

Death Spiral: Luftwaffe Airlift Training, Operation Stösser, and Lessons for the Modern U.S. Air Force

A Monograph

by

Major Allen C. Morris, Jr.

United States Air Force



School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas

2015-01

Approved for Public Release; Distribution is Unlimited

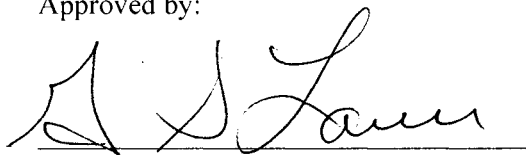
REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188		
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.					
1. REPORT DATE (DD-MM-YYYY) 22-05-2014		2. REPORT TYPE Monograph		3. DATES COVERED (From - To) JUN 2014 – MAY 2015	
4. TITLE AND SUBTITLE Death Spiral: Luftwaffe Airlift Training, Operation Stösser, and Lessons for the Modern U.S. Air Force			5a. CONTRACT NUMBER		
			5b. GRANT NUMBER		
			5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S) ALLEN C. MORRIS, JR.			5d. PROJECT NUMBER		
			5e. TASK NUMBER		
			5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Command and General Staff College ATTN: ATZL-SWD-GD Fort Leavenworth, KS 66027-2301			8. PERFORMING ORG REPORT NUMBER		
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSOR/MONITOR'S ACRONYM(S)		
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for Public Release; Distribution is Unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT In the face of shrinking budgets and wartime mission demands, the United States Air Force (USAF) C-17 pilot force endured cutbacks to aircraft training and proficiency over the last fourteen years not unlike those the <i>Luftwaffe</i> endured as World War II progressed. In light of recent modifications to airlift training programs, this monograph analyzes a historical case study of the perils of such action to highlight the similarities between the present day training reductions of the USAF, and those of the <i>Luftwaffe</i> between 1939 and 1944 for the reference and consideration of Air Mobility Command. Comparing how the modern USAF airlift force trains C-17 pilots to the programs and results of the <i>Luftwaffe</i> during World War II reveals striking similarities in the methods both forces used to find efficiencies and cut costs. Furthermore, analysis of the results of these cuts reveals not only that the <i>Luftwaffe</i> destroyed their airlift training programs to the point of operational failure in the execution of Operation Stösser, but that the USAF is potentially on a similar path toward marginalizing its own airlift capabilities.					
15. SUBJECT TERMS C-17, airlift, aircrew training, Fallschirmjäger, Operation Stösser,					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. PHONE NUMBER (include area code)
(U)	(U)	(U)	(U)	60	


Monograph Approval

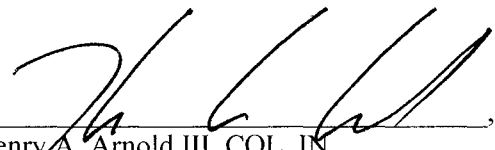
Name of Candidate: Maj. Allen C. Morris, Jr.

Monograph Title: Death Spiral: Luftwaffe Airlift Training, Operation Stösser, and Lessons for the Modern U.S. Air Force

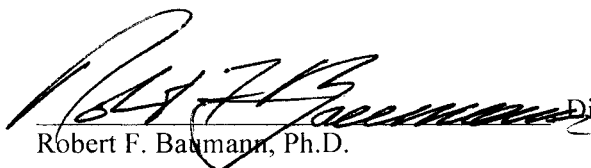
Approved by:


_____, Monograph Director
G. Stephen Lauer, Ph.D.

~~NOT AVAILABLE FOR SIGNATURE~~ 
_____, Seminar Leader
Yan Poirier, LCol (Canadian Army)


_____, Director, School of Advanced Military Studies
Henry A. Arnold III, COL, IN

Accepted this 22nd day of May 2015 by:


_____, Director, Graduate Degree Programs
Robert F. Baumann, Ph.D.

The opinions and conclusions expressed herein are those of the student author, and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other government agency. (References to this study should include the foregoing statement.)

Abstract

Death Spiral: Luftwaffe Airlift Training, Operation Stösser, and Lessons for the Modern U.S. Air Force, by Maj. Allen C. Morris, Jr., 60 pages.

In the face of shrinking budgets and wartime mission demands, the United States Air Force (USAF) C-17 pilot force endured cutbacks to aircraft training and proficiency over the last fourteen years not unlike those the *Luftwaffe* endured as World War II progressed. In light of recent modifications to airlift training programs, this monograph analyzes a historical case study of the perils of such action to highlight the similarities between the present day training reductions of the USAF, and those of the *Luftwaffe* between 1939 and 1944 for the reference and consideration of Air Mobility Command. Comparing how the modern USAF airlift force trains C-17 pilots to the programs and results of the *Luftwaffe* during World War II reveals striking similarities in the methods both forces used to find efficiencies and cut costs. Furthermore, analysis of the results of these cuts reveals not only that the *Luftwaffe* destroyed their airlift training programs to the point of operational failure in the execution of Operation Stösser, but that the USAF is potentially on a similar path toward marginalizing its own airlift capabilities.

Acknowledgements

The idea for this monograph topic grew out of the research thesis I completed on the Battle of Crete during the 2013-2014 academic year at the Army Command and General Staff College. When I first read about the German airlift force, the often ignored connection to American airlift and airborne doctrines was obvious. But like any good topic, it left me with more questions than answers. Further investigation was required to understand not only German and American airlift training, but also the impact of reduced training on the crew force; I chose to expand several elements of that research for this monograph. I hope this work can inspire and motivate at all levels of command and execution in Air Mobility Command, as America cannot afford an Operation Stösser created out of our own negligence.

Though impossible to thank everyone with a hand in the research effort, I will recognize a few. I wish to thank my committee for their words of encouragement and prodding, and for the freedom of maneuver they offered me on this topic. Dr. Stephen Lauer jumped at the chance to chair and I am grateful for the opportunity to write under his eye. The ease of his approach and sharpness of his input made this paper more much more impactful; I am forever grateful. LCol Yan Poirier never shied from using his red pen to hack drafts to death, but his effort steeled the final version appreciably. Thanks for making my argument make sense, sir. I also wish to thank my parents and family for understanding the trials of this past year, and for knowing that some weekends must be sacrificed to the study gods. Lastly, thank you Jess, for all your encouragement and love – I appreciate you more than you know!

Contents

Acronyms..... vi

Introduction: The Death Spiral 1

Section One: American Combat Airlift: History, Theory Doctrine 6

Section Two: The Rise and Fall of *Luftwaffe* Airlift Training..... 16

Section Three: The Failure of Operation Stösser..... 25

Section Four: The *Luftwaffe*'s *Shadow*: Reductions in USAF Airlift Training 37

Conclusion: Lessons in Parallel..... 48

Appendix A: AFI 11-2C-17V1 Training Tables Excerpt 52

Appendix B: Activation and Deactivation of *Luftwaffe* Airlift Units 1939-1945 53

Appendix C: Route of Flight, II/3TGr and III/4TGr, December 17, 1944 54

Appendix D: C-17 Active Duty AMC Flying Hour Summary, FY00-FY13 55

Appendix E: C-17 Active Duty AMC O&M Hours and Average Hours per Pilot Authorization. 56

Bibliography 57

Acronyms

AFDD	Air Force Doctrine Document
AFB	Air Force Base
AFI	Air Force Instruction
AFTTP	Air Force Tactics, Techniques, and Procedures
ALZ	Assault Landing Zone
AMC	Air Mobility Command
COCOM	Combatant Commander
DOC	Designed Operational Capability
DZ	Drop Zone
FHP	Flying Hour Program
GRF	Global Response Force
JFE	Joint Forced Entry Exercise
JOAC	Joint Operational Access Concept
JOAX	Joint Operational Access Exercise
KG	<i>Kampfgeschwader</i> [Wing]
KGrzbV	<i>Kampfgeschwader zur besonderen Verwendung</i> [Special Duty Bomber Wing]
KGzbV	<i>Kampfgruppe zur besonderen Verwendung</i> [Special Duty Bomber Group]
LZ	Landing Zone
METL	Mission Essential Task List
O&M	Operations and Maintenance Fund
PA	Pilots Authorized
PAA	Primary Authorized aerospace-vehicle Assigned
TG	<i>Transportgruppe</i> [Transportation Group]
TGr	<i>Transportgeschwader</i> [Transportation Wing]
TWCF	Transportation Capital Working Fund
USAF	United States Air Force

Introduction: The Death Spiral

First we have to beat Russia, and then we can start training.¹

—*Generaloberst* Hans Jeschonnek, Chief of the *Luftwaffe* General Staff, 1942

It was freezing in the cramped cockpit. As the flight of transports thundered along barely 500 feet above the gently rising pine forests below, the major, stuffed uncomfortably into the left seat, looked out into the inky blackness below him. He could barely see the snow-covered ground, illuminated by faint searchlights bouncing off the clouds on the far side of a nearby town. He felt the overcast closing in from above as the terrain rose up from the German side of the border toward the mountains. The Ju-52 transport bounced as if riding down a cobblestone path, jerking its way through the turbulent mountain air in heaves and throes.

Terrible visibility dominated the night. The major could just see the green and red wingtip lights of the aircraft ahead. Even at 2,500 feet spacing, the formation felt dangerously close. Shaking his head at the absurdity of this night's work, he turned and caught a glimpse of his copilot, a lieutenant fresh from flight training, wearing a face that betrayed his fear. The men seated behind him in the cargo hold wore different expressions – grim determination accentuated by jaws clenched against the cold. The frozen darkness unnerved even these experienced paratroopers; they just didn't show it so easily. The major silently wished them luck and turned back to the task at hand. Somewhere in the tunnel of clouds and Belgian pine-forested mountains ahead was their drop zone. The time to find it and be done with this night's work had come.

Easier said than done; so far as he knew, the major was the most experienced pilot in his group. Nonetheless, this mission felt like a death sentence: lead a flight of poorly-trained novice pilots, flying more than thirty transports overloaded with *Fallschirmjäger* [paratroopers] into the

¹Richard Suchenwirth, Numbered Air Force Study 189, "Historical Turning Points in the German Air Force War Effort" (Maxwell AFB, AL: Air Force Historical Research Agency, 1959), 27, accessed July 5, 2014, <http://www.afhra.af.mil/studies/numberedusafhistoricalstudies151-200.asp>.

December darkness, rendezvous with another strike group, and navigate through the mountains to drop zones miles behind Allied lines to secure the northern sector of Hitler's offensive in the West. When he thought of his mission in those terms, the major scoffed at his own chances. Still, this was his duty. He had done it before – in Norway, The Netherlands, Crete, Tunisia, Demyansk and Stalingrad. But nothing had prepared him for this mission – a forlorn hope.

The daunting challenges the *Luftwaffe* faced on the night of December 17, 1944 in the execution of Operation Stösser came about for a multitude of reasons. This operation, meant to secure the northern flank of the German thrust toward Antwerp, called upon atrophied skills and long-forgotten methods to achieve success. The airlift pilot force was largely unqualified, the result of years of reduced training prioritization and combat fatigue which left the air transportation elements of the *Luftwaffe* impotent. Yet operational failures as a result of atrophied training will likely occur once again; the German lessons of reduced training and crippled capability going unlearned or ignored. What lessons can the modern United States Air Force (USAF) learn from the *Luftwaffe*'s reduction of airlift aircrew training and the December 1944 failure of Operation Stösser?

The aim of this monograph is to highlight trends of historical significance to the USAF's Air Mobility Command (AMC) as it faces flying training reductions resulting from budgetary limitations and increased operations tempo. Doing so requires an examination of the history, theory, and doctrine behind combat airlift training and proficiency in the current USAF and AMC, providing an abstract through which to evaluate both the *Luftwaffe*'s reduced training programs prior to Operation Stösser, and recent trends in the USAF C-17 fleet. This research utilizes a lens based on the core competencies for airlift crews as explained in the Air Force Instruction (AFI) 11-2C-17 Volume 1: *Aircrew Training*. That publication mandates aircrew currency (recentness of experience) and proficiency (competence) in several skills including low altitude tactical ingress and egress, airdrop operations, instrument and night flight, and assault

airlift operations necessary for airlift pilots.² Viewed through this lens, the comparative analysis of the two airlift forces as their respective wars dragged on highlights several striking similarities.

After explaining the modern lens airlift training in the *Luftwaffe* and the USAF are examined, with German doctrine, training organizations, and combat employment serving as the historical starting point. For the *Luftwaffe*, operational missions and losses took a toll on the availability and quality of training, resulting in systematic reductions that produced operational failure.³ This reality crystalized for their airlift forces on the night of December 17, 1944 in the botched execution of Operation Stösser. The belief that combat airlift was simply “moving cargo from point to point” – and thus required little training – can be challenged by the examination of the *Luftwaffe*’s air transportation training reduction prior to the Ardennes Offensive, when an atrophied priority of aircrew training manifested itself in operational failure.⁴

For the modern USAF, the examination of combat airlift training questions the risk involved in cutting flying hours and redefining proficiency in the face of economic and operational demand. Focused study of current forced entry operation doctrine and USAF airlift training data (flight hours, requirements, reductions, overall experience of the crew force) show parallels between the *Luftwaffe*’s downward spiral and the initial indications of the same outcomes in AMC. This correlation is evident when examining AMC training regulation and flying hours data in light of the requirements for forced entry operations as specified in the Joint Publication (JP) 3-18 *Forced Entry Operations*, and the Joint Operational Access Concept

²U. S. Air Force, Air Force Instruction 11-2C-17 Volume 1, *C-17 Aircrew Training* (Scott AFB, IL: Government Printing Office, 2012), 7.

³Williamson Murray, *Strategy for Defeat: The Luftwaffe 1939-1945* (Maxwell AFB, AL: Air University Press, 1983), 318; D. Fritz Morzik, Numbered Air Force Study 167, “German Air Force Airlift Operations” (Air Force Historical Research Agency, Maxwell AFB, AL, 1961), 282, accessed 5 July 2014, <http://www.afhra.af.mil/studies/numberedusafhistoricalstudies151-200.asp>.

⁴Murray, *Strategy for Defeat: The Luftwaffe 1939-1945*, 312. This was the stated position of the OKL [*Oberkommando der Luftwaffe*].

(JOAC). Thus the comparative analysis is designed to highlight the relationships between historical experience and modern employment, informing AMC leadership on possible outcomes of continued reductions in aircrew training.

While the National Military Strategy and Joint Publications determine the modern framework, regulations such as 11-2C-17 Volume 1: *Aircrew Training* effectively detail the mission and training requirements for USAF airlift crews for comparison to the *Luftwaffe*. Several sources for the German narrative also inform this research, among them the USAF Historical Research Agency (USAFHRA) at Maxwell AFB, Alabama. The USAFHRA maintains studies authored by several *Luftwaffe* commanders including *Generalmajor* Fritz Morzik who commanded the transportation fleet and authored *German Air Force Airlift Operations*, a first-hand account of the systematic training and destruction of the *Luftwaffe*'s airlift force. Likewise, Richard Suchenwirth's account *Historical Turning Points in the German Air Force War Effort* relays the destruction of German pilot training methods, setting up conclusions for this research in the process. Finally, authors like James Corum detailed the doctrine, organization, and motivations behind *Luftwaffe* employment in several books on operations and losses, many including translations of original German documents. In total, this dataset provides ample evidence on the cost-benefit of reduced training, reduced flying hours, and decreased combat capability as the *Luftwaffe* faced ever-limited resources (fuel, aircraft, pilots, etc.) between mid-1941 and late-1944.

The results of this research and methodology correlate the *Luftwaffe*'s failures with modern USAF training reductions through the examination of historic flight training data for the C-17 force. Airlift training reductions over the last fourteen years highlight parallels between the *Luftwaffe*'s downward spiral, and the initial indications of the same outcomes in the USAF. When compared to the narrative of Germany's reduced capabilities and the resultant failure of the *Luftwaffe* in December 1944, these parallels serve as indicators of risk for AMC leadership.

Operation Stösser failed due to continued reductions in airlift training programs resulting from losses, fuel shortages, and the limited instructor cadres of the *Luftwaffe*'s transport fleet. The result was a force incapable of airborne forced entry operations.⁵ The *Luftwaffe*'s training reductions, and resulting failed operational employment, serve as a warning to the modern USAF airlift force on the perils of cutting competencies in the face of limited resources.

⁵Morzik, "German Air Force Airlift Operations," 323.

Section One: American Combat Airlift: History, Theory Doctrine

In *The Art of Warfare*, Sun Tzu advised commanders to know themselves and their enemies; by knowing oneself, faults materialize, awareness increases, and paths to victory are illuminated.⁶ A critical inquiry into the perils of reduced airlift training thus requires understanding the evolution of American airlift theory and doctrine. This basic understanding not only illuminates the missions and capabilities driving airlift training, but also the reasoning behind proficiency requirements in specific training tasks; it lays the foundation for understanding how poor training produces operational failure.

American airlift pre-dates the founding of the USAF, though not the history of its founders. Perhaps the most infamous American airpower advocate, Brigadier General Billy Mitchell, proposed the idea for massed bomber formations dropping parachute-equipped infantrymen behind enemy lines in the spring of 1918.⁷ After World War I, the US Army Air Corps led the effort to solidify air mail and cross-country navigation routes, building competency and infrastructure for national air carriers in the process. Indeed, the American obsession with long-distance transport, for profit or military advantage, sprang from conquering the vast distances of the continent by air.⁸ As America entered World War II, it did so utilizing militarized versions of the airliners of the day, the Douglas DC-3 (C-47 Skytrain) and DC-4 (C-54

⁶Sun-Tzu, *The Art of Warfare*, ed. and trans. by Robert Henricks and Roger Ames (New York, NY: Ballantine Books, 1993), 113.

⁷Michael Hickey, *Out of the Sky: A History of Airborne Warfare* (New York, NY: Charles Scribner's Sons, 1979), 13.

⁸David Wragg, *Airlift: A History of Military Transport* (Novato, CA: Presidio Press, 1986), 14.

Skymaster), much to the chagrin of early airpower pioneers.⁹ World War II developed two important ideas in American air mobility: “combat airlift” and the missions of tactical or “troop carrier” airlift, and strategic or “intertheater” airlift. Best articulated long after the war, the US Army Air Force (USAAF) concept of combat airlift meant, “moving combat forces and all their battle equipment in the size and mix required, with the greatest speed, to any point in the world, no matter how remote or primitive, where a threat arises.”¹⁰ This concept grew out of the USAAF’s employment of civilian-based C-47 and C-54 aircraft in combat operations, and the service’s desire to design and build aircraft specifically for military airlift. The separate missions of troop carrier and intertheater airlift furthered the notion that air mobility maintained a distinct combat element. While strategic intertheater airlift focused on logistics and moving cargo across vast distances, tactical troop carrier airlift focused on assault operations such as airdrop, austere landing zone (LZ) resupply, and special operations.¹¹ Though combat airlift encompassed both mission sets, the two fields rapidly diverged. Flying airdrop resupply operations under enemy fire to the drop zones of Korea required a different skill set than the non-stop aerial convoy of the Berlin Airlift. While both operations proved airlift’s vitality, the fledgling USAF still treated strategic and tactical airlift as separate and distinct in history, theory, and doctrine.¹²

Not until after the Vietnam War did airlift doctrine and aircraft design finally move in unison; until that time, limited payload and range prevented employing tactical airlift across

⁹Charles Miller, *Airlift Doctrine* (Maxwell AFB, AL: Air University Press, 1988), 7 and 19. Then-Major Generals Ben Foulois and Hap Arnold favored aircraft designed to military specifications. Civil air transport aircraft like the DC-3 and DC-4 were plentiful at the time, and the US War Department believed that they would suffice; funding was instead spent on development of bombers like the B-17 Flying Fortress.

¹⁰Miller, *Airlift Doctrine*, 346. Quoted by General Estes in *Air University Review*, September 1969, this idea, born in WW2, would inspire the development of the next generation of airlift aircraft.

¹¹Ibid., 73, 151 and 226.

¹²Ibid., 226.

strategic distance. The success of tactical airlift operations at Khe Sahn and Operation Junction City during the Vietnam War, combined with the later strategic lifts of Operation Eagle Thrust and the Israeli airlift of 1973, inspired the unification of all USAF airlift functions under a unified command (i.e. Air Mobility Command), as well as the design of an airlift aircraft made to execute both mission sets.¹³ Throughout the late 1970s and into the 1980s, the USAF's C-X Task Force refined and then built the aircraft that thereafter epitomized American airlift operations, the C-17 Globemaster III.¹⁴ Able to move cargo and personnel direct to the battlefield across strategic distances, bypassing remote staging bases and costly delays, the C-17 ushered in a new era in airlift doctrine, that of "direct delivery" to the front lines.¹⁵ Direct delivery missions include aerial delivery of supply via airdrop, but also airland missions to austere forward landing zones, moving cargo across strategic distances (i.e. from the United States) directly into combat areas. While C-17s move material and soldiers to the conflict sooner, they also require more detailed planning, preparation, and aircrew training. The mission requires proficiency in air refueling, assault landing techniques, low altitude flying, airdrop of personnel and equipment, and austere airfield operations.¹⁶ These requirements necessitated *more* aircrew training and proficiency to cope with the ever-increasing complexity of the operating environment and the expansion of capabilities across both the strategic and tactical mission sets.

The requirements, capabilities, and missions of the US Armed Forces are in part determined by the National Military Strategy (NMS). Informed and bracketed by the National Security Strategy, the National Defense Strategy, and the National Defense Budget, the NMS

¹³Miller, *Airlift Doctrine*, 318-319, 334-341, 348, 388.

¹⁴Ibid., 390.

¹⁵Ibid., 404-405.

¹⁶Ibid., 431-432.

specifically demands force readiness and the avoidance of a hollow military through properly funded training and equipment.¹⁷ Furthermore, it calls for the integration of “right-sized” forces defined by readiness for all contingencies, able to provide the Combatant Commanders (COCOMs) all capabilities necessary to execute their assigned missions; anything less invites the risk of operational failure.¹⁸ The Joint Chiefs of Staff and Department of Defense further transmit these requirements to the force through the Joint Publications document series, outlining specific missions sets for which the armed forces maintain readiness. Specific to airlift, the JP 3-17 *Air Mobility Operations* addresses all airlift methods (airland, airdrop), concepts (aerial resupply, direct delivery), mission types (contingency, training) and missions, including combat employment and forced entry operations.¹⁹

The USAF’s role in these missions is further addressed in separate doctrine, namely JP 3-18 *Forced Entry Operations* and the Joint Operational Access Concept (JOAC). First, JP 3-18 explains forced entry operations through the concept of operational access, or “the ability to project military force into an operational area with sufficient freedom of action to accomplish the mission.”²⁰ Maintaining the capabilities for operational access requires training to establish a

¹⁷Joint Chiefs of Staff, National Military Strategy (NMS), *National Military Strategy of the United States of America 2011: Refining America’s Military Leadership* (Washington, DC: Government Printing Office, February 2011), 18.

¹⁸Joint Chiefs of Staff, *National Military Strategy of the United States of America* 2011, 20; Joint Chiefs of Staff, Joint Publication (JP) 1-02, *Department of Defense Dictionary of Military and Associated Terms* (Washington, DC: Government Printing Office, 2010, amended 2014), 212.

¹⁹Joint Chiefs of Staff, Joint Publication (JP) 3-17, *Air Mobility Operations* (Washington, DC: Government Printing Office, 2013), IV-3 to IV-4; These methods, concepts, mission types and missions are further elaborated in Air Force Doctrine Document (AFDD) 3-17 *Air Mobility Operations*. U. S. Air Force, Air Force Doctrine Document 3-17 *Air Mobility Operations*. (Maxwell AFB, AL: LeMay Center, 2013), 27, 35-37 and 63.

²⁰Joint Chiefs of Staff, Joint Publication (JP) 3-18, *Forced Entry Operations* (Washington, DC: Government Printing Office, 2012), I-2.

lodgment against armed opposition anywhere in the world at a moment's notice.²¹ For the USAF this requirement translates into employing airpower anywhere on the globe, as required by the President of the United States. Regarding airlift, JP 3-18 specifies maintaining the capability for airborne assault and combat resupply operations to gain and maintain operational access.²²

The JOAC details how the Department of Defense employs the concepts outlined in the JP 3-18, and the enduring requirements for force projection against anti-access and area-denial weapons proliferated around the globe.²³ It further stresses the need for maneuver directly against key enemy objectives in force, without reliance on forward basing.²⁴ For the USAF airlift force, maintaining operational maneuver across strategic distances (direct-delivery, air refueling) requires training aircrews to operate while protecting themselves against detection and interception (low altitude operations), defeat enemy air and ground defenses (threat avoidance), and execute forced entry operations (airdrop, austere landing zone operations) to establish, isolate, and maintain a lodgment.²⁵ The combat employment, airdrop and resupply operations required to establish a lodgment are further addressed in Air Force Doctrine Document (AFDD) 3-17 *Air Mobility Operations*. Utilizing speed, mass, and maneuver, the AFDD specifies aerial delivery, direct delivery, and forced entry operations to achieve constant pressure on enemy forces, thus enabling operational access for American forces.²⁶

²¹Joint Chiefs of Staff, Joint Publication (JP) 3-18, *Forced Entry Operations*, I-1.

²²*Ibid.*, I-9.

²³Department of Defense, *Joint Operational Access Concept* (Washington, DC: Government Printing Office, 2012), i-ii, and 4.

²⁴*Ibid.*, 31.

²⁵Department of Defense, *Joint Operational Access Concept*, 23-25, 34-35.

²⁶U. S. Air Force, AFDD 3-17 *Air Mobility Operations*, 33-37.

Aircrews are the heart of these tasks. Understanding the history, theory and doctrine driving training thus requires an understanding of aircrew readiness in order to formulate the criteria with which to evaluate the past and future of air mobility operations and training. As such, “readiness” is defined as the ability of US military forces to meet the demands of the NMS.²⁷ The USAF maintains pilot readiness by training aircrew to accomplish assigned missions, and by providing mission-capable aircraft. Mission Essential Task Lists (METL) are built at the squadron level, and further consolidated in each unit’s statement of Designed Operational Capability (DOC). The unit DOC details required mission tasks, and is likewise referenced in reporting readiness.²⁸ These tasks generate training requirements for the aircrew force in order to maintain proficiency and unit readiness for operational missions. While the DOC informs and structures unit and aircrew training, this study requires further scoping to frame the entirety of a units’ training for usable comparison of limited scale; in this case, examining C-17 airlift pilot qualifications for forced entry operations.

Airlift training for C-17 aircrews developed along two distinct mission sets – airland and airdrop. Airland is a basic qualification all aircrews earn through training programs at the C-17 schoolhouse at Altus Air Force Base (AFB), Oklahoma; airdrop is an additional qualification requiring further training and currency requirements. New pilots typically arrive at their squadrons with between 160 to 180 primary pilot training hours and an additional 20 to 25 C-17

²⁷Joint Chiefs of Staff, Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 212.

²⁸U. S. Air Force, Air Force Instruction (AFI) 10-201, *Status of Resources and Training System*, Guidance Memorandum 2014-01 (Washington DC: HQ Air Force A3/5, 2014), 3.

training hours earned over the course of nearly two years of initial training.²⁹ Upgrade to aircraft commander typically takes another two years, and by regulation requires a minimum flying hour requirement of 1,000 total aircraft hours and at least 400 in the C-17.³⁰ Subsequently, typical airdrop aircraft commanders have between three and six years of C-17 experience and well over 1,500 hours of total flight time. But the C-17 force does not maintain airdrop qualifications universally; currently just over 18% of the pilot force is airdrop qualified.³¹ While this figure is adequate to fulfill requirements set forth by AMC, the USAF, and the NMS, it goes without saying that only a portion of the force is thus *qualified* to execute forcible entry operations, to say nothing of the proficiency required to execute such complex operations.³²

Examination of the training regulation for the C-17 force, Air Force Instruction (AFI) 11-2C-17 Volume 1 *C-17 Aircrew Training*, reveals initial and reoccurring training requirements for events linked to forced entry operations. These include Night Takeoff and Landing, Low Level Flight Operations, Formation Operations, Airdrop, and Assault Landing Zone (ALZ) operations

²⁹Totals from T-6A, T-1A, T-38C and C-17A PIQ syllabus hours combined. U. S. Air Force, Air Education and Training Command Syllabus, *C-17 Pilot Initial Qualification (PIQ)* (Randolph AFB, TX: HQ AETC/A3ZM, 2014), 2; U. S. Air Force, Air Education and Training Command Syllabus, *T-1A Joint Specialized Undergraduate Pilot Training* (Randolph AFB, TX: HQ AETC/A3FP, 2012), 2; U. S. Air Force, Air Education and Training Command Syllabus, *T-6A Primary Pilot Training* (Randolph AFB, TX: HQ AETC/A3FP, 2013), 2; U. S. Air Force, Air Education and Training Command Syllabus, *T-38C Specialized Undergraduate Pilot Training* (Randolph AFB, TX: HQ AETC/A3FP, 2012), 2.

³⁰U. S. Air Force, Air Force Instruction 11-2C-17 Volume 1, *C-17 Aircrew Training*, 52; Maintaining the production of adequate numbers of new aircraft commanders requires that *at a minimum* over the course of their first 2.3 years, inexperienced C-17 pilots must fly at least 650 hours as they gain experience prior to certification. On average, during the following two years those pilots selected for airdrop qualification attend additional training courses for airdrop operations. The 2.3 years figure is based on the current average seasoning rate for new pilots to progress to an “experienced” level, while 650 hours is based on the average “aging rate” of crew members (as of FY13, 23.4 hours per crew member per month over 2.3 years). Derek Gallagher, “Maintaining Aircrew Readiness in a Budget Constrained Environment” (Research Thesis, Air University Air Force Fellows: Maxwell AFB, AL, 2013), 14-15.

³¹Stephen J. Sullivan, Air Mobility Command, *C-17 Aircrew Training* (AMC/A3TA: Scott AFB, IL), Email to the author, 22 September 2014. 458 pilots out of a crew force of 2514 on record.

³²Gallagher, “Maintaining Aircrew Readiness in a Budget Constrained Environment,” 25.

(See Appendix A). Pilots accomplish these events on a quarterly or semi-annual basis, with younger, less experienced pilots requiring more training (hours and frequency) than veterans.³³ Further investigation into tactical-level doctrine reveals entire chapters of the Air Force Tactics Techniques and Procedures (AFTTP) 3-3.C-17 *Combat Aircraft Fundamentals-C-17* devoted to the techniques of properly executing and training to these requirements.³⁴ Yet, missing from these publications is any command guidance for directed training specific to the execution of large scale forced entry operations. Other than the squadron DOC statements, no doctrinal or regulatory text specifically directs training for forced entry operations.³⁵

While the tactical and doctrinal publications of the C-17 force provide guidance on the training and certification of aircrews executing the forced entry mission, no publication directs mandatory Joint training for this specific task. C-17 airdrop qualified aircrew and their aircraft are the vehicles the US Army uses to plan large scale airborne operations utilizing the Global Response Force (GRF), headquartered at Fort Bragg, North Carolina. As such, pilot airdrop training focuses on either large formation operations (nine to eighteen aircraft), or smaller three-ship flights dropping personnel and equipment on drop zones. While the currency requirements for large force training exist within the C-17 community (via the DOC statements and 11-2C-

³³U. S. Air Force, Air Force Instruction 11-2C-17 Volume 1, *C-17 Aircrew Training*, 35-41. See training tables in Appendix A.

³⁴U. S. Air Force, Air Force Tactics Techniques and Procedures (AFTTP) 3-3.C-17, *Combat Aircraft Fundamentals-C-17* (Nellis AFB, NV: Government Printing Office, 2012), xi-xxv.

³⁵The closest training documents come to specifying large-formation operations is a requirement for multi-element formation training, which can be simulated with as few as three aircraft. U. S. Air Force, Air Force Instruction 11-2C-17 Volume 1, *C-17 Aircrew Training*, 39.

17V1 *C-17 Aircrew Training*), no Joint training is directed in support of forced entry operations.³⁶ Though units participate in semi-annual airdrop rehearsals such as the Joint Operational Access Exercise (JOAX) at Fort Bragg, the only Joint large formation forced entry training into simulated contested airspace occurs at the USAF Weapons School's Joint Forcible Entry Exercise (JFE) at Nellis AFB, Nevada. Because this event only occurs every six months and no home station training provides the same level of mission complexity, successfully executing forced entry operations remains perhaps the greatest weakness of the C-17 force's training programs.³⁷

The requirements for trained and ready aircrews capable of executing forced entry operations abound. While *currency* in the tenant events of forced entry operations is rarely an issue, regulations fail to define the requirements for the *proficiency* of the C-17 airdrop force in these events.³⁸ This research therefore provides a snapshot into how the USAF trains its airlift force, and the composition of its doctrinally minimal training for forced entry operations. An understanding of the evolutionary history, theory, and doctrine behind C-17 training thus serves as an evaluative lens for the examination of previous forced entry operations, as well as a determinant for the viability of AMC's future C-17 airlift training plans. Subsequently, when

³⁶U. S. Air Force Weapons School, *EMP396A: GRF Concepts* (Nellis AFB, NV: USAF Weapons School, 2013), slide 11. The CJCS EXORD dated 24 August 2011 establishes the requirement for the Global Response Force – the Joint Army-Air Force capability to execute forced entry operations rapidly, anywhere in the world. This document directs that each service maintain the capability, but falls short by not mandating training to execute the capability.

³⁷U. S. Air Force Weapons School, 57th Weapons Squadron (C-17). "US Air Force Weapons School JFE 13A Brief to 18th Air Force Commander." Briefing (Nellis Air Force Base, NV, 23 May 2013), Slide 10.

³⁸U. S. Air Force, Air Force Instruction 11-2C-17 Volume 1, *C-17 Aircrew Training*, 35-41. Forced entry operations and/or large formation operations require no training *currency*, thus there is no way to judge if the force is capable, let alone proficient, in forced entry operations other than to investigate the currency of the pilot force on specific training events such as airdrop, low altitude flight or ALZ landings. Pilots maintain no requirement to drop actual cargo loads or personnel from the aircraft. Furthermore, no regulation requires any Joint training to participate as a pilot in forced entry operations.

. evaluating the past using present standards, the *Luftwaffe*'s system of training its operational aircrews appears woefully under-resourced – a fate from which the future USAF is not immune.

Section Two: The Rise and Fall of *Luftwaffe* Airlift Training

Understanding the reduction of *Luftwaffe* airlift training and why it matters in relation to the current USAF requires an examination of the doctrine, theory, and history surrounding the German downfall. Recalling the evaluative abstract of combat airlift training, proficiency, and capabilities in the modern USAF, the further examination of *Luftwaffe* training programs in the years 1939-1944 clearly reveals the perils of reductions to the point of operational failure.

Following World War I, the Treaty of Versailles banned the German *Reichswehr* [armed forces] from the construction, training, or operation of an air force. As Germany re-armed and rebuilt its military prior to World War II, the *Luftwaffe*'s resurgence came about slowly, through clandestine training programs in collaboration with the Soviet Union. The German General Staff, active in disguise in the office of the *Truppenamt* [Troop Office], retained several pilots who later built the *Luftwaffe*, including airlift pioneers like Kurt Student.³⁹ At General Hans von Seeckt's direction, the Central Flying Office published the "*Directives of the Execution of the Operational Air War*" in 1926.⁴⁰ This groundbreaking document included the first mention of battle in the enemy rear, the exploitation of the "vertical flank," paratroopers, combat resupply, and a flying transportation force based on civil aviation passenger aircraft.⁴¹ These ideas manifested in the *Luftwaffe*'s rise in 1935 when Hitler's air force rewrote doctrine, detailing in "*The Conduct of Air Warfare*" the principles of air power as the fledgling *Luftwaffe* understood them.⁴² Here doctrine expanded to include specifics on air mobility, resupply, and air assault operations like paratrooper

³⁹Anthony Farrar-Hockley, *Student* (New York, NY: Ballantine Books, 1973), 25-31.

⁴⁰James Corum, *The Luftwaffe's Way of War: German Air Force Doctrine 1911-1945* (Baltimore, MD: The Nautical and Aviation Publishing Company of America, 1998), 109.

⁴¹*Ibid.*, 109.

⁴²*Ibid.*, 9.

assaults, in addition to the creation of the transportation forces.⁴³ But the exploitation of such grand ideas required not only a German airlift force in name and composition, but also one organized and trained for war.

The theory of *Luftwaffe* airlift forces in WWII focused on its organization, its principle aircraft, the Ju-52, and its primary mission of combat airlift. By 1935 the tri-motor Junkers Ju-52 outfitted the majority of *Luftwaffe* transport and bomber squadrons. Though its usefulness as a bomber quickly deteriorated, the aircraft continued service as an advanced pilot trainer, transport, and staff courier.⁴⁴ As the *Luftwaffe* bomber forces converted to military-designed aircraft, the emergence of the parachute infantry battalions occurred simultaneously. In support of this new method of warfare (airborne insertion of paratroopers), the IV Group of Bombardment Wing Hindenburg retained their Ju-52's. Re-designated I *Kampfgruppe zur besonderen Verwendung* (KGzbV) [1st Bombardment Group for Special Employment], it was the *Luftwaffe*'s first attempt to organize airlift under a single commander, General Kurt Student of the 7th *Flieger* [Air] Division.⁴⁵ By the summer of 1939, the *Luftwaffe* fielded four such groups, organized under a single *Kampfgeschwader* (KGr) [wing], capable of dropping an entire regiment of paratroopers (and designated I KGrzbV). As the summer wore on, Student's division expanded to include a second parachute regiment. However, the *Luftwaffe* chose not to expand the airlift force in

⁴³James Corum, *The Luftwaffe: Creating the Operational Air War, 1918-1940* (Lawrence, KS: University of Kansas Press, 1997), 284-285; German airlift doctrine further explains concepts of employment for the *Luftwaffe* such as Air Supply (airlift), Air Transport (troop repositioning or deployment via airlift aircraft), and combat airlift (assault airlift such as airdropping or landing close to the front lines, offloading cargo or personnel directly into the fight). Morzik, "German Air Force Airlift Operations," 67 and 71.

⁴⁴Morzik, "German Air Force Airlift Operations," 1-2; Twenty Ju-52s accompanied the Condor Legion to Spain during the Spanish Civil War as bomber aircraft, and were later replaced in this role by Heinkel He-111's. Suchenwirth, "Historical Turning Points in the German Air Force War Effort," 32.

⁴⁵Bruce Quarrie, *German Airborne Divisions* (Oxford: Osprey Publishing, 2004), 89; By October 1937, the Group corresponded to the size and strength of a *Fallschirmjäger* battalion: four squadrons of twelve aircraft each (plus five aircraft for spares and staff elements), corresponding to the four companies and staff of a parachute battalion. Morzik, "German Air Force Airlift Operations," 3-4.

concert. The *Luftwaffe* General Staff instead decided that in the case of contingencies requiring the employment of more than one regiment, they would simply augment operational airlift units with aircraft and instructors assigned to pilot training and staff duty; no expansion was required.⁴⁶ This decision, made in the summer of 1939, handicapped the *Luftwaffe* airlift force throughout the coming war.

In addition to I KGrzbV, the *Luftwaffe* maintained a large and parceled-out fleet of airlift aircraft for use in a variety of routine resupply operations and pilot training. Each *Luftflotte* [Air Fleet], *Fliegerkorps* [Air Corps], and *Fliegerdivision* [Air Division] commander maintained squadrons of Ju-52s for resupply operations, staff transportation and courier duty. Because each *Luftflotte* essentially acted as its own miniature air force, the *Luftwaffe* maintained no single manager for resupply or systematic airlift organization such as the USAF does today (i.e. Air Mobility Command). Subordinated to local commanders for use as they saw fit, *Luftwaffe* airlift organization outside I KGrzbV resulted in a tactically agile but operationally unwieldy force, often lacking in efficiency and interoperability with other *Luftwaffe* or army units.⁴⁷

Training the next generation of *Luftwaffe* pilots was the other duty of the Ju-52 airlift fleet prior to WWII. By the summer of 1939, the *Luftwaffe* General Staff reorganized pilot training under its Office of the Chief of Training. The Chief of Training centrally supervised pilot training programs run by each *Luftflotte* commander, but mainly acted as a program manager with no direct control over assets.⁴⁸ German pilot training in the late 1930s maintained parity with the armed forces of the industrialized world. Pilots completed an average of more than two years of

⁴⁶Morzik, "German Air Force Airlift Operations," 3.

⁴⁷Without equivalent organizational parity, airlift commanders subordinated to fighter and bomber commands were often the only officers knowledgeable on resupply or transportation operations in an entire air force. Their advice and expertise was regularly ignored. Suchenwirth, "Historical Turning Points in the German Air Force War Effort," 34-35.

⁴⁸*Ibid.*, 20-22.

training before operational assignment to frontline squadrons. They arrived at operational units with between 220-250 flight hours, having completed basic (A-School), advanced (B-School), combat crew/multi-engine (C-School), and advanced instrument training courses.⁴⁹ The Germans used Ju-52s as the primary multi-engine and advanced instrument training aircraft due to its stability and ease of operations; qualities that also made the aircraft an ideal airlift asset.⁵⁰

Despite years of training, neophyte pilots arriving at operational units found themselves assigned to squadrons where a period of seasoning and local aircraft orientation completed the process of building new crews. For German airlift pilots prior to WWII, this included training rigorously for assignment to Kurt Student's 7th *Flieger. Luftwaffe* airlift pilots trained exclusively for assault airlift – the employment of paratroopers, formation operations, low-altitude flight, and austere airfield landings to move troops to the front line as rapidly as possible.⁵¹ Crews completed their seasoning training having logged more than 250 hours of flight time, including months of integrated training with paratroopers.⁵² In these early days the *Luftwaffe* airlift force was combat oriented. As so many *Luftwaffe* pilots trained on the Ju-52, these aircraft and their instructors thus played a pivotal role in growing the pilot force as Germany entered WWII. But *Luftwaffe* organization and training of airlift pilots would prove woefully unable to maintain the agility and prowess of its original conception after September 1, 1939.

⁴⁹Karl Gundelach and Werner Kreipe, Numbered USAF Study 169 “Technical Training Within the German *Luftwaffe*” (Maxwell AFB, AL: Air Force Historical Research Agency, 1955), 338, accessed September 13, 2014. <http://www.afhra.af.mil/studies/numberedusafhistoricalstudies151-200.asp>. A-schools were the basic flying training schools. B-schools were specialized, with high performance aircraft. C-school students experienced their first multi-engine aircraft, gunnery, advanced navigation and formation operations. Bomber, airlift and reconnaissance pilots went on to complete the advanced instrument course, which focused on navigation and night operations.

⁵⁰Air Ministry of the United Kingdom, *The Rise and Fall of the German Air Force* (London: Air Ministry Press, 1948), 31.

⁵¹Morzik, “German Air Force Airlift Operations,” 2 and 18. They often worked with only one *Fallschirmjäger* unit to foster bonds, trust and integration between aircrew and paratroopers.

⁵²Gundelach, “Technical Training Within the German *Luftwaffe*,” 223.

At the outbreak of WWII, I KGrzbV was the only airlift organization larger than a squadron authorized in the *Luftwaffe*'s force structure.⁵³ Any contingency or emergency employment of airlift required the augmentation of operational squadrons to meet demand, primarily from the aircraft and pilots of the C-Schools and Advanced Instrument Schools.⁵⁴ Upon the invasion of Poland, *Luftflotte* commanders across the *Luftwaffe* immediately raided their assigned schools for airlift instructors and aircraft to supplement their own transportation forces and increase their airlift capability.⁵⁵ The temporary assignment of instructors and aircraft to combat support roles initially stymied training for a short period, but had little effect on pilot production. Unfortunately the trend continued, with *Luftwaffe* leadership and doctrine to blame.

Subscribing to the German doctrinal beliefs that the nation could only support short, rapid campaigns, the *Luftwaffe* mobilized nearly its entire airlift training force for every contingency over the next four years.⁵⁶ In each instance, the force subsequently went "all in" to support active operations at the expense of training. In early 1940, the Office of the Chief of Training authorized the release of pilots and aircraft from training duties and their subsequent assignment to the newly designated Chief of Air Transportation for the creation of reserve airlift groups (See Appendix

⁵³Morzik, "German Air Force Airlift Operations," 5.

⁵⁴Barry Ketley and Mark Roulfe, *Luftwaffe Fledglings, 1935-1945: Luftwaffe Training Units and Their Aircraft* (Aldershot, UK: Hikoki Publications, 1996), 4.

⁵⁵Suchenwirth, "Historical Turning Points in the German Air Force War Effort," 21-22.

⁵⁶Robert Citino, *The German War of War: From the Thirty Years War to the Third Reich* (Lawrence, KS: The University Press of Kansas, 2005), 311; Suchenwirth, "Historical Turning Points in the German Air Force War Effort," 21.

B).⁵⁷ The April 1940 invasion of Norway marked the first halt in training operations of the C-Schools and Advanced Instrument Schools to equip these new airlift groups.⁵⁸ Recalls to operational units occurred again prior to the May 1940 invasion of France and the Low Countries; only three groups returned to training pilots by the summer's end.⁵⁹ This was the norm for *Luftwaffe* airlift operations; no plan existed other than to augment operational forces from the training schoolhouses. Halting training and activating the instructor cadre continued into 1942, prompting *Reichsmarschall* Herman Goering's warning to Adolf Hitler that, "The *Luftwaffe* is going to war with the training squads."⁶⁰ He meant it literally.

Instructors flowed to operational squadrons, not only to build new units, but to replace losses. The manning of operational *Luftwaffe* airlift squadrons thus devolved into a struggle over who controlled assets. At one point in 1941, the commanding officer of the instrument schools worked for three different commands; all three demanded operational replacement pilots and Ju-52 aircraft on a continual basis, whether for new squadrons or as replacement aircraft.⁶¹ The *Luftwaffe* navigated this command and control wasteland while attempting compliance with

⁵⁷Morzik, "German Air Force Airlift Operations," 5; The reserve groups were controlled by local *Luftflotte* commanders, as needed to augment their organic forces. The Office of the Chief of Air Transport of the *Luftwaffe* General Staff held no official command, but instead acted as a central force provider and manager for the *Luftwaffe*. Following the Invasion of Norway, the Chief of Air Transport was designated the Air Transport Officer (ATO) under the Quartermaster General, but was still without any authoritative control over airlift assets. Fighting for resources continued. Morzik, "German Air Force Airlift Operations," 33.

⁵⁸Morzik, "German Air Force Airlift Operations," 4. The invasion of Norway resulted in the activation of seven airlift groups; more than 350 aircraft and their pilots pulled from training duty and assigned to combat operations.

⁵⁹Gundelach, "Technical Training Within the German *Luftwaffe*," 302. See Appendix B for a complete *Luftwaffe* airlift unit activation/deactivation narrative for the years 1939-1945.

⁶⁰Suchenwirth, "Historical Turning Points in the German Air Force War Effort", 74-75.

⁶¹Morzik, "German Air Force Airlift Operations," 6-8; This untenable command structure remained until April 1942, when command of flight training and air transportation assets split into separate entities. A year later the *Luftwaffe* established *Luftflotte XIV* and consolidated all airlift forces for the first time. Morzik, "German Air Force Airlift Operations," 13-14.

increased demand for airlift across all theaters of operations in the face of mounting losses. Five operations put great strain on the *Luftwaffe*'s airlift and training apparatus: Norway and the Low Countries, Crete, Demyansk, Stalingrad, and Tunisia. Each required the activation of additional units, robbing the training schools of available pilots and aircraft. Each surge in operations also resulted in significant losses; over 1,000 aircraft in three years.⁶² Despite the post-1943 overhaul of the German wartime economy, production of Ju-52s noticeably declined in favor of producing fighters and bombers.⁶³ Healing wounds in the operational and training forces thereafter remained an unachievable task.

The *Luftwaffe*'s airlift training squadrons bore the brunt of the increased operational tempo and decreased availability of instructors and aircraft. As the lifeblood of the advanced training courses, the departure of the Ju-52 fleet to operational assignments drastically reduced training quality with every activation. During these periods of high demand, training fell off to approximately 20% of planned capacity.⁶⁴ Combat losses on operational service forced the returning units "to close ranks"; any losses deteriorated the experience of the training squadrons as those serving operationally were often among the most seasoned pilots in the airlift force. Maintaining pilot trainee production despite fewer aircraft and the lack of instructors required curtailing any non-essential flight training from January 1942 onward. At the same time fuel

⁶²Norway and the Low Countries cost the *Luftwaffe* 242 Ju-52s; Crete, 143; Demyansk, 265; Stalingrad, 266 and more than 222 other airlift aircraft; Tunisia, 123. Gundelach, "Technical Training Within the German *Luftwaffe*", 301-302; Suchenwirth, "Historical Turning Points in the German Air Force War Effort," 104; Morzik, "German Air Force Airlift Operations," 142; E. R. Hooten, *Eagle in Flames: The Fall of the Luftwaffe* (London: Arms and Armour Press, 1997), 224.

⁶³Air Ministry of the United Kingdom, *The Rise and Fall of the German Air Force*, 205-207; After 1942, Ju-52 production fell to less than 100 aircraft annually and production of Ju-52s no longer kept pace with combat losses as the Germans ranged across Europe (not to mention those aircraft destroyed in routine resupply operations or in training). Production of Ju-52 aircraft did not exceed 36 per month in 1939 (430+ annually), 32 per month in 1940 (380+ annually), 41 per month in 1941 (490+ annually). Gundelach, "Technical Training Within the German *Luftwaffe*," 4.

⁶⁴*Ibid.*, 4 and 299-300.

rationing for training operations took effect; flight operations diminished as much as 40% to free up fuel for combat squadrons.⁶⁵ To save flight hours and maintain a sustainable rate of pilot production, the C-schools and advanced instrument schools reduced aircraft familiarity training. Accident rates increased, causing further strain on the both aircraft and pilot manning.⁶⁶ Students thus left their initial pilot training with less experience.⁶⁷ Training hours focused on safe aircraft operation rather than tactical employment skills like heavy-weight landings, navigation, formation operations, instrument or night flying. These reductions forced the fledgling aviators to learn these skills in combat.⁶⁸

Due to the reduced availability of training aircraft, fuel, and pilots, the operational squadrons took on the responsibility of preparing pilots for combat. Replacement training units at each wing began conversion and operational combat training for new arrivals, though seasoning new pilots invited increased hazards for the experienced crews.⁶⁹ The more they flew to break in new pilots, the more exposure to enemy threats they faced. Subsequently, increased losses exponentially reduced the overall experience levels of the operational force. Veteran pilot losses meant that replacement training fell to younger and less experienced crews. New pilots received

⁶⁵Air Ministry of the United Kingdom, *The Rise and Fall of the German Air Force*, 204-205; Gundelach, 5 and 315.

⁶⁶Murray, *Strategy for Defeat: The Luftwaffe 1939-1945*, 94 and 303-312.

⁶⁷James Corum, "Defeat of the *Luftwaffe*" in *Why Air Forces Fail*, edited by Robin Higham and Stephen J. Harris, 203-226 (Lexington, KY: University Press of Kentucky, 2006), 220. By June of 1942, the average *Luftwaffe* pilot reported to their operational squadron with 200 hours of training flight time. One year later that total dwindled to 150 hours, with only 25 flown in their assigned aircraft type. By March 1944, the total experience level of new pilots dropped to 100 hours. By the summer of 1944, only squadron and group commanders had more than 6 months of operational flight experience; the majority of the force averaged between 10 days and 3 months. Comparatively, at the same timeframe USAAF pilots reported to operational assignments having accomplished 2.5 years of training 325-400 hours, 125-200 of which in the same aircraft type.

⁶⁸Air Ministry of the United Kingdom, *The Rise and Fall of the German Air Force*, 315.

⁶⁹Gundelach, "Technical Training Within the German *Luftwaffe*," 322; Morzik, "German Air Force Airlift Operations," 167.

less seasoning and fell victim to enemy action at an ever increasing rate, requiring more replacement pilots and placing added strain on the training system. The cycle of new pilots receiving less and less training before death or injury propagated as the war dragged on. The *Luftwaffe* entered a “death spiral” – an unrecoverable crisis which left normal operations unable to cope.⁷⁰ In a vain effort to break the cycle, Quartermaster General of the *Luftwaffe* General von Seidel begged Chief of Staff Hans Jeschonnek to increase fuel allocations for training in late 1942. In a terribly short-sighted response Jeschonnek replied, “First we have to beat Russia, and *then* we can start training!”⁷¹

The *Luftwaffe*'s narrative of reduced training reveals the operational impact of a doctrinal employment strategy conceived to produce rapid victory at the cost of prolonged proficiency. As a result the airlift force suffered atrophy in its primary mission: combat airlift. By the end of 1942, skills such as paratrooper employment, assault airlift, low altitude flight, and formation operations dwindled. Experienced instructor pilots no longer manned squadrons, and operational units focused on providing enclave resupply of encircled and embattled troops as the German sphere of influence slowly contracted. The attitude of the *Luftwaffe* General Staff shifted; airlift no longer meant flying “Special Duty Bomber Squadrons” in large formations to insert paratroopers via vertical envelopment, as General Kurt Student originally envisioned. Instead it evolved to supplement the operational ground commanders' supply system – a task of routine they believed any pilot could accomplish – which required little or no specialized training.⁷² Reducing airlift training appeared an easy, yet necessary, decision to the General Staff and the Chief of Training. Their seemingly obvious decision had disastrous operational impact.

⁷⁰Murray, *Strategy for Defeat: The Luftwaffe 1939-1945*, 302-312.

⁷¹Suchenwirth, “Historical Turning Points in the German Air Force War Effort,” 27.

⁷²Morzik, “German Air Force Airlift Operations,” 34-35.

Section Three: The Failure of Operation Stösser

Operation Stösser [Goshawk, or Auk], the last German airborne operation of World War II, best demonstrated the cumulative effect of the *Luftwaffe*'s airlift training death spiral. By the time of its execution, the *Luftwaffe* no longer maintained training or proficiency in combat airlift tasks such as low altitude and formation flight, or airdrop operations. Yet as part of the planned German offensive toward Antwerp (now known as The Battle of the Bulge), this attempted insertion of a parachute infantry blocking force along the northern line of advance of the 6th Panzer Army necessitated all of these skills and more. The airlift ultimately failed. While a lack of resources and insufficient planning contributed to the failure, reduced airlift training and proficiency was the underlying reason more than 800 German *Fallschirmjäger* met disaster.

Although the idea of executing a winter offensive to split the Allied armies and drive on Antwerp originated with Adolf Hitler, gathering the means to secure this objective fell on his subordinate commanders, chiefly General Walter Model of *Heeresgruppe B* [Army Group B]. In planning conferences on December 3-4, 1944, Model broached an old idea to his staff – that of dropping paratroopers in advance of the line of attack to seize and hold vital crossroads.⁷³ He wanted to ensure the smooth westward advance of the 6th Panzer Army's northern flank, specifically that of the rebuilt 12th SS Panzer Division 'Hitlerjugend' [Hitler Youth].⁷⁴ Model tasked I *Fallschirmarmee* [1st Parachute Army] Commander General Kurt Student with assembling a *Kampfgruppe* [fighting group, or task force] for the parachute assault. On December 8, Student turned to his most trusted regimental commander, *Oberstleutnant* [Lieutenant Colonel]

⁷³John Galvin, *Air Assault: The Development of Air Mobile Warfare* (New York, NY: Hawthorn Books, 1969). Similar operations occurred during the attack on France and the Low Countries in May, 1940. General Kurt Student dropped elements of the 7th *Flieger* Division in advance of the 4th Panzer Division. They captured bridges and the fortress Eben Emael, speeding the westward German advance.

⁷⁴Danny Parker, *Battle of the Bulge* (Cambridge, MA: Da Capo Books, 2004), 129; The 12th SS suffered almost 50% casualties in the Normandy campaign. It was rebuilt in November 1944 from transferred personnel from the *Luftwaffe* and *Kriegsmarine*. Hubert Meyer, *The 12th SS: The History of the Hitler Youth Panzer Division Volume 2* (Mechanicsburg, PA: Stackpole Books, 2005), 171-173.

Graf [Count] von der Heydte, a veteran of the Battles of Crete, Normandy, and Holland.⁷⁵

Attached to *Waffen-SS Generaloberst* Sepp Dietrich's 6th SS Panzer Army, von der Heydte requested 100 men from each regiment in Student's command.⁷⁶ Only when reporting to Dietrich on December 11 did von der Heydte fully comprehend his mission.⁷⁷ Without appreciation for the methods or effects the paratroopers brought to the operation, Dietrich assigned his unit the task of blocking a junction of three roads in the *Hohes Venn* [literally, 'high marshes'] area of the Belgian Ardennes Forrest.⁷⁸ Intelligence information was scarce; the American V Corps held the line opposite the 6th SS Panzer Army, but von der Heydte received little else in the way of disposition. Undiscouraged, he left to find the pilots assigned to insert his 870-man force in the Belgian highlands.⁷⁹ Luckily, he received more materiel support than intelligence support in the coming days.

⁷⁵Von der Heydte commanded the 6th *Fallschirmjäger* Regiment which fiercely defended Carentan during the Allied invasion of Normandy, earning them the *nom de guerre* 'The Lions of Carentan.' Hickey, *Out of the Sky: A History of Airborne Warfare*, 173.

⁷⁶Morzik, "German Air Force Airlift Operations," 65; Von der Heydte spent the next two days assembling a force of 870 men, organized into four rifle companies, a heavy machine gun company, a signals platoon and a mortar platoon. The men sent were mostly of poor quality and fighting spirit. When his old unit heard of the pending attack, a company assembled and left to join their former commander. Only some 250 of von der Heydte's troops had ever parachuted from an aircraft, despite serving as *Fallschirmjäger*; most of these were from his old regiment. Parker, *Battle of the Bulge*, 130-132.

⁷⁷The full text of the order read as follows: "On the first day of the attack, 6SS Panzer Armee will take possession of the Liege or the bridges across the Meuse south of the city. At early dawn on the first day of the attack, *Kampfgruppe von der Heydte* will drop into the Baraque Michel mountain area, eleven kilometers north of Malmedy, and secure the multiple road junction at Baraque Michel for use by the armored spearhead of the 6SS Panzer Armee, probably elements of the 12th SS Panzer Division. If, for technical reasons, this mission is impracticable on the morning of the first day of the attack, *Kampfgruppe von der Heydte* will drop early on the next morning into the Ambeleve River valley or Amay areas to secure the bridges there for the advance of the 6SS Panzer Armee's armored spearheads. *Generalmajor* Fritz Krämer, Chief of Staff, 6SS Panzer Armee, 11 Dec 1944." Parker, *Battle of the Bulge*, 131.

⁷⁸Charles Whiting, *Ardennes: The Secret War* (New York, NY: Stein and Day, 1985), 134; The intersection of the road west to Verviers and Liege, the road north to Eupen, and the Road south to Malmedy, at the Baraque Michel. Galvin, *Air Assault: The Development of Air Mobile Warfare*, 203.

⁷⁹Whiting, *Ardennes: The Secret War*, 94; Parker, *Battle of the Bulge*, 131.

The Air Transportation Officer assigned two airlift units to Operation Stösser; II *Gruppe*, III *Transportgeschwader* [2d Group, 3d Transportation Wing, or “II/3TGr”] commanded by Major Otto Baumann, and III/4TGr [3d Group, 4th Transportation Wing], an ad hoc unit organized on short-notice, commanded by *Hauptmann* [Captain] Brambach.⁸⁰ Baumann, a veteran airlift pilot who flew at Crete and Demyansk, also commanded II/3TGr during the Stalingrad airlift and in the Tunisian bridgehead as well.⁸¹ By December, 1944, no veterans of his “Stalingrad Squadron” remained except their commander.⁸² Based at Paderborn Airfield, Baumann’s pilots had some operational experience; many executed parachute resupply and assault airlift operations under fire almost continuously since the summer of 1943. *Hauptmann* Brambach’s group at Lippspringe Airfield lacked comparable experience or proficiency. Much of his force arrived to their operational squadrons straight from pilot training. They lacked currency in night flying, navigation, and airdrop operations; none had flown a Ju-52 in formation.⁸³ The majority lacked any significant combat experience.⁸⁴ Curtailed training programs, inexperienced instructors, and fuel shortages produced a pilot force unable to execute the basic missions of combat airlift. In the coming days, planning for Operation Stösser exposed the *Luftwaffe*’s disregard for training and employing its airlift force and the operational impact of such actions during mission execution.

⁸⁰Morzik, “German Air Force Airlift Operations,” 282.

⁸¹Whiting, *Ardennes: The Secret War*, 93.

⁸²Combat losses and pilot attrition claimed the rest long before II/3TGr executed Operation Stösser. The transport groups were alerted on 7 December, and flew to Paderborn and Lippspringe Airfields on the night of 8-9 December. ULTRA, the Allied program of encrypted message interception via the ENIGMA device, detected these movements and alerted American army commanders to a probable parachute assault. Morzik, “German Air Force Airlift Operations,” 287.

⁸³Charles MacDonal, *A Time for Trumpets* (New York, NY: William Morrow, 1985), 191.

⁸⁴Morzik, “German Air Force Airlift Operations,” 286.

On December 14, 1944, Major Baumann briefed the officer assigned to support the insertion, *Generalmajor* Dietrich Pelz, a career bomber pilot in command of II *Jagdkorps* [2d Fighter Corps]. Operation Stösser faced several challenges. Execution on the day of the initial attack required an insertion of paratroopers well in advance of the ground forces' movement. Allied air superiority and radar coverage of the front necessitated low level ingress to the target area behind Allied lines in order to avoid detection; the airlift pilots stopped training on low level operations years ago. The target was in mountainous terrain, which increased the danger of impacting the ground. Landing to offload the troops proved impossible as no airfields existed in the target area; airdrop was the only option. Ensuring all *Fallschirmjäger* dropped together near the target area required flight in close formation. Few of the pilots had flown the Ju-52 in formation, and none had done so at night or in mountainous terrain. Finally, the attacks predetermined timing and overwhelming Allied air superiority meant execution in darkness, something the German airlift force had never attempted.⁸⁵ Untrained for low altitude, mountainous, formation or night operations, not to mention navigating to a defended target in these conditions, Baumann's force faced a mission outside the span their capabilities.⁸⁶

Unless they flew in a single file line at medium altitude to the target area, Baumann feared losing his entire force to navigation errors, enemy fire, or flight into the rising Belgian terrain.⁸⁷ Von der Heydte balked at this idea. Seventy aircraft dropping in-sequence would result in a single file "formation" nearly forty minutes in length; the paratroopers required assembly as fast as possible to secure their objectives. Grim in his estimations of success, Bauman studied

⁸⁵Galvin, *Air Assault: The Development of Air Mobile Warfare*, 204.

⁸⁶Morzik, "German Air Force Airlift Operations," 282; In a meeting with Model later than evening, Baumann and von der Heydte opined of a 10-20% chance of success for the operation. Model scoffed and ordered them to execute; in his opinion Hitler's entire plan had less than a 10% chance of success. Charles Whiting, *Hunters from the Sky* (London: Leo Cooper Publishing, 1974), 164-165.

⁸⁷Danny Parker, *To Win the Winter Sky* (Conshohocken, PA: Combined Books, 1994), 160.

Pelz as the old bomber pilot smiled with a solution to the airlifter's problems: fly like a "bomber stream." Launch aircraft from both fields simultaneously, route them over a prescribed flight path, keep all aircraft lights on and rejoin the formations together in tighter spacing. Pelz boasted that even without formation or night training the pilot's basic skill would keep them from hitting each other.⁸⁸ If they used the bomber stream tactics the formation could pass over the drop zone and deliver the paratroopers in seventeen minutes. More importantly, he pledged his night fighter and bomber instructor pilots would teach the airlifters to master the formation.⁸⁹

To boost Baumann's confidence and chances of success, Pelz's pilots planned the night navigation portions of the flight. They telephoned subordinate *Luftwaffe* units and arranged for searchlights to mark a path to the front lines between Paderborn Airfield and the Ruhr Valley.⁹⁰ Pelz ordered the Bonn-Handelar Airfield lighting illuminated for use as a navigation checkpoint despite the blackout orders in effect. Planners coordinated with anti-aircraft batteries at the front line to fire star-shell illumination rounds and colored tracers into the night sky marking the direction of the drop zone once the formation approached. They prepared detailed maps of the approach and target area to aide in navigation.⁹¹ Lastly, they arranged for the experienced bomber pilots from *Nachtschlachtgruppen* [Night Attack Groups] 20 and 106 to lead the formation to the drop zone in fifteen He-111 bombers. These pathfinders would mark the target with incendiary

⁸⁸Galvin, *Air Assault: The Development of Air Mobile Warfare*, 206; Pelz suggested giving the tail gunners flashlights to shine rearward as additional position lights. Morzik, "German Air Force Airlift Operations," 289.

⁸⁹Morzik, "German Air Force Airlift Operations," 283. At 105-112 mph flight speed and 2500-foot spacing between aircraft (standard for airlift night formation operations still today), 70 aircraft will pass over the same geographic point in 17 minutes, 30 seconds, at a rate of one every 15 seconds.

⁹⁰*Ibid.*, 289. Searchlights were placed in the Lenne Mountains south of Plettenburg, the Ruhr Valley, and at the Bonn-Handelar Airfield.

⁹¹Galvin, *Air Assault: The Development of Air Mobile Warfare*, 204-206; Morzik, "German Air Force Airlift Operations," 284.

bombs and drop 300 straw dummy *Fallschirmjäger* in the vicinity as decoys.⁹² Aside from flying the mission themselves, there was little more the II *Jadgkorps* could offer; execution rested on the young shoulders of airlift pilots. *Kampfgruppe von der Heydte* and the airlift groups spent the next 48 hours assembling at Paderborn and Lippspringe airfields, rehearsing operations and completing pre-flight coordination.⁹³ Orders soon arrived from the Chief of Staff of the 1st SS *Panzerkorps*: drop at 03:00 on December 17. With all preparations complete by 23:00 the evening prior, the assault force rested for a few fitful hours.⁹⁴

The difficulties encountered in planning only hinted at those to come in launching the transports and their human cargo airborne. Shortly after the transport pilots completed preflight preparations and navigation calculations, a pathfinder reconnaissance aircraft from II *Jadgkorps* returned from the target area north of Malmedy. Higher than forecast winds observed at altitude forced a re-computation of the entire flight profile. Observed winds at the drop zone gusted between 28 and 31 miles per hour (mph). Von der Heydte shot a concerned glance at Baumann; both knew wind speeds in excess of 18 mph could injure the entire *Fallschirmjäger* force. The reconnaissance pilot continued: hazy conditions enroute to the target made for poor visibility and cloud cover over the target approached overcast. In many places clouds obscured mountain tops, making low altitude flight and navigation more hazardous.⁹⁵

⁹²Parker, *Battle of the Bulge*, 132 and 136; Parker, *To Win the Winter Sky*, 160.

⁹³Galvin, *Air Assault: The Development of Air Mobile Warfare*, 207. Originally scheduled for execution on the morning of December 16, a lack of ground transportation assets in the rear delayed assembly of the parachute infantry companies. The delay, caused by fuel shortages for the truck convoy moving *Fallschirmjäger* to the airfields, failed to surprise any of the assembled commanders given the size and scope of the pending attack.

⁹⁴Parker, *Battle of the Bulge*, 133.

⁹⁵Morzik, "German Air Force Airlift Operations," 288.

As the pilots stepped to their awaiting aircraft, Baumann wondered aloud if they could even get airborne on such a night. Snow began to fall as the overloaded Ju-52s started engines.⁹⁶ Flames flickered at the exhaust ports, clearly visible as only a third of the aircraft possessed flame dampeners normally installed to hide the exhaust at night.⁹⁷ As the procession struggled airborne, the first incarnations of the *Luftwaffe*'s reduced training programs materialized.⁹⁸ Packed with men, weapons, and ammunition, many of the transports exceeded their maximum designed cargo load - some by as much as half a ton. One of the II/3TGr Ju-52s struggled airborne during its heavy-weight takeoff, stalled and belly flopped at the end of the Paderborn runway, its crew unable to safely takeoff.⁹⁹ The rest of the 67 aircraft lumbered into the snowy night, red and green wingtip navigation lights shining brightly, the long strung out formations clearly visible even in the snowy night sky. The two formations lifted off simultaneously; Baumann's veteran force in 32 Ju-52s of II/3TGr from Paderborn, Brambach's 35 novice crews of III/4TGr from Lippspringe. They droned west for two minutes, climbing as they turned southwest toward Wewelsburg, the first navigation checkpoint; III/4TGr north of the town, II/3TGr to the south.¹⁰⁰ As they headed for Bonn, searchlights marking their waypoints shone brightly into the night sky, reflecting off the cloud base 100 feet above each formation flying just 500 feet above the ground. Turbulent air

⁹⁶Morzik, "German Air Force Airlift Operations," 286. Each transport carried 13-14 paratroopers and up to four weapons *waffenbehälter* [weapons canisters]. German paratroopers dropped their weapons (machine guns, mortars, anti-tank weapons, ammunition, etc.) into the drop zone in specially made canister fitted to the bottom of the airlift aircraft. Thus many times they landed without means to defend themselves until locating a weapons canister. Roger Edwards, *German Airborne Troops 1936-45* (New York, NY: Doubleday, 1974), 24-25.

⁹⁷Morzik, "German Air Force Airlift Operations," 286. Many of the transport aircraft were in terrible maintenance condition, long overdue for routine maintenance work.

⁹⁸Galvin, *Air Assault: The Development of Air Mobile Warfare*, 207.

⁹⁹Morzik, "German Air Force Airlift Operations", 290; The Ju-52 designed maximum cargo load is just over 4,000 pounds. Amazingly, no personnel perished as a result of this crash. Alfred Price, *The Last Year of the Luftwaffe* (London: Greenhill Books, 2001), 113.

¹⁰⁰Morzik, "German Air Force Airlift Operations," 284-285.

rocked the aircraft as they executed the rendezvous and formed into a single formation, the veterans of the “Stalingrad Squadron” in the lead (See Appendix C for route of flight).

As the formation approached the front lines, it began to fall apart from the rear-forward, like a zipper unzipping. Several of the overloaded and underpowered Ju-52s fell back from the formation. Pilots noted stronger than forecast winds at altitude.¹⁰¹ The formation lost integrity as inexperienced pilots and navigators turned to their next checkpoints based on pre-calculated winds and ground speed, rather than following their formation leaders. Stronger than expected headwinds made timing from point-to-point based on pre-flight calculations inaccurate; the novice aircrews turned early or missed checkpoints entirely.¹⁰² Ten crews at the tail mistakenly turned towards Aachen and lost the formation. They encountered heavy Allied anti-aircraft fire and eventually returned to Lippspringe completely disoriented, without dropping their *Fallschirmjäger*.¹⁰³ As the rest of the formation continued on, it passed checkpoints illuminated by searchlight beams. When the first aircrews passed overhead, the searchlights quickly winked out, leaving the trailing aircraft without reference points and creating confusion. As expected when approaching the front lines, occasional star-shells and tracers lit the way to the *Hohes Venn*.¹⁰⁴ As the formation crossed the front, the sky exploded. Illuminated against the cloudy overcast sky by the navigation and position lights meant to assist pilots in avoiding collisions, the Ju-52s drew heavy Allied anti-aircraft fire. The formation disintegrated in the shrapnel-filled skies near the Belgian border.

¹⁰¹Galvin, *Air Assault: The Development of Air Mobile Warfare*, 207.

¹⁰²James Lucas, *Kommando* (New York, NY: St. Martin’s Press, 1985), 134.

¹⁰³Galvin, *Air Assault: The Development of Air Mobile Warfare*, 207; Morzik, “German Air Force Airlift Operations,” 290; Price, *The Last Year of the Luftwaffe*, 113.

¹⁰⁴Galvin, *Air Assault: The Development of Air Mobile Warfare*, 207-208.

The veterans of the II/3TGr pressed ahead towards the Ardennes drop zone. Making the final turn, Bauman and von der Heydte saw incendiary fires in the shape of a cross in a tiny field to the west; General Pelz's night fighters did their job marking the drop zone.¹⁰⁵ With much of the Paderborn formation still intact, II/3TGr dropped their *Fallschirmjäger* over the *Hohes Venn* at 03:30, despite terrible visibility, snow, and winds gusting in excess of 30 miles per hour.¹⁰⁶ In spite of the dangerous conditions and determined to execute his mission, von der Heydte leapt into the darkness from the lead aircraft. Most of his *kampfgruppe* followed. The high winds resulted in hundreds of *Fallschirmjäger* injured and out of action. Only 320 of the original 870 assembled for battle; many never even reached the drop zone.¹⁰⁷

While Baumann's veteran II/3TGr completed their drops, the newly constituted III/4TGr at the tail end of the formation unraveled. Disoriented by a lack of navigation checkpoints, untrained in maintaining formation, flying at night for the first time in poor-visibility conditions through mountainous terrain, and now receiving heavy enemy fire from the alerted Allied gunners, the terrified pilots endeavored to escape.¹⁰⁸ Ten aircraft tumbled from the sky in flames; Allied night fighters on the prowl over the front lines claimed two more. Of those who made it through the flak, some flew the last thirty-five miles to what they believed was the target area by dead-reckoning; the predetermined heading led them miles off course. Others dropped their

¹⁰⁵Galvin, *Air Assault: The Development of Air Mobile Warfare*, 208-209.

¹⁰⁶John Toland, *Battle: The Story of the Bulge* (New York, NY: Random House, 1959), 44-45; Post-flight calculations revealed winds at the drop zone measured at 37 mph, more than twice the safe velocity for parachute landings. Morzik, "German Air Force Airlift Operations," 291.

¹⁰⁷Morzik, "German Air Force Airlift Operations," 291.

¹⁰⁸One aircraft (serial # G6+DU) from III/4TGr took fire just east of Aachen; the Ju-52 received a direct hit aft of the wing section, which blew the aircraft apart. *Unteroffizier* [Sergeant] Josef Heinkelbein was thrown clear of the aircraft as it tumbled toward earthward. He somehow opened his parachute and survived; the rest of the flight crew and all *Fallschirmjäger* onboard perished. Parker, *To Win the Winter Sky*, 160.

paratroopers over the Bonn Airfield, somehow mistaking the lit tarmac for the target area. Some flew past checkpoints and dropped their cargos over Cologne; many *Fallschirmjäger* landed some eight miles behind the *German* lines.¹⁰⁹ Those pilots that made it to the target vicinity groped in the inky blackness for the incendiary drop zone markings; the fires burned out before the second half of the formation arrived over target.¹¹⁰ Confused, disoriented, cold, and terrified, the airlift force turned northeast as they dropped their *Fallschirmjäger*; for those unfortunate parachute infantrymen, the battle had just begun.

When von der Heydte crashed to the earth he found himself alone; it took an hour to find five members of his command, another three to assemble 150. His force, scattered to the winds behind enemy lines, totaled 320 by nightfall on December 17, 1944; no others joined him.¹¹¹ Though depleted, von der Heydte managed to reach his crossroads, but could not secure the objective. He nonetheless evaded elements of the American 18th Infantry Regiment and captured 200 prisoners despite not possessing any heavy weapons. The 12th SS Panzer Division never arrived; elements of the American V Corps checked their advance and destroyed most of their armor over the course of the next two weeks. Von der Heydte and his scattered command lasted the better part of three days before splitting up, heading toward German lines or surrendering to the Americans; 100 made it back to Germany.¹¹²

¹⁰⁹Morzik, "German Air Force Airlift Operations," 290; Parker, *Battle of the Bulge*, 133.

¹¹⁰Galvin, *Air Assault: The Development of Air Mobile Warfare*, 208-209.

¹¹¹*Ibid.*, 209; 50-65% casualties due to injury, midrops, and enemy fire. Parker, *Battle of the Bulge*, 136.

¹¹²Galvin, *Air Assault: The Development of Air Mobile Warfare*, 210; MacDonald, *A Time for Trumpets*, 370; For years after World War II, residents of the *Hohes Venn* region reported discovering skeletons in *Fallschirmjäger* gear hanging from trees and in bogs, some still attached to their parachutes; a testament to the remoteness of the "high marsh" region of Belgium, as well as the scattering of German parachute forces as a result of misdrops. Whiting, *Ardennes: The Secret War*, 135.

Operation Stösser thus ended in failure, though not without several notable occurrences. First, although short of successful, the airdrop did occupy American troops on the northern flank of “the Bulge.” Dummy drops combined with the scattering of von der Heydte’s force across a thirty mile front convinced the Allies that an entire division dropped into the Ardennes.¹¹³ Considering the enormity, timing, and unexpectedness of the German attack, this is not an unreasonable analysis. As V Corps responded to the confused situation, it assigned 3,000 men to hunt down and engage the German paratroopers; combat power otherwise unavailable to check the German advance.¹¹⁴ Second, after-action reports demonstrate how reduced training affected the transportation groups in the airdrop. They lost ten aircraft to Allied anti-aircraft fire and another two to night fighters; ten returned to base without dropping their cargos after losing their bearings and one crashed on takeoff. Thus, of the 68 planned aircraft, only 45 executed the drop (66%). Post-mission analysis claimed only 20 aircraft dropped in the vicinity of the target area (44% of the aircraft airborne, and only 29% of the overall planned total).¹¹⁵ Given the composition of the force – the veteran II/3TGr leading the formation and the inexperienced III/4TGr in the rear – obviously, a majority of the more experienced II/3TGr found their targets while the novice and poorly-trained III/4TGr went astray. These forces went into battle untrained and unable to execute their assigned mission. Their failure punctuated the poor strategic plan to train and equip a proficient *Luftwaffe* pilot force.

In the end, Operation Stösser was not planned or executed with the *Luftwaffe*’s poor state of airlift training and proficiency in combat airlift operations in mind. Like most of the written

¹¹³Lucas, *Kommando*, 135.

¹¹⁴An additional 5,000 men and 100 tanks were assigned to protect the V Corps command post. Parker, *Battle of the Bulge*, 136.

¹¹⁵Galvin, *Air Assault: The Development of Air Mobile Warfare*, 208; Price, *The Last Year of the Luftwaffe*, 113; Morzik, “German Air Force Airlift Operations,” 290.

accounts, this operation focused on the *Fallschirmjäger* and the failed mission north of The Bulge, not the aircrews who inserted them there. The *Luftwaffe*'s reduction of its own training system culminated in operational failure; pilots no longer maintained currency or proficiency in the combat airlift tasks required for such missions. Upon examining what happened on the ground, the results of the airlift operation speak for themselves: operational failure. Some argue that Operation Stösser was too small to make a difference, and thus doomed regardless.¹¹⁶ Nonetheless, small failures still warrant examination and assist in determining weaknesses in doctrine and training even today.

¹¹⁶Morzik, "German Air Force Airlift Operations," 290-291.

Section Four: The *Luftwaffe's Shadow*: Reductions in USAF Airlift Training

Research into the reduction of present day USAF airlift training highlights three areas worthy of comparison to the *Luftwaffe's* missteps between 1941 and 1944; training hours, training programs, and finding efficiencies. When viewed using the lens of currency and proficiency in assigned combat airlift tasks, these three areas of investigation and the realities of reduced capability resulting from each, clearly illustrate the risks with which AMC must contend in the face of reduced resource availability and high operations tempo.

Undoubtedly, AMC experienced an unprecedented operations tempo in the years following September 11, 2001. Tabulated C-17 flying hour data from the years 2000-2013 shows dramatic increases in operations as the aircraft fleet expanded to its current size and flew in support of Operations Enduring Freedom and Iraqi Freedom.¹¹⁷ Training hours fluctuated in response to the expansion of, and demands on, the aircraft fleet. Changes to pilot training followed suit, as the force continually expanded until 2012. Throughout, training requirements shifted from the schoolhouse to the operational units while available training hours at those squadrons stagnated and dwindled. As war-weariness set in on the American public and budgets flagged, the search for efficiency began. Proposed cuts in training manifested in the wake of recent budget sequestration, culminating with what amounts to a present day push to reduce training requirements even further at the cost of combat capability. Meanwhile, in the background, the specter of lessons from a bygone air force hangs over the entire process.

The first area of investigation into the current reduction of USAF C-17 airlift training must focus on the quantitative data available - specifically flying hour data amassed by AMC -

¹¹⁷From an initial compliment of 44 active duty, AMC-assigned aircraft in 2000 to a total of 124 active duty AMC-assigned aircraft in 2013. U. S. Air Force, Air Mobility Command (AMC), *AMC C-17 FY00-FY13 Flying Hour Program Reports* (AMC/FMAO, Scott AFB, IL).

which requires the explanation of the command's Flying Hour Program (FHP).¹¹⁸ The FHP is primarily determined by operational needs – airlift required to support COCOM warfighting requirements, and the training required to man cockpits with qualified aircrews. Many subdivisions of the FHP exist, but each falls into one of two categories: Operations and Maintenance (O&M), or the Transportation Working Capital Fund (TWCF). Simplified, TWCF hours are those used to move men and materiel to war and execute routinely scheduled airlift operations. Conversely, O&M hours are those dedicated to Joint and aircrew training operations and maintenance.¹¹⁹ While wartime operations dictate the planned-versus-actual use of TWCF hours, AMC calculates an annual allocation of O&M flying hours based aircrew training requirements, the available budget, and the seasoning rate of pilots. These hours are then distributed to each wing.¹²⁰

A common saying in the C-17 force, “operations drive training,” rings particularly true when examining the reduction of executed training flying hours between 2000 and 2013. Overall, while the fleet expanded and high operations tempo in Afghanistan and Iraq drove training rates lower, the crew force endured a steady erosion of available training hours. In addition to noting the sheer (and fluctuating) volume of O&M versus TWCF flying hours reported (See Appendixes

¹¹⁸Only Active Duty Flying Hour Programs were used in these calculations.

¹¹⁹David Thayer, Carl J. Dahlman, *Assessing Unit Readiness, Case Study of an Air Force Mobility Wing*, Project Air Force Report (Santa Monica, CA: RAND Corporation, 2002), 7.

¹²⁰U. S. Air Force, Air Force Instruction 11-102 *Flying Hour Program Management* (Washington DC: HQ AF/A3O-AT, August 2011), 6; Aircrew Training Requirements are determined by DOC and authorized manning, as well as the AFI 11-2 series of regulations (ex: See AFI11-2C-17V1 Training Tables, Appendix A). When combined, these documents produce an annual minimum of required training hours for the force to maintain currency and qualification. “Seasoning rates” are determined by averaging experience gained per month across the new-accession force. $FHP = \% \text{ inexperienced pilots} \times \text{Authorized Force} \times \text{Aging Rate} = X \text{ Flying Hours}$. U. S. Air Force, Air Mobility Command, *AMC C-17 FY00-FY13 Flying Hour Program Reports*, FY13; In 2012 average monthly seasoning rates dropped from 30 hours per month to 25 hours per month (300 hours annually) as the C-17 aircrew force reached its full authorized compliment. The force was able to “sustain” footing achievable at 25 hours per month. This change drove authorized flying hours down across the force. James Cooper, AMC/A3TF Chief of Rated Aircrew Management, email message to the author, September 18, 2014.

D and E) these figures must also consider the number of aircrews and aircraft assigned which executed these hours. As of 2013, manning for the C-17 pilot force includes a compliment of two pilots per crew, and three pilot “crews” per aircraft or Primary Authorized aerospace-vehicle Assigned (PAA); thus each PAA accounted for six pilots authorized (PA).¹²¹ Annual rates of change show a steady increase in the size of the C-17 pilot force as the aircraft entered active service and the fleet expanded. Based on aircraft totals and factoring in the pilot positions in the crew force, a comparison to the amount of O&M flying hours reveals a dramatic drop in the overall rates of training over the fourteen years examined. In 2000, with a PAA of 44 aircraft and some 264 pilots authorized, crews averaged between five and six hours of O&M flying per month, over 63 hours per year.¹²² This equates to roughly two training flights of three hours in duration per month. Over the course of the next 13 years, the active duty aircraft inventory grew to 124 C-17s, with a pilot authorization of 744. Yet in FY13, the crew force received approximately 12,600 O&M hours – enough for each pilot to average 1.41 hours of training per month, just 16.8 hours annually (See Appendix E).¹²³ This means that the majority of hours each

¹²¹Though authorizations exceed this total, this monograph uses this formula to establish a metric and illustrate the potential impact of reduced aircraft flight hours for training per pilot. U. S. Air Force, Air Force Instruction 65-503 *U. S. Air Force Cost and Planning Factors, Table A36-1, Authorized Aircrew Composition-Active Forces* (Washington DC: HQ AF/A3O, June 2013), Table 36-1, 19; A crew consists of a basic compliment of two pilots, thus six pilots in three crews are authorized for each PAA. U. S. Air Force, Air Force Instruction 16-402 *Aerospace Vehicle Programming, Assignment, Distribution, Accounting and Termination* (Washington DC: HQ AF/A8PB, May 2013), 3; Per LtGen Samuel Cox, HQ AF/A1, these figures will change in the 2016 fiscal year. Crew ratios will reduce to two crews per aircraft and 16 aircraft will be moved from the active duty force to the USAF Reserve. Impacts to this research are minimal given its historical nature, but initial reviews reveal a resulting PAA of 108 aircraft and a new PA of only 432 pilots, a reduction 16 aircraft and 312 pilots from previous year’s authorizations (96 due to transfer of aircraft, 216 from the change in metrics). Stephen Losey, “A Leaner Force: Key Changes Emerge After Tough Year of Airmen Cuts,” *Air Force Times*, last modified 24 November, 2014, accessed 24 November, 2014, <http://www.airforcetimes.com/story/military/careers/2014/11/17/air-force-cuts-rank-afsc/19161847/>

¹²²O&M hours for FY00 were approximately 16,900, for 480 fewer pilots. U. S. Air Force, Air Mobility Command (AMC), *AMC C-17 FY00-FY13 Flying Hour Program Reports*, FY00-13.

¹²³U. S. Air Force, Air Mobility Command (AMC), *AMC C-17 FY00-FY13 Flying Hour Program Reports*, FY00-13.

pilot logged came about as part of operational missions, not as part of a dedicated training sortie. AMC thus greatly increased the numbers of trained aircrew without increasing the amount of aircraft training available; doing so meant finding efficiencies where none previously existed simply to maintain a crew force trained at the minimum acceptable levels in accordance with the AFI 11-2C-17 Volume 1 training regulation.

Several reasons explain the aforementioned drop in training hours. First, the wars in Afghanistan and Iraq increased mission requirements for aircrews, meaning they spent less time training. Instead, many wings emphasized the execution of training currencies during operational missions instead of on dedicated training sorties.¹²⁴ Eerily similar to *Luftwaffe* seasoning efforts for airlift pilots on operational missions, this practice left no margin for error, little time for remedial or repeat training, and added additional stress to the instructor pilot corps. Scheduling volatility and wartime missions kept crew members on the road for extended amounts of time, and made scheduling training the equivalent to building a house of cards. Without the ability to effectively predict schedule fidelity beyond 10 days, training officers struggled to ensure aircrews remained current and qualified, let alone proficient.¹²⁵ Second, as the C-17 force expanded over the years 2000-2013, the seasoning rate for crews reduced; by 2012 the force was sufficiently manned so as to no longer require an O&M authorization based on an estimated 30 hours of total flight time per month to season new crew members (see footnote 120).¹²⁶ Accordingly, AMC reduced the amount of flight hours available for training. Third, AMC brought more simulators online as the crew force expanded, and credited more simulator-based training toward currency

¹²⁴LtCol Brian Wald, 62OG/CD, email to the author, August 12, 2014.

¹²⁵Ibid.

¹²⁶James Cooper, AMC/A3TF Chief of Rated Aircrew Management, email message to the author, September 18, 2014.

requirements, which reduced the amount of event-based training pilots logged in the aircraft.¹²⁷ Given that the cost of flying a C-17 for one hour exceeds \$16,000, moving training to high-fidelity digitally-connected simulators made fiscal sense; a long-overdue cost-saving development.¹²⁸ Obviously, when comparing the cost-per-hour for C-17 flight operations to the reduced number of training hours allotted, and factoring in the most recent reductions in Pentagon budgets as a result of the Budget Control Act of 2011, the desire to create savings while maintaining training operations is of paramount concern to AMC.¹²⁹ Nonetheless the fact remains: C-17 crews receive less training in the aircraft today than at any point in history.¹³⁰

The second area of investigation into the current reduction of USAF C-17 airlift training focused on changes to pilot training programs. Much like the *Luftwaffe*, the push for cost-effectiveness not only decreased how much the C-17 crew force trained, it also affected the primary and advanced schools. Originally, following graduation from Undergraduate Pilot Training, new C-17 pilots entered initial qualification training at Altus AFB, OK. Designed to teach the basics of aircraft operations and graduate qualified and knowledgeable co-pilots, AMC replaced this course with a series of redesigned schools under the Mobility Pilot Development program (MPD) in the mid-2000's. The MPD, originally conceived as a way to reduce the temporary duty (TDY) costs and speed a pilot's return to operational flying, taught new

¹²⁷Thayer and Dahlman, *Assessing Unit Readiness, Case Study of an Air Force Mobility Wing*, Project Air Force Report, 5.

¹²⁸U. S. Air Force, AF1 65-503, Table A4-1. Cost per flying hour for AMC aircraft.

¹²⁹Congressional Research Service, *The Budget Control Act of 2011: The Effects on Spending and the Budget Deficit When the Automatic Spending Cuts Are Implemented*, last modified May 4, 2012, accessed September 30, 2014, <http://www.fas.org/sgp/crs/misc/R42506.pdf>, 4.

¹³⁰U. S. Air Force, Air Mobility Command (AMC), *AMC C-17 FY00-FY13 Flying Hour Program Reports* (AMC/FMAO, Scott AFB, IL).

accessions to act as aircraft commanders from the first day of training.¹³¹ It replaced Co-Pilot Initial Qualification (CPIQ) programs with Pilot Initial Qualification (PIQ), and taught young pilots the essentials of systems and aircraft operations from both the pilot and co-pilot seats. The once months-long Aircraft Commander course was shortened to a weeks-long substitute, Pilot Check-Out (PCO), which re-taught the basics of air refueling and assault-zone landings as a “top-off” course. While some cost saving occurred the failure rates and poor performance of new students at PIQ and PCO forced changes in the program.¹³² Reoccurring failures reduced overall cost-effectiveness and increased the proposed course length. To lower failure rates and provide some advantage to their students, operational squadrons began training prospective aircraft commanders, using their own O&M training budgets and locally-conjured training programs to do so.¹³³ This caused a ripple effect in the training continuum, as squadron priorities shifted from ensuring all pilots maintained required levels of currency and proficiency for combat operations, to ensuring that prospective aircraft commanders received preparation prior to departing for Altus.¹³⁴ Furthermore, as newly-minted MPD pilots returned to their operational units they often required follow-on training as the reduced timeline and syllabus at Altus curtailed flying abilities and systems knowledge, and afforded little time to practice new skills in the aircraft.¹³⁵ Thus as the schoolhouse transitioned to the MPD process, operational squadrons took up the slack at the expense of training the rest of the force, much as the Germans experienced in later 1942-43.

¹³¹Roger Shapiro, “Mobility Pilot Development: Is AMC Off Course?” Research Thesis (Maxwell AFB, AL: Air Command and Staff College, April 2007), 6.

¹³²Ibid., 9.

¹³³Ibid., 8.

¹³⁴Ibid., 14.

¹³⁵Ibid., 15-16.

Combined with sequestration and reducing budgets, these programs made the task of training C-17 aircrew for combat all the more difficult.

In areas of specialized training, any reduction of training opportunities manifests in diminished combat capability. Reductions in Force (RIF), sequestration and the resultant flagging budgets for military training (O&M) are the modern day equivalent to the *Luftwaffe*'s struggle against pilot attrition and fuel budgets in 1943-44. Reduced budgets demand fiscal austerity and perpetual efficiency, often at the expense of combat capability. Take for instance the sequestration's impact on advanced airlift training: sequestration caused the cancellation of the USAF Weapons School's (USAFWS) second class (13B) of the 2013 fiscal year.¹³⁶ Every six months the USAFWS graduates over 100 new weapons officers in 18 different disciplines, including airlift. These graduates return to the operational force to build, teach, and lead; they instruct the instructors. Due to the course cancellation, the combined USAF instructor force is now 120 Weapons Instructors short, with more fallout on the horizon.¹³⁷ In the interim, the Weapons School faculty spent six months rewriting every syllabus, and rebuilt with sequestration in mind. Now two weeks shorter and lacking numerous opportunities for integration, the course only recently returned to operations. Combined with the effects of normal attrition, the C-17

¹³⁶Ironically, this was not the first time the USAF cut training entirely due to higher priorities or reduced funding. In an effort to display the USAF's determination and dedication to the war in Afghanistan at the height of operations in 2009, the CSAF ordered rescue squadrons from Nellis AFB, NV to theater. This order included the instructors and students of the 34th Weapons Squadron at the USAF Weapons School, which normally trains combat rescue instructor pilots. Operations downrange now dictated otherwise; the CSAF ordered training halted. Despite the rescue assets already in theater, USAF Major General Marke Gibson, Deputy Chief of Staff for Operations, Plans and Requirements relayed, "We got very direct guidance from the Chief. He said we're not going to have Americans over there dying while we're worried about a Weapons Instructor Course." The order rings eerily similar to justification given some six decades prior, when another air force cut training to go "all in." Bruce Rolfson, "Policy Change Means Most Able to Deploy," last modified December 29, 2009, accessed September 14, 2014, <http://www.airforcetimes.com/article/20091229/NEWS/912290302/Policy-change-means-most-able-deploy>.

¹³⁷Marc Schanz, "Critical 'Patch,' Smaller Window," *Air Force Magazine*, November 2014.

Weapons Instructor force in particular now faces 65% manning in the immediate future, which translates into reduced combat capability and proficiency for the entire force.¹³⁸ Once again the specter of the *Luftwaffe*'s intermittent airlift training program emerges.

The third area of investigation into the current reduction of USAF C-17 airlift training focuses on finding efficiency. Several methods to preserve combat capability and remain fiscally responsible emerged over the last few years; many focus on aircrew training. Among those gathering support are fuel savings initiatives and the examination of reduced combat capabilities. Arguably already a success story, fuel savings initiatives in AMC strove for a ten percent reduction on fuel consumption over ten years, achieving the goal in half that time. However, the push for optimization is now blurring lines between training and efficiency. AMC-sponsored studies at the Flight Dynamics Lab discovered eight-to-ten percent fuel savings opportunities by flying C-17s in tight formation on long-haul airlift operations.¹³⁹ Unfortunately, much like the late-war *Luftwaffe*, the majority of the C-17 force no longer trains for formation operations. While the entire pilot force was once qualified in two-ship formation flight, AMC curtailed the practice, then limited formation operations to the airdrop-trained force in the early 2000's. With just over 18% of the force formation qualified, the potential efficiencies of this formation capability, combined with the realities of reduced training and manning priorities, call into question the feasibility of such ideas for the crew force at large.¹⁴⁰

Another idea proposed reducing the combat capabilities of the C-17 crew force. Though popular with units not tasked for airdrop operations, this notion calls into question the continued utilization of airlift in a combat-support role. Much like the "troop carrier" tactical airlift of

¹³⁸Schanz, "Critical 'Patch,' Smaller Window," *Air Force Magazine*, November 2014.

¹³⁹John Tirpak, "The Once and Future Mobility Force," *Air Force Magazine*, March 2014.

¹⁴⁰Stephen Sullivan, AMC/A3TA, email message to the author, September 22, 2014.

World War II, the C-17 force currently trains in both the airland and airdrop missions. While only 18% of the force is airdrop qualified, all C-17 pilots train for air refueling, landings on assault LZ's measuring just 3500' long, and flight at low altitude to avoid detection.¹⁴¹ Studies on reduced training for these capabilities focus on recent and continued utilization of C-17s as the primary inter-theater airlift asset in the USAF inventory during the wars in Afghanistan and Iraq. In those conflicts, the force primarily operated in strategic airlift – long haul flights moving troops and equipment from the United States to bases in theater. In only a few instances did the advanced tactical training and capabilities of the C-17 force come into use. In 2001 at Rhino LZ in Afghanistan, C-17 crews utilized a dirt landing-zone in-country. Pilots used night vision goggles (NVGs) to assist in landings at Rhino and the practice spawned increased training for the entire force.¹⁴² Additionally, in 2003 at Bashur in northern Iraq, C-17s airdropped the personnel and equipment of the 173d Airborne Brigade to open the “second front” of Operation Iraqi Freedom. The parachute assault utilized the combat airlift capabilities designed into the C-17 aircraft and its crew force across strategic distances.¹⁴³ But these few and far between utilizations do not represent the majority of combat employment for the force; most pilots spent their combat time executing medium-altitude “One-to-One” descents into friendly airfields in-country, and never used the extensive training in combat airlift they received and maintained.¹⁴⁴ These routine operations thus bred combat complacency. Much like their *Luftwaffe* predecessors, some

¹⁴¹Stephen Sullivan, AMC/A3TA, email message to the author, September 22, 2014.

¹⁴²James Young, “Lessons from Rhino LZ,” *Armed Forces Journal*, November, 2011. NVG training is now standard for C-17 pilots, but the capability took years to matriculate.

¹⁴³Shane Hershman, “Employment of the C-17 in Airdrop and Airland Operations in Closing the Force,” Research Thesis (U. S. Army War College: Carlisle Barracks, PA, March 2005), 6-7.

¹⁴⁴Descending 1000 feet for every 1 mile of distance travelled. Air Force Tactics Techniques and Procedures (AFTTP), 3-3.C-17 *Combat Aircraft Fundamentals-C-17* (Nellis AFB, NV: Government Printing Office, June 2012), 5-9.

advocates in AMC believed that unused capabilities translated into wasted training, flight time, and resources.

Accordingly, the idea for a reduction in combat airlift training and the consolidation of training into “tactical” squadrons gained ground recently in some corners of AMC.¹⁴⁵ The reduction or curtailment of assault landing training, air refueling, and low-altitude flight operations (all combat-proven tactics or procedures) could no doubt produce savings.¹⁴⁶ Unfortunately, cuts of this magnitude leave no room for error, and no time for retraining once employment requirements arise. Additionally, these studies do not consider the impact outside of AMC, specifically to COCOM Theater Operational Plan (OPLAN) requirements.¹⁴⁷ While endeavoring to save funding and allow those flying hour dollars to flow elsewhere, the command must also acknowledge its supporting role to the COCOMs. Reducing flying hours, training currency, or combat capabilities directly affects the warfighting commanders and their theater OPLANs, making such a search for efficiency antagonistic. Reducing training does not simplify the mission as some advocate.¹⁴⁸ Instead, it makes the force less capable, robs them of the ability to complete assigned missions, and increases the risk of operational failure. Significantly for AMC, without a change to American foreign policy and military strategy these studies amount to mere data points, not advocacy.

¹⁴⁵Gallagher, “Maintaining Aircrew Readiness in a Budget Constrained Environment,” 31.

¹⁴⁶*Ibid.*, 30. One study estimates that a 40% reduction in crews qualified for these operations would recoup some \$56 million dollars annually in training flying hour costs alone. If only the airdrop crew force is utilized in a “tactical squadron” arrangement (16-18% of the crew force), the savings top \$115 million annually.

¹⁴⁷Joint Chiefs of Staff, Joint Publication 5-0 *Joint Operational Planning* (Washington, DC: Government Printing Office, August 2011), II-3 to II-7. Those requirements stem from the NSS, NDS, and NMS, dictated by the President, the Secretary of Defense and the Joint Chiefs of Staff.

¹⁴⁸Gallagher, “Maintaining Aircrew Readiness in a Budget Constrained Environment,” 30.

Sentiments on the reduction of airlift training, proficiency, and ultimately combat capability no doubt heighten emotions over the training debate. Air Mobility Command faces a monumental task in maximizing efficiency in the face of a fiscally austere future. But at the same time, leadership from the headquarters down to the squadron level must assess the risk posed by reduced training and proficiency on operational capabilities and employment. As this section details, the evidence is in the numbers; aircrews today train less than they did some 14 years ago and the budgets are decreasing. Efficiency is the buzzword of the day, and often (as in the case of flying hours programming, training programs, and efficiency measures) it dictates methods of future employment. As detailed and compared to the *Luftwaffe*'s experience, it should also serve as a warning for commanders throughout AMC on the perils of cutting proficiency, currency, and capabilities to the point of operational failure.

Conclusion: Lessons in Parallel

The origins of failure in the *Luftwaffe*'s airlift training management and the resultant poor performance in Operation Stösser highlights several takeaways for the modern USAF, should that force choose to learn from the mistakes. What lessons emerge from the examination of 70 year old failures of another air force, which dealt with conditions and circumstances differing from those facing the USAF today? Research reveals many parallels, all of which point to a reduction in proficiency, currency, and subsequently in combat capability.

First, though Operation Stösser undoubtedly failed, the result came about due to an inability to execute and not due to poor planning, available resources, or leadership. This outcome occurred due to the systemic destruction of *Luftwaffe* airlift training as World War II progressed. The Germans cut training as a matter of efficiency and a matter of operational doctrine; reduced fuel budgets and aircrew casualties added to the effects of this reduction but did not cause its sustainment. The Germans employed a system of training which routinely “robbed Peter to pay Paul,” much as the current USAF training construct operates to create trained aircrews. In decentralizing their airlift organization and subordinating training resources to operational commanders, the *Luftwaffe* routinely suffered the total theft of its cadre for emergency activations and operational contingencies. For every crisis, the Germans went “all in,” a process which eventually halted training altogether. Consequently, no manner of efficiency-seeking cuts could salvage *Luftwaffe* pilot training once the instructor cadres died in combat. The *Luftwaffe* eliminated entire qualification courses from the instructional syllabus; from 1942 to the end of the war it neglected advanced airlift training altogether. Students arrived at operational squadrons with less experience, resulting in less proficiency, further losses, and additional demands for new pilots to feed the system. This culminated in the “death spiral” of the training program. Though the results of this *Luftwaffe* case study are no doubt extreme, it nonetheless echoes in modern times. The recent reduction of C-17 training, restructuring of initial pilot training, and the

cancellation of advanced courses at the USAF Weapons School highlights the congruent narratives of two vastly different forces.

Second, based on the information obtained from AMC, pilots in today's C-17 force likewise face an emergent training crisis similar to that experienced by the *Luftwaffe*. Efficiency initiatives, changes to the pilot training programs, reductions in available flight training hours, increased simulator training, and wartime missions have all decreased the quantity and quality of aircraft training new pilots receive. Though more pilots and aircraft comprise the C-17 force today than at any point in the USAF's history, the volume of aircraft flight training accomplished per pilot has greatly reduced. Wartime missions, ancillary training requirements, and schedule volatility have all contributed to the USAF reducing training philosophy to that of event-completion (a currency metric), rather than targeted development of the force as a whole.¹⁴⁹ But currency does *not* equate to proficiency. This contingency is the new continuity in AMC, where reduced proficiency takes the form of currency-only training. While this new reality maximizes each hour of flight training, it reduces opportunities to make or correct any mistakes by inexperienced crewmembers. It simultaneously increases the stress of an instructor corps unable to correct the training system, yet mandated to train and further develop the force. Targeted development focuses on new pilots and aircraft commanders, not improving the skills of those flying the line. Thus once a pilot is trained, qualified, and current in the aircraft, their proficiency in all tasks is assumed so long as they continue flying. This is the same logic of thinking that resulted in a largely untrained and unqualified force stepping to execute Operation Stösser some 70 years ago.

Third, the study of the *Luftwaffe*'s failure and its relation to the emerging USAF training crisis begs questioning what capability the force will sacrifice on the altar of efficiency. Evidence

¹⁴⁹LtCol Brian Wald, 62OG/CD, email to the author, August 12, 2014.

abounds highlighting the recent decrease in flight training endured by the C-17 force over the last 14 years. However, in light of the requirement to expand, train, and equip the force in wartime, this trend is not without precedent. The Germans, forced to feed the demand for operational pilots as WWII dragged on, faced similar challenges. Instead of restructuring, they decided that based on operational needs, eliminating training for capabilities including night, formation, low altitude flight, and airdrop presented the most economical course of action. Though the USAF has faced similar wartime crises, the curtailment of realistic training does, at times, occur.¹⁵⁰ While some C-17 unit training embraces realistic combat employment scenarios, such as those now included in the training syllabus at Altus AFB and at the USAF Weapons School, many units still desire a reduction in combat capability to satisfy efficiency initiatives.¹⁵¹

Reducing training in the C-17 force generates heightened risk and sacrifices proficiency in its primary task – combat airlift. American foreign policy, COCOM campaign plans, and the continuing nature and mission sets of the direct delivery of forces to combat zones all demand combat airlift employment remain relevant in future operations. Strategic capabilities like Joint Forcible Entry require coordination and synchronization across the entire Department of Defense, including detailed planning and execution to successfully accomplish their objectives. Though recently tightening budgets jeopardized training for these tasks, no indication exists that these capabilities are somehow “nice to have” as opposed to “required” by national strategy. Forced

¹⁵⁰Throughout the nearly decade-long conflict in Vietnam the USAF endeavored to train and equip its fighter forces for combat in Southeast Asia. The curtailment of realistic air-to-air combat training for F-4 pilots later resulted in losses that spurred the subsequent genesis of Red Flag training exercises at Nellis AFB, NV. C.R. Anderegg, *Sierra Hotel: Flying Air Force Fighters in the Decade After Vietnam* (Washington DC: Government Reprints Press, 2001), 76.

¹⁵¹U. S. Air Force, Air Education and Training Command Syllabus *C-17 Pilot Initial Qualification (PIQ)* (Randolph AFB, TX: HQ AETC/A3ZM, January 2014); Marc Schanz, “Critical ‘Patch,’ Smaller Window,” *Air Force Magazine*, November 2014; Gallagher, “Maintaining Aircrew Readiness in a Budget Constrained Environment,” 30.

entry operations and tactical training therefore cannot take a back seat to efficiency and budgetary considerations without a serious assessment of risk.

The constant stress of more than a decade of war, combined with the dwindling experience of aircrew cadres and reduced opportunities to improve their skills only adds to the obstacles AMC faces as it provides trained aircrews to the force. Training for the toughest missions, those requiring the most planning and experienced crews – the airdrop and assault airlift missions – sometimes takes a back seat to training the next generation of aircraft commanders on a limited flying hour budget. The routine nature of airlift missions makes combat training ancillary, and no longer a primary utilization of the USAF airlift fleet. Nonetheless, historic examples of air forces tasked to fly missions beyond their capability exist, with instances of success and failure alike. Specifically this research revealed that Operation Stösser failed due to continued reductions in airlift training programs within the German *Luftwaffe*'s air transportation fleet. The result was a force incapable of airborne forced entry operations.¹⁵² The *Luftwaffe*'s failure thus serves as a warning to modern USAF airlift commanders on the perils of cutting training in the face of limited resources. For AMC to avoid sending aircrews out the door on a snowy night in the execution of an impossible assault, it must balance training programs with operational mission requirements. Continued trends of going “all in,” and cutting training in lieu of wartime missions or reduced budgets can only produce outcomes eerily familiar to those experienced by another air force some 70 years ago.

¹⁵²Morzik, “German Air Force Airlift Operations,” 323.

Appendix A: AFI 11-2C-17V1 Training Tables Excerpt

Code	Event	Aircraft Commander (FPL+)					Pilot (FPQ)				
		A	B	C	E	CUR	A	B	C	E	CUR
M055	Day Low-Level	1	1	1			1	1	1		
AS12	Landing LZ Nt	1	1	2			1	1	1		
AS21	Heavy Wt Full Flap	1	2	2			1	2	2		
AS22	Heavy Wt Full Flap Night	1	1	1			1	1	1		
F080	AD Visual Wing	2	2	2			2	2	2		
F100	AD Vis Night Wing	1	1	1			1	1	1		
F136	AD Multi-Elm Vis	1	1	1			1	1	1		
R015	Formation Air Refueling	1	1	2			1	1	1		
AD01	AD Event	2	2	2		Q	2	2	2		Q
AD05	Personnel	1	2	2			1	2	2		

Legend:

- A – Highly Experienced
- B – Experienced
- C – Mission Qualified (new)
- E – Basic Qualified

Event Descriptions:

- M055 – Day, Low Altitude Flight
- AS12 – Night Assault Landing
- AS21 – Heavy Weight Landing
- AS22 – Heavy Weight Night Landing
- F080 – Visual Airdrop as Wingman
- F080 – Night Visual Airdrop as Wingman
- F136 – Multi-Element Visual Airdrop Procedures
- R015 – Formation Air Refueling
- AD01 – Airdrop Event (accomplished quarterly)
- AD05 – Personnel Airdrop Event

Abbreviations:

- AD – Airdrop
- FPL – Aircraft Commander
- FPQ – Co-pilot
- LZ – Landing Zone
- Nt – Night
- Wt – Weight

Extrapolated from AFI 11-2C-17V1 *C-17 Aircrew Training* Table 4.4, the above data highlights selected quarterly (90 day) and semi-annual (180 day) training requirements for C-17 pilots of varying airdrop experience qualifications. As is evident, more experienced pilots require less continuation training. Additionally, many of these events are creditable in simulator flight, making actual (and expensive) aircraft training operations all the rarer.

Furthermore, *Luftwaffe* pilots had similar training requirements when WWII initially began, trained in “assault airlift” including airdrop, low altitude, and formation flight operations. Training for those operations dwindled and disappeared as the war dragged on.

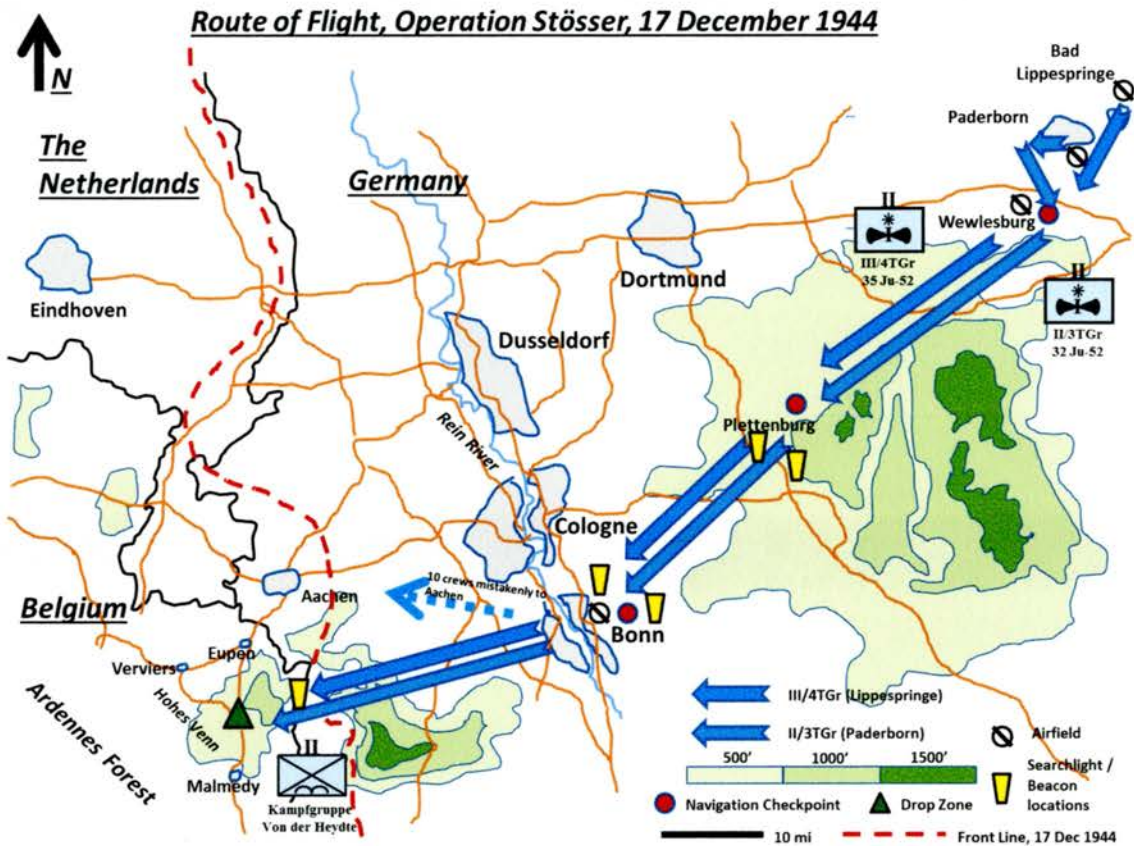
Source: U. S. Air Force. Air Force Instruction 11-2C-17 Volume 1 *C-17 Aircrew Training*. Scott AFB, IL: Government Printing Office, June 2012; Bruce Quarrie, *German Airborne Divisions* (Oxford: Osprey Publishing, 2004), 89.

Appendix B: Activation and Deactivation of *Luftwaffe* Airlift Units 1939-1945

- 1 Sept 39: I KGrzbV active with 7th *Flieger* division
 Early Sept 39: II KGrzbV established, comprised of C-school instructors
 IX KGzbV established, comprised of C-school and advanced instrument school
 instructors (returned to C-schools / AIS, 30 Sep 39)
 172d KGrzbV established (returned to C-schools / AIS 30 Sept 40)
 1 Mar 40: 101-108 KGzbV established
 1 Apr 40: 102 KGzbV reassigned to C-schools / AIS late April 40
 103 KGzbV deactivated
 30 Jun 40: 107, 108 KGzbV merged. 50% of instructors from 107 KGzbV reassigned to C-
 schools
 1 Jan 41: 40, 50, 60 KGzbV activated
 1 Feb 41: 101, 104, 105 KGzbV consolidated
 Apr 41: 40, 50, 60, 101, 104, 105 KGzbV assigned to XI *Fliegerkorps* for Operations
Merkur (prelude to the Battle of Crete)
 Mid-May 41: 3x Groups consolidated under XI *Fliegerkorps* for the Battle of Crete
 I KGrzbV – 105, 106, 40 KGzbV
 II KGrzbV – I/*Luftlande*, I/I KGrzbV, 60, 102, 101
 III (Reserve) – I/172, II/172, Freight glider units, 50x Ju-52s
 1 Jun 41: All groups withdrawn from Crete
 40, 60 KGzbV disbanded
 Mid Jun 41: I, II, IV *Luftflotte*'s assigned all transportation units from Crete for Operation
 Barbarossa (Invasion of Russia)
 Nov 41: 300 KGzbV established
 6-10 Dec 41: 400, 500 KGzbV established from C-school / AIS instructor cadre
 15 Dec 41: 600, 700, 800, 900, 999 KGzbV established from C-school / AIS instructor cadre
 Jan 42: 4, 5, 6, 7, 8 KGzbV established
 Late Apr 42: 8, 999 KGzbV deactivated
 Oct 42: S-7th, S-11th, S-13th KGzbV (Sicily) established
 Nov 42: 20, 21, 22, 23 KGzbV established for the Stalingrad airlift operation
 Feb 43: S-7th, S-11th, S-13th KGzbV (Sicily) disbanded
 Apr 43: XIV *Fliegerkorps* established to consolidate all airlift forces under a single
 commander. This complete reorganization results in the establishment of five
 airlift wings (*Transportgeschwader*, or 'TGr'), each comprised of 3-4 assigned
 groups (TG).
 1st *Transportgeschwader* (4 groups, Ju-52), 2d *Transportgeschwader* (3 groups,
 Ju-52), 3d *Transportgeschwader* (4 groups, Ju-52), 4th *Transportgeschwader* (4
 groups, Ju-52), 5th *Transportgeschwader* (2 groups, Me-323 Gigant)
 Replacement Wing, 2 groups, 5 independent squadrons
 1 May 44: 24 groups active; fuel supplies dwindling, majority of units undertrained
 1 Oct 44: XIV *Fliegerkorps* disbanded, TG's attached to *Luftflotte* commanders once again
 15 Jan 45: 10 groups remain active through the end of the war, though by 1 Apr 45, they
 have almost no fuel available for operations.

Source: D. Fritz Morzik, Numbered Air Force Study 167, "German Air Force Airlift Operations"
 (Air Force Historical Research Agency, Maxwell AFB, AL, 1961), accessed 5 July 2014,
<http://www.afhra.af.mil/studies/numberedusafhistoricalstudies151-200.asp>.

Appendix C: Route of Flight, II/3TGr and III/4TGr, December 17, 1944



Map drawn by author.

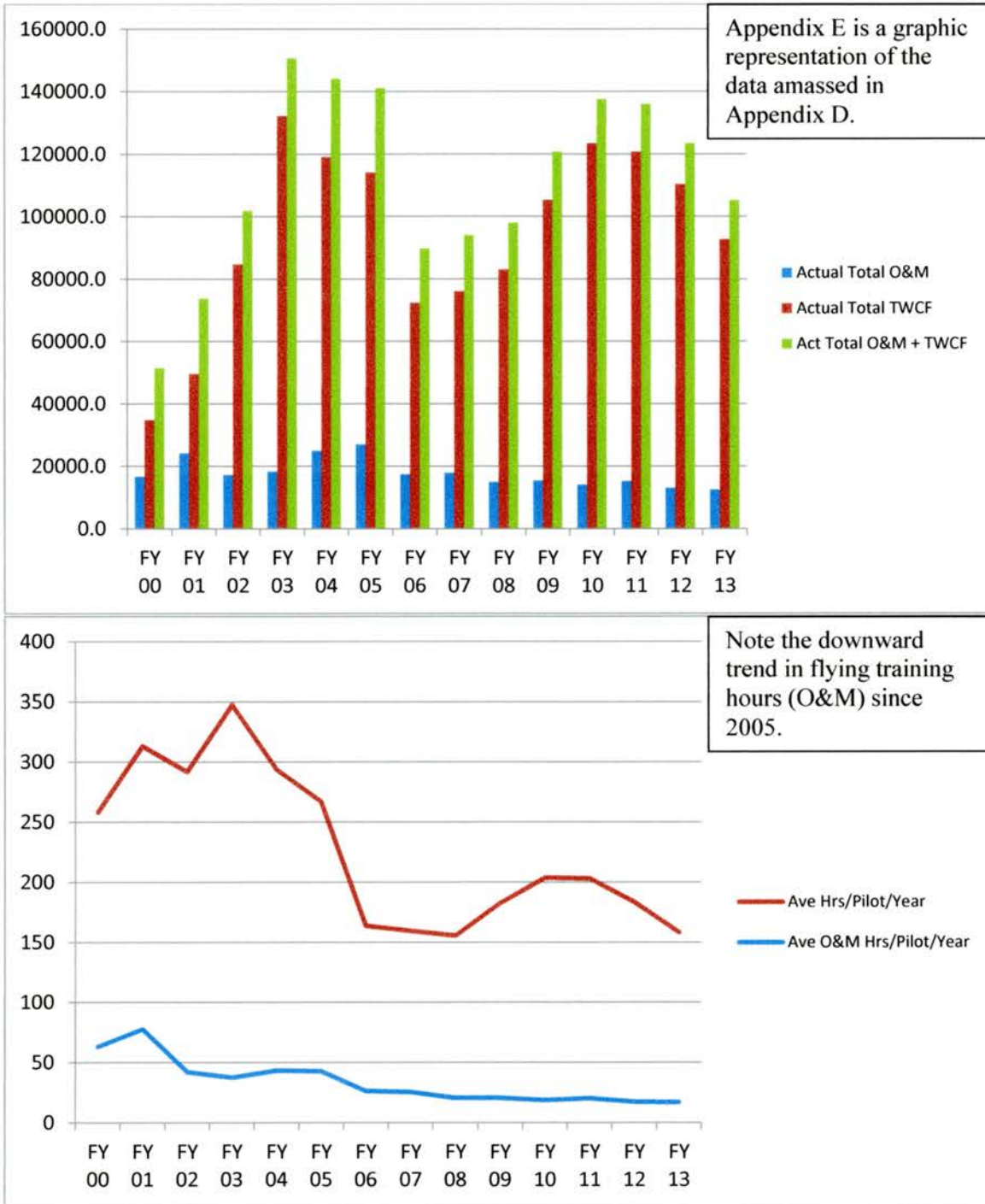
Source: D. Fritz Morzik, Numbered Air Force Study 167, "German Air Force Airlift Operations" (Air Force Historical Research Agency, Maxwell AFB, AL, 1961), accessed 5 July 2014, <http://www.afhra.af.mil/studies/numberedusafhistoricalstudies151-200.asp>.

Appendix D: C-17 Active Duty AMC Flying Hour Summary, FY00-FY13

FY00	PLAN	TOTAL	PAA: 44 PA: 264	FY08	PLAN	TOTAL	PAA: 121 PA: 726
	TOTAL O&M	16949	32%		TOTAL O&M	15007	16%
	TOTAL TWCF	36173	68%		TOTAL TWCF	81713	84%
	ACTUAL	TOTAL			ACTUAL	TOTAL	
	TOTAL O&M	16684.8			TOTAL O&M	14980.7	
	TOTAL TWCF	34793.4			TOTAL TWCF	83019.4	
FY01	PLAN	TOTAL	PAA: 52 PA: 312	FY09	PLAN	TOTAL	PAA: 124 PA: 744
	TOTAL O&M	24941	33%		TOTAL O&M	15527	13%
	TOTAL TWCF	51396	67%		TOTAL TWCF	106200	87%
	ACTUAL	TOTAL			ACTUAL	TOTAL	
	TOTAL O&M	24207.0			TOTAL O&M	15374.8	
	TOTAL TWCF	49606.2			TOTAL TWCF	105344.5	
FY02	PLAN	TOTAL	PAA: 68 PA: 408	FY10	PLAN	TOTAL	PAA: 124 PA: 744
	TOTAL O&M	17560	17%		TOTAL O&M	14263	10%
	TOTAL TWCF	84560	83%		TOTAL TWCF	122800	90%
	ACTUAL	TOTAL			ACTUAL	TOTAL	
	TOTAL O&M	17187.2	Training halved w/start of OEF		TOTAL O&M	14095.5	
	TOTAL TWCF	84740.3			TOTAL TWCF	123457.3	
FY03	PLAN	TOTAL	PAA: 81 PA: 486	FY11	PLAN	TOTAL	PAA: 124 PA: 744
	TOTAL O&M	18499	12%		TOTAL O&M	15320	11%
	TOTAL TWCF	132629	88%		TOTAL TWCF	121400	89%
	ACTUAL	TOTAL			ACTUAL	TOTAL	
	TOTAL O&M	18354.2			TOTAL O&M	15199.0	
	TOTAL TWCF	132247.3			TOTAL TWCF	120762.5	
FY04	PLAN	TOTAL	PAA: 96 PA: 576	FY12	PLAN	TOTAL	PAA: 124 PA: 744
	TOTAL O&M	26063	18%		TOTAL O&M	13134	11%
	TOTAL TWCF	119500	82%		TOTAL TWCF	110350	89%
	ACTUAL	TOTAL			ACTUAL	TOTAL	
	TOTAL O&M	25011.6	WRI online		TOTAL O&M	13069.1	
	TOTAL TWCF	119112.6	4th Sq's online CHS,TCM		TOTAL TWCF	110362.0	
FY05	PLAN	TOTAL	PAA: 105 PA: 630	FY13	PLAN	TOTAL	PAA: 124 PA: 744
	TOTAL O&M	27120	19%		TOTAL O&M	12653	12%
	TOTAL TWCF	114400	81%		TOTAL TWCF	95850	88%
	ACTUAL	TOTAL			ACTUAL	TOTAL	
	TOTAL O&M	27020.2			TOTAL O&M	12547.4	
	TOTAL TWCF	114100.5			TOTAL TWCF	92675.2	
FY06	PLAN	TOTAL	PAA: 109 PA: 654	Data amassed from AMC Flying Hours reports FY00-FY13 (last complete year of data as of this writing). Note the increase in aircraft (PAA) and pilot authorizations (PA) until FY09, and the accompanying decrease in training hours (O&M) despite the expanded fleet.			
	TOTAL O&M	17645	20%				
	TOTAL TWCF	71000	80%				
	ACTUAL	TOTAL					
	TOTAL O&M	17422.8	SUU online				
	TOTAL TWCF	72293.4					
FY07	PLAN	TOTAL	PAA: 117 PA: 702				
	TOTAL O&M	18150	19%				
	TOTAL TWCF	76864	81%				
	ACTUAL	TOTAL					
	TOTAL O&M	17918.4	DOV online				
	TOTAL TWCF	76064.5					
Totals do not include Reserve, Reserve Associate, or ANG FHP - AMC / PACAF Active Duty Units ONLY							

Source: U. S. Air Force, Air Mobility Command (AMC), AMC C-17 FY00-FY13 Flying Hour Program Reports (AMC/FMAO, Scott AFB, IL).

Appendix E: C-17 Active Duty AMC O&M Hours and Average Hours per Pilot Authorization



Source: U. S. Air Force, Air Mobility Command (AMC), *AMC C-17 FY00-FY13 Flying Hour Program Reports* (AMC/FMAO, Scott AFB, IL).

Bibliography

Primary Sources

- European Historical Division, European Theater Historical Interrogation (ETHINT) Series #75
German Paratroopers in the Ardennes (Oberst Von der Heydte), 31 October 1945.
- Gundelach, Karl and Werner Kreipe. Numbered USAF Study 169 "Technical Training Within the German *Luftwaffe*." Maxwell AFB, AL: Air Force Historical Research Agency, 1955. Accessed September 13, 2014. <http://www.afhra.af.mil/studies/numberedusafhistoricalstudies151-200.asp>.
- Morzik, D. Fritz. Numbered USAF Study 167 "German Air Force Airlift Operations." Maxwell AFB, AL: Air Force Historical Research Agency, 1961. Accessed July 5, 2014. <http://www.afhra.af.mil/studies/numberedusafhistoricalstudies151-200.asp>.
- Suchenwirth, Richard. Numbered Air Force Study 189 "Historical Turning Points in the German Air Force War Effort." Maxwell AFB, AL: Air Force Historical Research Agency, 1959. Accessed July 5, 2014. <http://www.afhra.af.mil/studies/numberedusafhistoricalstudies151-200.asp>.

Secondary Sources

- Air Ministry of the United Kingdom. *The Rise and Fall of the German Air Force*. London: Air Ministry Press, 1948.
- Anderegg, C. R. *Sierra Hotel: Flying Air Force Fighters in the Decade After Vietnam*. Washington DC: Government Reprints Press, 2001.
- Citino, Robert M. *The German Way of War: From the Thirty Years War to the Third Reich*. Lawrence, KS: The University Press of Kansas, 2005.
- Corum, James. "Defeat of the *Luftwaffe*." In *Why Air Forces Fail*, edited by Robin Higham and Stephen J. Harris, 203-226. Lexington, KY: University Press of Kentucky, 2006.
- . *The Luftwaffe: Creating the Operational Air War, 1918-1940*. Lawrence, KS: University of Kansas Press, 1997.
- . *The Luftwaffe's Way of War: German Air Force Doctrine 1911-1945*. Baltimore, MD: The Nautical and Aviation Publishing Company of America, 1998.
- Edwards, Roger. *German Airborne Troops 1936-45*. New York, NY: Doubleday, 1974.
- Farrar-Hockley, Anthony. *Student*. New York, NY: Ballantine Books, 1973.
- Galvin, John R. *Air Assault: The Development of Airmobile Warfare*. New York, NY: Hawthorn Books, 1969.
- Hickey, Michael. *Out of the Sky: A History of Airborne Warfare*. New York, NY: Charles Scribner's Sons, 1979.
- Hooten, E. R. *Eagle in Flames: The Fall of the Luftwaffe*. London: Arms and Armour Press, 1997.
- Ketley, Barry and Mark Rolfe. *Luftwaffe Fledglings 1935-1945: Luftwaffe Training Units & Their Aircraft*. Aldershot, UK: Hikoki Publications, 1996.
- Lucas, James. *Kommando*. New York, NY: St. Martin's Press, 1985.

- . *Storming Eagles: German Airborne Forces in World War II*. Edison, NJ: Castle Books, 2004.
- MacDonald, Charles B. *A Time for Trumpets*. New York, NY: William Morrow, 1985.
- Meyer, Hubert. *The 12th SS: The History of the Hitler Youth Panzer Division Volume 2*. Mechanicsburg, PA: Stackpole Books, 2005.
- Miller, Charles E. *Airlift Doctrine*. Maxwell AFB, AL: Air University Press, 1988.
- Murray, Williamson. *Strategy for Defeat: The Luftwaffe 1933-1945*. Maxwell AFB, AL: Air University Press, 1983.
- Parker, Danny. *Battle of the Bulge*. Cambridge, MA: Da Capo Books, 2004.
- . *To Win the Winter Sky*. Conshohocken, PA: Combined Books, 1994.
- Price, Alfred. *The Last Year of the Luftwaffe*. London: Greenhill Books, 2001.
- Schramm, Percy. "The Preparations for the German Offensive in the Ardennes." In *The Battle of the Bulge: The German View*, edited by Danny S. Parker, 11-152. London: Greenhill Books, 1999.
- Sun-Tzu. *The Art of Warfare*. ed. and trans. by Robert Henricks and Roger Ames. New York, NY: Ballantine Books, 1993.
- Toland, John. *Battle: The Story of the Bulge*. New York, NY: Random House, 1959.
- Whiting, Charles. *Ardennes: The Secret War*. New York, NY: Stein and Day, 1985.
- . *Hunters from the Sky*. London: Leo Cooper Publishing, 1974.
- Wragg, David. *Airlift: A History of Military Transport*. Novato, CA: Presidio Press, 1986.

Research Papers

- Gallagher, Derek P. "Maintaining Aircrew Readiness in a Budget Constrained Environment." Research Thesis. Air University Air Force Fellows, Maxwell AFB, AL, March 2013.
- Hershman, Shane. "Employment of the C-17 in Airdrop and Airland Operations in Closing the Force." Research Thesis. U. S. Army War College, Carlisle Barracks, PA, March 2005.
- Shapiro, Roger. "Mobility Pilot Development: Is AMC Off Course?" Research Thesis. Air Command and Staff College, Maxwell AFB, AL, April 2007.
- Thomas, Mark A. "The Benefits of Simulator Training to AMC." Research Thesis. Air Command and Staff College, Maxwell AFB, AL, April 1999.

Government Documents

- Aerospace Studies Institute. *Vulnerability of Transport Aircraft in Support of Combat Operations*. Maxwell AFB, AL: USAFHRA, Volume 2, June 1966.
- Congressional Research Service. *The Budget Control Act of 2011: The Effects on Spending and the Budget Deficit When the Automatic Spending Cuts Are Implemented*. Last modified May 4, 2012. Accessed September 30, 2014. <http://www.fas.org/sgp/crs/misc/R42506.pdf>.
- Joint Chief of Staff. Joint Publication 1-02 *Department of Defense Dictionary of Military and Associated Terms*. Washington, DC: Government Printing Office, 8 November 2010 (amended 15 August 2014).

- . Joint Publication 3-17 *Air Mobility Operations*. Washington, DC: Government Printing Office, September 2013.
- . Joint Publication 3-18 *Forcible Entry Operations*. Washington, DC: Government Printing Office, November 2012.
- . Joint Publication 5-0 *Joint Operational Planning*. Washington, DC: Government Printing Office, August 2011.
- . National Military Strategy (NMS), *National Military Strategy of the United States of America 2011: Refining America's Military Leadership*. Washington, DC: Government Printing Office, February 2011.
- U. S. Air Force. Air Education and Training Command Syllabus *C-17 Aircraft Commander Airdrop (ACAD)*. Randolph AFB, TX: HQ AETC/A3ZM, October, 2012.
- . Air Education and Training Command Syllabus *C-17 Copilot Airdrop (CAD)*. Randolph AFB, TX: HQ AETC/A3ZM, November 2012.
- . Air Education and Training Command Syllabus *C-17 Instructor Aircraft Commander Qualification (IAC)*. Randolph AFB, TX: HQ AETC/A3ZM, February 2013.
- . Air Education and Training Command Syllabus *C-17 Pilot Checkout (PCO)*. Randolph AFB, TX: HQ AETC/A3ZM, March 2013.
- . Air Education and Training Command Syllabus *C-17 Pilot Initial Qualification (PIQ)*. Randolph AFB, TX: HQ AETC/A3ZM, January 2014.
- . Air Education and Training Command Syllabus *T-1A Joint Specialized Undergraduate Pilot Training*. Randolph AFB, TX: HQ AETC/A3FP, July 2012.
- . Air Education and Training Command Syllabus *T-6A Primary Pilot Training*. Randolph AFB, TX: HQ AETC/A3FP, October 2013.
- . Air Education and Training Command Syllabus *T-38C Specialized Undergraduate Pilot Training*. Randolph AFB, TX: HQ AETC/A3FP, October 2012.
- . Air Force Instruction 10-201 *Status of Resources and Training System*. Guidance Memorandum 2014-01. Washington DC: HQ Air Force A3/5, May 2014.
- . Air Force Instruction 11-102 *Flying Hour Program Management*. Washington DC: HQ AF/A3O-AT, August 2011.
- . Air Force Instruction 11-2C-17 Volume 1 *C-17 Aircrew Training*. Scott AFB, IL: Government Printing Office, June 2012.
- . Air Force Instruction 11-2C-17 Volume 3 *C-17 Operations Procedures*. Scott AFB, IL: Government Printing Office, September 2011.
- . Air Force Instruction 16-402 *Aerospace Vehicle Programming, Assignment, Distribution, Accounting and Termination*. Washington DC: HQ AF/A8PB, May 2013.
- . Air Force Instruction 65-503 *U. S. Air Force Cost and Planning Factors, Table A36-1, Authorized Aircrew Composition-Active Forces*. Washington DC: HQ AF/A3O, June 2013.
- . Air Force Tactics Techniques and Procedures (AFTTP) 3-3.C-17 *Combat Aircraft Fundamentals-C-17*. Nellis AFB, NV: Government Printing Office, June 2012.

- . Air Force Doctrine Document 3-17 *Air Mobility Operations*. Maxwell AFB, AL: LeMay Center, February 2013.
- . Air Mobility Command Syllabus *C-17 Formation Lead Airdrop Upgrade*. Scott AFB, IL: HQ AMC/A3TA, September 2009.
- U. S. Department of Defense. *Joint Operational Access Concept (JOAC)*. Washington, DC: Government Printing Office, January 2012.

Online Articles

- Rolfson, Bruce. "Policy Change Means Most Able to Deploy." *Air Force Times*. Last modified December 29, 2009. Accessed September 14, 2014.
<http://www.airforcetimes.com/article/20091229/NEWS/912290302/Policy-change-means-most-able-deploy>.
- Losey, Samuel. "A Leaner Force: Key Changes Emerge After Tough Year of Airmen Cuts." *Air Force Times*. Last modified 24 November, 2014. Accessed 24 November, 2014.
<http://www.airforcetimes.com/story/military/careers/2014/11/17/air-force-cuts-rank-afsc/19161847/>

Other Sources

- Cooper, James. Air Mobility Command Chief of Rated Aircrew Management, AMC/A3TF, Scott AFB, IL. Email message to the author, September 18, 2014.
- Schanz, Marc V. "Critical 'Patch,' Smaller Window." *Air Force Magazine*, November 2014.
- Sullivan, Stephen J. Air Mobility Command C-17 Aircrew Training, AMC/A3TA, Scott AFB, IL. Email to the Author, 22 September 2014.
- Thayer, David E., Carl J. Dahlman, *Assessing Unit Readiness, Case Study of an Air Force Mobility Wing*. Project Air Force Report, Santa Monica, CA: RAND Corporation, 2002.
- Tirpak, John A. "The Once and Future Mobility Force." *Air Force Magazine*, March, 2014.
- U. S. Air Force, Air Mobility Command (AMC). AMC C-17 FY00-FY13 Flying Hour Program Reports. AMC/FMAO. Scott AFB, IL.
- U. S. Air Force Weapons School, 57th Weapons Squadron (C-17), *EMP396A: GRF Concepts (U)*. Weapons School Courseware, Nellis AFB, NV: April 2013.
- . "U. S. Air Force Weapons School JFE 13A Brief to 18th Air Force Commander." Briefing, U. S. Air Force Weapons School, Nellis Air Force Base, NV, 23 May 2013.
- Wald, Brian, 62OG/CD, Joint Base Lewis-MCChord. Email to the author, August 12, 2014.
- Young, James G. "Lessons from Rhino LZ." *Armed Forces Journal*, November, 2011.