbert Elsas to Brigadier General George McDonald concluded the information derived from airborne



The B-24, "We'll Get By" from the 392d Bomb Group, dropping bombs.

COMINT collection was "the only basic source material of signals intelligence originated by Eighth Air Force."<sup>47</sup> Additionally, in a report on the effectiveness of airborne COMINT, the Eighth Air Force A-2 stated, "The airborne 'Y' [COMINT] project can be considered to have produced highly successful results."<sup>48</sup>

While airmen in the European theater of operations honed their airborne COMINT collection capabilities, a similar effort developed in the Pacific theater. In the early stages of the war, there was little need for an airborne collection capability in the Pacific. Ship- and ground-based units intercepted Japanese communications and were deemed adequate to meet the services' requirements. When Operation Matterhorn – the use of air bases in China and India to conduct bombing missions against Japan – began in spring 1944, planners looked to improve tactical intelligence collection.<sup>49</sup> To do this, XX Bomber Command's 58th Bomb Wing began using Japanese-American, or Nisei, airmen on their Boeing B-29 Superfortress missions to provide the same type of intelligence the German-American airborne linguists provided in the European theater.<sup>50</sup> These Nisei from the 6th Radio Squadron Mobile (RSM) were ground linguists, but many volunteered for flying status.<sup>51</sup> Little is documented about the linguists' effectiveness during these operations, but at least two of the Nisei, Ser-

geant Kazuo Kamoto and Sergeant Masaharu Okinaka, were awarded Air Medals for their work.<sup>52</sup>

As the war in the Pacific progressed, the island-hopping campaign provided new air bases for the USAAF. By November 1944, B-29s of the XXI Bomber Command were attacking the Japanese homeland from bases in the Marianas. Hearing of the airborne linguist success in XX Bomber Command, XXI Bomber Command sought ways to take advantage of the new capability. Due to a shortage of Nisei, the Command first installed recorders on their B-29s and asked ground-based Japanese linguists to transcribe the collection post-mission.<sup>53</sup> This provided some strategic value, but intelligence officers knew they could do more. Seeking the tactical value having linguists on board provided, XXI Bomber Command tasked the 8th RSM to provide additional manpower.<sup>54</sup> Arriving in Guam on November 10, 1944, the 8th RSM brought additional Nisei linguists to fly on bombing and B-24 ELINT missions.<sup>55</sup>

After going through aircrew training and waiting for the B-29s to be equipped with the S-27 receiver, ten 8th RSM Nisei began flying operational combat missions on B-29s and B-24s in the spring of 1945.<sup>56</sup> While few specific details exist regarding their missions, commendation letters from senior leaders reflect the importance of their con-

tributions. In a memorandum from the Chief of Staff of the United States Army Strategic Air Forces in the Pacific, Brigadier General Kenneth P. McNaughton, to the Commanding Officer of the 8th RSM, McNaughton stated, “Production of this information [tactical intelligence] placed our forces at a definite advantage over the enemy and, therefore, the contribution of the 8th Radio Squadron Mobile in this war cannot be overemphasized.”<sup>57</sup> Further highlighting their impact, the squadron also received a congratulatory letter from Commander in Chief, Pacific Ocean Areas, Admiral Chester Nimitz stating: “Joint operation of the 8th Radio Squadron Mobile and the Navy Supplementary Station in Guam . . . proved to be a very profitable arrangement. . . . The proficiency developed by the officers and men of the 8th Radio Squadron Mobile in their field of signal intelligence, and hence their share in the victory over Japan, can well be a source of pride to them.”<sup>58</sup>

In addition to the Nisei of the 8th RSM, a similar effort was conducted by V Bomber Command from Clark Air Base in the Philippines. Between April and July 1945, Nisei airmen of the 1st RSM flew on at least five B-24 bombing missions over Formosa and Kyushu.<sup>59</sup> Flying in a modified position in the bomb bay of the aircraft, the airmen listened for Japanese air or anti-aircraft activity that would help keep the bombers safe. To underline the importance of their contributions, many of the 1st RSM Nisei were awarded Bronze Star Medals for their contributions.<sup>60</sup>

The USAAF continued flying airborne voice intercept missions over Europe and Japan until the end of the war. While the impact can be debated, the fact that such significant advances were made in scarcely three years must be commended. Over the course of the war airmen of the USAAF and RAF created a capability that protected aircrews, gave the Allies unprecedented insight into enemy tactical operations, and, perhaps more importantly for the impending battle for United States Air Force independence, was something that could not be replicated by the Army or Navy. Additionally, the groundbreaking work of these intelligence pioneers enabled success in the coming Cold War. Beginning almost immediately following V-E and V-J days, the American airborne reconnaissance force provided the vast majority of the available intelligence on the Soviet Union; this intelligence often gave air planners and the national command authority the decision advantage needed to stay one step ahead of the Soviets and other ideological adversaries.

The story does not end there, however. The seed corn planted during World War II is still being harvested today. At any given moment around the world, airborne linguists are flying on today’s modern airborne collection platforms gathering the same types of information their 1940s-era predecessors did. Whether delivering tactical intelligence directly to ground troops or by providing strategic intelligence to high-level decision makers, today’s airborne linguists are inextricably linked to those who came before. ■

## NOTES

1. R.V. Jones, *Most Secret War: British Scientific Intelligence, 1939-1945* (London: Hamish Hamilton, 1978), pp. 52 and 97.
2. Martin Streetly, ed., *Airborne Electronic Warfare: History, Techniques, and Tactics* (London: Jane’s Publishing Company Limited, 1988), p. 124. Interestingly, the British did not have a radio receiver capable of collecting the German *Knickebein* signal. As a result, they settled on the American Hallicrafters S-27 to outfit the Ansons. For further information, see Alfred Price, *The History of U.S. Electronic Warfare*, vol. 1, *The Years of Innovation—Beginnings to 1946* (Westford, MA: The Association of Old Crows, 1984), p. 12.
3. “Intelligence section: Signals: ‘Y’ investigation flights: No 162 Squadron,” 1 January–31 October 1943, AIR 51/298, The (United Kingdom) National Archives (TNA); Aileen Clayton, *The Enemy Is Listening* (New York: Ballantine Books, 1980), p. 212.
4. “Minutes of a meeting held at Air Ministry on Thursday, 17th June, 1943, to consider the question of Airborne Interception of VHF R/T,” AIR 40/2717, TNA.
5. “Minutes of a meeting held at Air Ministry on Thursday, 17th June, 1943”; F. H. Hinsley et al., *British Intelligence in the Second World War*, vol. 3, part 2, *Its Influence on Strategy and Operations* (London: Her Majesty’s Stationery Office, 1988), pp. 785–86.
6. “Airborne Interception of VHF/RT,” Officer Commanding, 192 Squadron, to Officer Commanding, RAF Station, Kingsdown, 21 June 1943, AIR 40/2717, TNA.
7. Flight Officer Ludovici, “Report on Airborne Search for German V.H.F. R/T—Dutch and Frisian Area,” 21 June 1943, AIR 40/2717, TNA.
8. “Airborne Interception of VHF/RT,” AIR 40/2717, TNA.
9. “No. 192 Squadron flight reports,” 1 April 1943–31 January 1945, AIR 14/2928, TNA; “Squadron Number: 192. Summary of

- Events: Y,” July 1943, AIR 27/1156/25–26, TNA.
10. Squadron Leader Butler, Air Ministry A.I.4, to Commanding Officer, 192 Squadron, memorandum, “V.H.F. R/T Interceptions,” 21 June 1943, AIR 40/2717, TNA. VIII Bomber Command was the predecessor organization to the well-known Eighth Air Force; Eighth Air Force was officially stood-up in February 1944.
11. “No. 192 Squadron flight reports.”
12. “No. 192 Squadron flight reports.”
13. “No. 192 Squadron flight reports.”
14. Colonel William W. Dick, Air Adjutant General, Headquarters Northwest African Air Forces, to Air Officer Commanding in Chief, Mediterranean Air Command, letter, 9 August 1943, in “Intelligence section: Signals: ‘Y’ service: investigation flights by American aircraft,” AIR 51/299, TNA.
15. Alexander S. Cochran, Robert C. Erhart, and John F. Kreis, “The Tools of Air Intelligence: ULTRA, MAGIC, Photographic Assessment, and the Y-Service,” in *Piercing the Fog: Intelligence and Army Air Forces Operations in World War II*, ed. John F. Kries (Washington, D.C.: Air Force History and Museums Program, 1996), p. 97.
16. The United States and Great Britain established the Combined Operational Planning Committee in June 1943 as an agency to coordinate all aspects of the strategic bomber offensive. “Air Ministry: Combined Operational Planning Committee: Papers,” AIR 42, TNA.
17. Brig. Gen. Orvil Anderson to D.D.I.4, Air Ministry, memorandum, 25 September 1943, AIR 42/15, TNA.
18. Lieutenant General Ira C. Eaker to Air Vice Marshal Frank F. Inglis, letter, “Extension of ‘Y’ Service,” 13 October 1943, AIR 40/2717, TNA.
19. Eaker to Inglis.
20. “Airborne Interception of Enemy Fighter R/T. Results of Test

- Flight on 20th Feb. 1944,” report, 23 February 1944, 40/2717, TNA.
21. D.D.I.4., Air Ministry, to D.B. Operations, letter, “Y Recording Equipment for Eighth Bomber Command,” 21 October 1943, AIR 40/2717, TNA.
22. Lt. Gen. Ira C. Eaker to Air Vice Marshal Norman H. Bottomley, letter, 2 November 1943, AIR 40/2717, TNA.
23. “Airborne Interception of Enemy Fighter R/T.”
24. ABL-15 was a combined American and British scientific effort to study radio and radar and to develop countermeasures. There is little information available on ABL-15; I can only assume from the sources that it was responsible for installation of non-standard electronic equipment and the requisite aircraft modifications. George Raynor Thompson and Dixie R. Harris, *The Signal Corps: The Outcome (Mid-1943 through 1945)* (Washington, DC: Office of the Chief of Military History, United States Army, 1966), p. 305; “Airborne Recorder Tests,” report, 23 February 1944, 40/2717, TNA.
25. “Airborne Recorder Tests.”
26. The Funkgerät 16 or FuG 16 was the VHF transceiver found in most Luftwaffe fighter aircraft. Though available sources do not specifically mention how the Allies obtained the FuG 16s, my assumption is that they were recovered from downed Luftwaffe fighters. Additionally, many of the linguists’ airborne logs mention having improved hearability when intercepting with the FuG 16 vice the S-27. “Airborne Recorder Tests,” “FuG 16ZY airborne radio equipment,” report, 3, February 1945, AIR 14/3637, TNA; “Airborne Y Logs,” 520.6251, Air Force Historical Research Agency (AFHRA).
27. “Airborne Interception of Enemy Fighter R/T.”
28. “Airborne Interception of Enemy Fighter R/T.”
29. Maj. Gen. James Doolittle, Commander, Eighth Air Force, to Commanding Generals, 1st, 2nd, and 3rd Bombardment Divisions, memorandum, “Intercept of Enemy Fighter R/T Traffic,” 15 March 1944, 40/2717, TNA.
30. “S27 Report from mission of April 1, 1944,” 4 April 1944, 520.6251, AFHRA. This is the earliest available report I could find from airborne intercept operations in the Eighth Air Force. This report is from the 95th Bomb Group’s 1 April mission over Ludwigshafen, Germany; Tech. Sgt. Emil W. Bachman was the linguist. Of note, identifying the airborne linguists from the crew reports is problematic as it does not appear that a standard crew position was ever created for them; some logs list the linguist as “Y,” while others use “S27” or “Observer.”
31. Hauschildt was a native-born German who had immigrated to the United States with his family shortly after his birth. This was typical of the first batch of airborne linguists as there was limited German language training available in the United States and native speakers were far more fluent than the linguists produced by the War Department schools. For Hauschildt’s enlistment record see RG 64, box 1400, film reel 6.166, The U.S. National Archives and Records Administration (NARA).
32. “Airborne R/T Interception by N.A.S.A.F.,” 1, 21 March 1944, AIR 40/2717, TNA.
33. Second Lieutenant Jakob Gotthold, “Report on Airborne Interception of Enemy R/T Traffic Carried Out with the Fifteenth Air Force,” Air Communications Office, HQ U.S. Army Air Corps, 1 November 1944, McDonald Collection 16, Series 5, Folder 11, United States Air Force Academy.
34. “Airborne R/T Interception by N.A.S.A.F.”
35. William E. Burrows, *By Any Means Necessary* (New York: Farrar, Straus, and Giroux, 2001), pp. 85–86.
36. “Airborne R/T Interception by N.A.S.A.F.” No. 276 Wing was the RAF organization responsible for coordinating SIGINT operations in North Africa and the Mediterranean, “Headquarters No. 276 Wing RAF: Operations instruction number 1,” 7 December 1943, HW 41/432, TNA.
37. “Airborne R/T Interception by N.A.S.A.F.”
38. “Airborne R/T Interception by N.A.S.A.F.”
39. “Airborne R/T Interception by N.A.S.A.F.”
40. “Status of ‘Y’ Intelligence in Eighth Air Force,” report, Eighth Air Force Director of Intelligence, 1, 1 May 1945, Spaatz Papers, Box 297, Library of Congress (LOC).
41. Major Herbert Elsas, “Outline History of Operational Employment of ‘Y’ Service,” 6 June 1945, 3, Spaatz Papers, Box 297, LOC.
42. Gotthold, “Report on Airborne Interception of Enemy R/T Traffic,” 4.
43. Gotthold, “Report on Airborne Interception of Enemy R/T Traffic,” 2; Minutes, HQ USSTAF/Directorate Intel, “Meeting of A-2s of American Air Forces in Europe, Held 0900–1800 Hours, Jan 23, 1945,” Spaatz Papers, Box 121, LOC. Unfortunately, the meeting notes do not include the full names or positions held by the officers who attended the meeting.
44. “Meeting of A-2s of American Air Forces in Europe.”
45. Gotthold, “Report on Airborne Interception of Enemy R/T Traffic,” 18.
46. “The Contribution of the ‘Y’ Service to the Target Germany Campaign of the VIII Air Force,” report, Eighth Air Force Director of Intelligence, 4, 18 March 1945, Spaatz Papers, Box 297, LOC.
47. Maj. Herbert Elsas to Director of Intel HQ 8 AF, report, 5 May 1945, Spaatz Papers, Box 297, LOC.
48. “The Contribution of the ‘Y’ Service,” p. 4.
49. Haywood S. Hansell, Jr., *The Strategic Air War Against Germany and Japan: A Memoir* (Washington, DC: Government Printing Office, 1986), p. 142.
50. James C. McNaughton, *Nisei Linguists: Japanese Americans in the Military Service During World War II* (Washington, DC: Department of the Army, 2006), p. 371. The unanswered question here is whether XX Bomber Command got the airborne linguist idea from Eighth Air Force or if the idea was generated indigenously. Second Lieutenant Gotthold, in his aforementioned report, speculated whether the linguist capability could be transferred to the Pacific theater, but I have found no documentation that discussions were happening between 8th AF and XX Bomber Command.
51. “Unit History, 6th Radio Squadron Mobile,” SRH-397, September 1944–December 1945, call number 35019428, National Defense University Library, Washington, DC.
52. “Win Medals for B-29 Missions,” *Pacific Citizen* 20, no. 25 (23 June 1945), <http://ddr.densho.org/ddr/pc/17/25/>.
53. “21 Bomber Command Mission Statistics,” 1 October 1944–1 March 1945, 702.308, AFHRA.
54. “OP-20-G File, Communication Intelligence Organization, 1942–1946,” SRH-279 (describes the function of USAAF intelligence units on Guam and specifically, the 8th Radio Squadron Mobile), 34–36, Reel 5, Frame 310, Cryptologic Documents Collection, U.S. Army Heritage and Education Center, Carlisle Barracks, Pennsylvania.
55. “The Story Behind the Flying Eight Ball,” 8th Radio Squadron Mobile, 1 November 1942–2 September 1945, 25, author’s copy provided courtesy of Mr. Larry Tart.
56. While only ten Nisei actually flew, according to the 8th Radio Squadron Mobile history, all fifty volunteered; see “The Story Behind the Flying Eight Ball,” 39; Kenneth P. Werrell, *Blankets of Fire: U.S. Bombers Over Japan During World War II* (Washington, DC: Smithsonian Institution Press, 1996), 191.
57. Brigadier General K.P. McNaughton, to, Commanding Officer, 8th Radio Squadron Mobile, letter, “Commendation,” 16 October 1945, in “The Story Behind the Flying Eight Ball,” p. 40.
58. Admiral Chester Nimitz, Commander in Chief, U.S. Pacific Fleet and Pacific Ocean Areas, to Commanding General, U.S. Army Strategic Air Forces, “Contributions of the 8th Radio Squadron Mobile to the Joint Army-Navy Radio Analysis Group,” in “The Story Behind the Flying Eight Ball,” pp. 40–41.
59. Larry Tart and Robert Keefe, *The Price of Vigilance: Attacks on American Surveillance Flights* (New York: Ballantine Books, 2001), p. 174.
60. Tart and Keefe, p. 175.