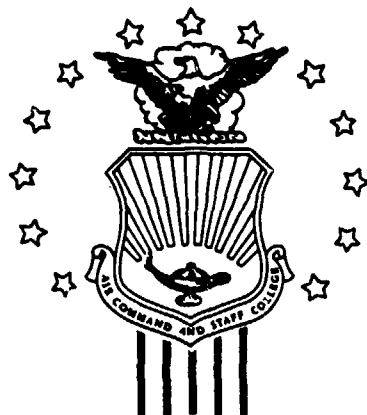


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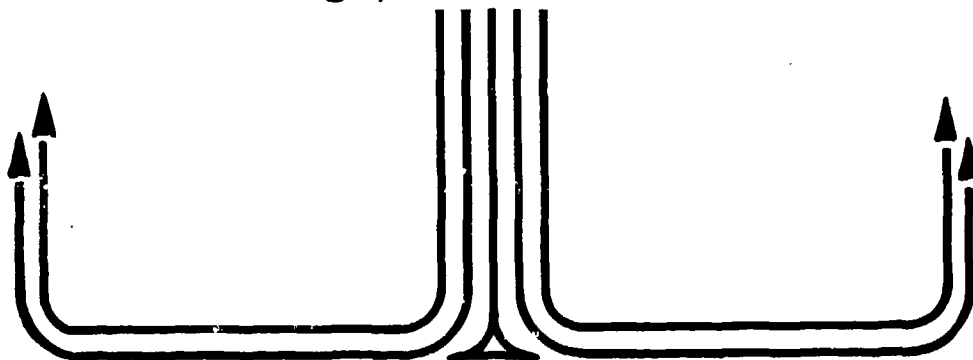
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AIR COMMAND AND STAFF COLLEGE

STUDENT REPORT

HISTORY OF BARDENAS REALES
AIR-TO-GROUND RANGE (1970-1985)
MAJOR DAVID A. DELLAVOLPE 88-0720

"insights into tomorrow"



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REPORT NUMBER 88-0720

TITLE HISTORY OF BARDENAS REALES AIR-TO-GROUND RANGE
(1970-1985)

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Submitted to the faculty in partial fulfillment of
requirements for graduation.

AIR COMMAND AND STAFF COLLEGE
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PREFACE

The United States Air Forces in Europe (USAFE) faces the considerable challenge of locating air-to-ground ranges to keep its forces trained and combat ready. Numerous factors, such as weather, crowded airspace, small training areas, and a constantly changing political environment, complicate this task.

This history examines how USAFE met the challenge with the Bardenas Reales Air-to-Ground Range. It discusses the initial requirement for the range. Then, it follows the development of the range from its inception in 1970 until 1985. Finally, the history reviews the political considerations and negotiations that have impacted USAFE's use of the range.

This material is being submitted to the faculty of The University of Alabama in partial fulfillment of the requirements for the Master of Arts in History degree.



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Major David A. DellaVolpe is a senior navigator with 1100 flying hours in the F-4. He graduated from Fairfield University, Fairfield, Connecticut in 1974 with a Bachelor of Science in Biology degree. He was commissioned as a Second Lieutenant in the United States Air Force following completion of Officer Training School in February 1975. He graduated from Undergraduate Navigator Training in December 1975 and was assigned to George AFB, California for F-4 training. After this training, he flew the F-4 with the 480th Tactical Fighter Squadron, Spangdahlem AB, Germany and the 80th Tactical Fighter Squadron, Kunsan AB, Korea. Returning to George AFB in 1980, he served as an Instructor Weapons System Officer in the 21st Tactical Fighter Squadron and the 39th Tactical Fighter Squadron. In 1984, he was assigned to the Directorate of Fighter Operations and Training, Headquarters United States Air Forces in Europe as a staff officer. During this assignment, he had the primary responsibility for Bardenas Reales Air-to-Ground Range as the command's Range Manager. He has also flown on the range numerous times and served as Range Control Officer. He has completed the Squadron Officers School resident program and the Air Command and Staff College nonresident program.

TABLE OF CONTENTS

Preface.....	iii	
List of Illustrations.....	vi	
Executive Summary.....	vii	
CHAPTER ONE--PRELUDE TO BARDENAS		
Introduction.....	1	
El Uotia Range.....	1	
Search for a Replacement Range.....	3	
CHAPTER TWO--ESTABLISHMENT OF BARDENAS		
Decision to use Bardenas.....	6	
Negotiations with the Spanish.....	7	
Zaragoza Air Base.....	8	
Flying Operations.....	9	
Importance of Bardenas.....	13	
CHAPTER THREE--DEVELOPMENT OF BARDENAS 1972-1979		
Negotiations with the Spanish.....	14	
Flying Operations.....	16	
Importance of Bardena.....	22	
CHAPTER FOUR--BARDENAS MOVES INTO THE EIGHTIES		
Negotiations with the Spanish.....	23	
Flying Operations.....	25	
Importance of Bardenas.....	29	
CHAPTER FIVE--CONCLUSION.....		30
FOOTNOTES.....		32
BIBLIOGRAPHY.....		43

LIST OF ILLUSTRATIONS

FIGURES

FIGURE 1--USAFE WEAPONS RANGES (1969).....	4
FIGURE 2--RANGE ASSIGNMENTS FY 1971.....	10
FIGURE 3--WTS ANNUAL RANGE CAPABILITY.....	10
FIGURE 4--NEW USAFE WEAPONS RANGES (1970).....	11
FIGURE 5--BARDENAS RANGE USAGE.....	17
FIGURE 6--NEW USAFE WEAPONS RANGES (1978).....	20
FIGURE 7--BARDENAS RANGE TARGETS.....	31

EXECUTIVE SUMMARY



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REPORT NUMBER 88-0720

AUTHOR(S) MAJOR, DAVID A. DELLAVOLPE, USAF

TITLE HISTORY OF BARDENAS REALES AIR-TO-GROUND RANGE
(1970-1985)

I. Purpose: To examine the establishment and development of Bardenas Reales Air-to-Ground Range over its first fifteen years.

II. Problem: In 1969, USAFE lost access to its major weapons training site in Libya. Poor weather, crowded airspace, small training areas, and a constantly changing political environment in Europe made the search for a replacement a major challenge.

III. Data: This history examines how USAFE met the challenge by establishing Bardenas. The history discusses the development of the range over its first fifteen years and its ability to meet USAFE weapons training requirements. Also, it reviews the political considerations and negotiations that impacted range operations during this period.

IV. Conclusions: As an overseas command, USAFE will continue to face the challenge of keeping its aircrews trained and combat ready. Thus, ranges, such as Bardenas, are critical. Despite the limitations and host nation restrictions, USAFE will continue to

CONTINUED

operate on these ranges to the best of its ability.

V. Recommendations: This history should be used to provide an historical background on the establishment and development of a major weapons training range. Although not a complete account of Bardenas, it does consolidate the major aspects of the first fifteen years. Information is valuable to provide the historical perspective to those planning or searching for new training areas.

Chapter One

PRELUDE TO BARDENAS

INTRODUCTION

Bardenas Reales Air-to-Ground Range, Spain has been the most utilized bombing range by aircrews of the United States Air Forces in Europe (USAFE) since its inception in 1970. The range came into existence, since the Air Force was looking for a place to train its tactical fighter aircrews in weapons employment. This history will examine the background of the range, its development to meet aircrew training requirements, and capabilities and limitations of the range over the period 1970-1985. Also, this history will discuss the political considerations which have had a great impact upon US forces operating overseas. As such, it will emphasize USAFE attempts to overcome all these factors while trying to establish an effective range.

Forward basing of US forces in foreign countries continues to require a delicate balance of political considerations. When the balance is achieved, the military is then responsible to train its forces and keep them ready to accomplish their assigned tasks. The Air Force needs bombing ranges to reach the appropriate readiness levels for its aircrews. In USAFE, a key challenge is finding locations where the tactical fighter units can practice bombing and gunnery events to increase their combat proficiency. To accomplish this, with forces spread throughout six different countries, USAFE faces a full time task. Also, the poor weather, crowded airspace, small training areas, and constantly changing political environment make this a major challenge.¹

This history will examine how USAFE met the challenge by using the Bardenas air-to-ground range in Spain during its first fifteen years. However, to begin the story of Bardenas, this history will look at what range preceded it, why it was no longer a viable training option, and why Bardenas was now necessary.

EL UOTIA RANGE

From 1948 until 1969, USAFE aircrews maintained their bombing

proficiency on the El Uotia Range, Libya. El Uotia Range was an extensive training complex, located 80 miles southwest of Wheelus AB, Libya,² that provided USAFE aircrews with the capability to fully train in all bombing events. During the 1960s, El Uotia Range supported over 85% of the USAFE aircrew training requirements, equating to over 54,000 bombing events per year. In fact, the range had the capability to exceed the entire command's aircrew weapons training requirements,³ since it had two conventional ranges and a tactical range within the complex. Each conventional range consisted of a bombing circle and strafe targets that supported all the required aircrew weapons delivery events. Further, the aircrews practiced more realistic training against simulated targets on the tactical range. These targets consisted of full-sized mock ups of actual tactical targets a pilot could expect to attack in combat.⁴

In support of El Uotia Range, Wheelus AB, Libya became the biggest operation in the European Theater. Aircrews from all USAFE bases throughout the United Kingdom, Germany, France (up until 1966 when the US withdrew its forces from the country), and Spain deployed to Wheelus to take advantage of the excellent flying weather, unrestricted airspace, and the first-rate bombing range.⁵ Primarily, units deployed to Mediterranean locations because of the consistently poor weather and lack of sufficient bombing ranges near their home bases in the United Kingdom and on the European continent to adequately attain the necessary training.

These deployments, called Weapons Training Deployments (WTDs), were the primary method for aircrews to have the weather and range availability to practice their bombing and maintain their combat proficiency. Thus, Wheelus became the largest operation for USAFE and also the most important--at least for providing peacetime aircrew training. "The characteristically poor European weather made the operation at Wheelus essential to the maintenance of the Command's Operational Readiness (OR) posture."⁶

Supporting the vast majority of the command's training requirements, El Uotia was vital to enhancing the combat capability of the front-line air forces in Europe. Yet, as vital as it was, the USAFE staff planners recognized the instability in the region and the availability of Wheelus AB and the range might not continue. In 1966, the government of Morocco requested the US to close down its bases in that country. This was followed shortly by the removal of all US forces from France. Together with these closures, "operational restrictions placed on US aircraft in Turkey, Greece, Italy, and Spain, soon made it clear that American operations from its overseas bases could be severely affected by host political considerations."⁷ Thus, the command began to look for alternative training locations.

As a start, USAFE conducted a feasibility study in 1966 of several smaller ranges in the Mediterranean region. After evaluation in July of Bardenas Range, Spain, they opened negotiations with the Spanish for the 401st Tactical Fighter Wing (TFW), which was recently activated at Torrejon AB, Spain, to use the range on a part-time basis. Although the range was located a significant distance (130 nautical miles) from Torrejon, the successful negotiation for its use would at least give USAFE a small alternative in the event of the loss of El Uotia. Further, this in-country range was highly desired to reduce temporary duty (TDY) time and cost for the unit. Yet, in 1966, relations between the US and Libya were still good and there was no need to actively pursue a replacement for the operations at El Uotia.⁸

Relations between the US and Libya started to strain shortly after this. In 1967, operations at Wheelus were interrupted when the Arab-Israeli Six-Day War erupted in June. The Libyans, fearing US intervention into the conflict, required US units on station to cease flying operations. As a result, USAFE staff planners started seriously working on plans to withdraw from the base in case relations deteriorated further. When tensions eased, all plans were put away until 1969.⁹

In September 1969, a coup-de-etat led by anti-Western Libyan Army officers overthrew the pro-US government of King Idris. The group, led by Lieutenant Colonel Moammar Khadaffi, demanded the US immediately cease operations at Wheelus AB and El Uotia Range. All bomb training and operational flying at Wheelus were terminated in September. By December, the US was discussing the evacuation of its forces from Libya at the revolutionary government's request. This occurred in spite of intense US efforts to negotiate for continued use of the Libyan facilities. Despite their efforts, after three sessions the US agreed to remove its forces from the country by June 1970. Thus, from the time the Libyans ordered operations to stop at Wheelus in September 1969, the US did not drop another bomb in Libya.¹⁰ That is until 15 April 1986 when USAFE F-111s returned to Libya to strike the terrorist organization of Colonel Moammar Khadaffi. As a side note, it is interesting that one of the targets struck by the F-111s was Tripoli AB--renamed from Wheelus.

SEARCH FOR A REPLACEMENT RANGE

The termination of Wheelus AB and El Uotia Range placed the USAFE weapons training operation into turmoil, in spite of the previous studies. The reason for this was simple--there just did not exist another range complex in the Mediterranean (or anywhere in Europe) that was as extensive or met USAFE's training needs the way the Libyan operation did. However, USAFE started its

search for a replacement by reviewing its 1966 feasibility study.

USAFE expanded on this study by directing Sixteenth Air Force (16 AF) to conduct a more extensive weapons range study.¹¹ From this, the command decided to pursue several courses of action. Although no current range in the Mediterranean could compare with El Uotia, there were several smaller ranges USAFE could use. "Since the closing of Wheelus Air Base and the associated ranges, there was an effort to minimize the resulting weapons training deficiency by increasing the use of the remaining ranges in USAFE."¹² In 1969, there were only nine air-to-ground ranges available in Europe for use by USAFE forces (Figure 1).

<u>Name/Controlled By</u>	<u>Location</u>	<u>Type Range</u>
Holbeach/Royal Air Force (RAF)	30 nm N of RAF Lakenheath, UK	Conventional/ Nuclear
Wainfleet/RAF	40 nm N of RAF Lakenheath, UK	Nuclear
Jurby/RAF	200 nm NW of RAF Lakenheath, UK	Nuclear
Vliehors/Royal Netherlands Air Force	60 nm N of Soes- terberg AB, Neth	Conventional/ Nuclear
Nordhorn/Royal Air Force Germany	150 nm N of Hahn AB, Germany	Conventional/ Nuclear
Siegenburg/USAFE	40 nm N of Munich, Germany	Conventional
Bardenas/Spanish Air Force	35 nm NM of Zara- goza AB, Spain	Conventional/ Nuclear
Maniago/Italian Air Force	10 nm E of Aviano AB, Italy	Conventional/ Nuclear
Konya/Turkish Air Force	160 nm NW of Incirlik AB, Turk	Conventional/ Nuclear

Figure 1. USAFE Weapons Ranges (1969)¹³

USAFE considered replacing El Uotia with Bardenas Reales in Spain, Capo Frasca in Sardinia, Maniago in Italy, and Konya in

Turkey. After negotiations with the Libyans failed in December 1969, USAFE took numerous steps to increase their access to these ranges.¹⁴ Currently, USAFE operated on Bardenas with its unit stationed at Torrejon AB, Spain in accordance with the agreement signed in 1966. USAFE units intermittently operated on Maniago while flying out of nearby Aviano AB, Italy.¹⁵ Access to Maniago was approximately 2-3 hours per day based on Italian Air Force requirements. Capo Frasca was coming available since the Canadian Air Force was terminating its operation on nearby Decimomannu AB, Sardinia. In January 1970, a deployment from Hahn AB, Germany successfully tested the capabilities of the range; however, their after action report indicated the area could best be suited for air-to-air training.¹⁶ Konya was used on a limited basis by the 401st TFW when it deployed to Incirlik AB, Turkey. The drawbacks of the range were its poor condition and its extensive distance (160nm) from Incirlik AB.¹⁷ To augment these Southern Region ranges, the command began an intense effort to obtain time on the local ranges (listed in Figure 1) throughout the United Kingdom and the European continent. It was not going to be easy to find a substitute for El Uotia. "Despite efforts to increase the training on other European ranges, the inherent political and physical restrictions resulted in many units failing to meet the established training requirements."¹⁸

Faced with this critical training shortage for its fighter units, many in USAFE felt Bardenas was the obvious choice to replace El Uotia. While the range was a significant distance from Torrejon AB, it was a reasonable distance (35 nm) from Zaragoza AB, Spain. This base was available for USAFE use, as it was under their control in caretaker status after a Strategic Air Command unit had returned to the US. Another major attraction of Zaragoza AB and Bardenas Range was their location. Situated in the northeastern portion of Spain, they could easily be reached in just one sortie from all the other European bases. In spite of the positive aspects of this potential training complex, USAFE knew negotiations with the Spanish would be lengthy even if they were successful.¹⁹

To negotiate for the use of the range on the scale as USAFE envisioned was going to be a different matter entirely from 1966. From the Spanish viewpoint, they could not understand the increased interest with which USAFE was pursuing this range agreement. Their attitude was, "anything so important must, by its nature, take a long time to resolve."²⁰ However, they were obliging and did allow USAFE to start deployments into Zaragoza while the terms of the Memorandum of Understanding (MOU) were negotiated.²¹

Chapter Two

ESTABLISHMENT OF BARDENAS

DECISION TO USE BARDENAS

El Poligono de Tiro de Las Bardenas Reales is the official name of the bombing range according to the Spanish. However, for the remainder of this history, we will refer to the range as Bardenas (as do most US personnel who have flown on the range). The range is located in a narrow, uninhabited valley approximately 30 miles long by 15 miles wide.¹ The area is under the control of the Commander, Pyrenees Air Region of the Spanish Air Force.² With an elevation of approximately 1000 feet above sea level, the terrain is desert resembling the landscape of the high deserts in the southwest United States. In fact, the climate is also similar to the Southwest US, with hot dry days accentuated by a strong wind, followed by cool evenings.

USAFE hesitated in its initial decision to use Bardenas. While the weather in Spain far surpassed the poor conditions that predominated over the rest of Europe, it was not as good as Libyan weather, which supported 360 days of operational flying per year. Further, the size of Bardenas, approximately 6500 acres, was larger than any other range in Europe, but it was not nearly as extensive as El Uotia. In fact, the range did not meet the minimum size criteria of a standard Air Force range, and USAFE had to obtain a waiver in order to legally use it.³ Yet, the range had a great deal of potential, and the command was in dire need of a weapons training location.

In its current state, the range needed many improvements to support the extensive training USAFE intended to conduct. So, as 16 AF, the executive agent for USAFE in the southern region of Europe, was conducting negotiations with the Spanish Air Force over use of the range, a combined US-Spanish working group studied the range layout to determine the necessary improvements. Since the range was in an undeveloped state and had minimal training value to USAFE, this group made several recommendations to initially improve the targets, scoring capability, and communications on the range. These recommendations laid the groundwork for the bilateral agreements to follow. More importantly to USAFE, the group highlighted the failure of the Spanish to understand the urgency and importance the US was placing on Bardenas.⁴

NEGOTIATIONS WITH THE SPANISH

The initial MOU on joint Spanish Air Force-USAFE use of Bardenas was signed on 14 May 1970. It listed each side's responsibility, primarily derived from the recommendations of the joint working group. In addition to the overall terms, the MOU listed short-term projects requiring completion by 30 June 1970 to improve the usefulness of the range.⁵ In return for the construction projects to upgrade the range, USAFE had successfully negotiated for six hours and 40 minutes of range use per day, Monday through Thursday, with Friday left for range cleanup.⁶ While falling short of their use of El Uotia, USAFE was back in the full time business of weapons training.

By September 1970, construction on the range was proceeding quite well with new control towers, bombing targets and strafing pits already completed.⁷ In accordance with the MOU, USAFE would provide capital investments and construction for the range, while the Spanish Air Force would provide personnel to operate and maintain it. Yet, with the more sophisticated range setup, USAFE personnel noticed the Spanish were having problems with keeping the range up to US standards.⁸ An example of this occurred when the US forces encountered problems from ricocheting bullets during their strafing runs. The Spanish balked at the US request for additional cleaning of the strafe pits to prevent this. They claimed this would require additional manpower, and they did not have room for them in their current barracks at the range. Only through continued negotiations, in which the US agreed to build a new barracks to house more Spanish range personnel, did the Spanish agree to provide this service.⁹

At this time, these were only verbal promises made by both sides. To formalize them, USAFE requested to meet with the Spanish in the fall of 1970. The intent of the meeting was to discuss the new US projects and the willingness of the Spanish to properly maintain the range. Unfortunately, the meeting did not occur until April 1971, due to Spanish procrastination.¹⁰

By this time, several other factors impacted the need for successful negotiations to increase and improve operations on Bardenas. Range times on Maniago and Capo Frasca were not as easy to obtain as previously thought. Further, the training benefit of these two ranges was not as significant as Bardenas, and the potential to expand them did not exist. Thus, the need to officially extend the operating hours on Bardenas became paramount.¹¹

After a long wait and several negotiation sessions, the US and Spain signed a long-term MOU. This formalized the US commitment to build a larger barracks for the Spanish personnel on the

range. Also, it outlined other US construction projects, such as communications facilities, roads throughout the range and to the nearby village, a water supply, and helicopter pad.¹² For the Spanish part, they committed to improved range service, but more importantly they provided the US up to seven hours daily range time, now including Fridays.¹³

After USAFE signed the MOU in June 1971, they felt reassured the Spanish were committed to developing a quality gunnery range. Since Bardenas, was owned by Spain, this was a primary concern to all those connected with the implementation of the project.¹⁴ Now, working within the size constraints at Bardenas, US personnel began upgrading all aspects of the range complex. An excellent opportunity for this came in July. The area around Bardenas was still a farming community and the Spanish insisted, as part of the agreement, the range must be closed for a two week period in July of each year for the local farmers to complete their harvest.¹⁵ While this took away valuable training time, it did allow the range personnel to work on the targets and facilities without interruption.

ZARAGOZA AIR BASE

Fortunately, the Spanish allowed USAFE units to deploy into Zaragoza AB on a temporary basis while the negotiations were ongoing. In March 1970, the first unit arrived from the 20th Tactical Fighter Wing at RAF Upper Heyford, UK with 12 F-4D Phantoms to use the range. The deployment was highly successful and another deployment of 12 aircraft from the 48th TFW at RAF Lakenheath, UK followed later in the month.

As previously mentioned, USAFE decided to use Zaragoza AB as its host unit for Bardenas operations. While the base had ample space, facilities, and personnel to provide for the beddown of the initial deployments, problems began to arise almost immediately. To support a large operation, such as a weapons training site, USAFE would have to substantially increase the base population. Insufficient housing and a lack of support facilities were among the many issues facing the new operation. Yet, the primary issue the command had to overcome was the negotiations with the Spanish over the range. Since the range negotiations were concluded expeditiously, USAFE proceeded with the necessary improvements to the base.¹⁶

Next, USAFE formally activated the 406th Tactical Fighter Training Group (TFTG) at Zaragoza AB on 1 July 1970 as the caretaker unit for the operation at Bardenas.¹⁷ With a signed MOU and a unit designation, Zaragoza AB was now ready to start replacing Wheelus as the primary weapons training site in Europe. Facing this significant task, the 406th TFTG developed a concept

of operations that stressed setting up weapons training operations on a small scale. The plan called for no more than two 12 aircraft deployments to Zaragoza at any one time. This allowed for a slow build up of training during the early phase of this range. Carrying this philosophy into the support sector, the 406th gave priority to construction of facilities directly related to the flying and range operations.¹⁸ Yet, this slow, disciplined approach did not resolve all the problems facing this new operation.

In September 1970, the 406th TFTG received a visit from the Headquarters USAF Inspector General (IG). Arriving within two months of the unit's activation, the IG team found numerous deficiencies with the operation of the base and the range.¹⁹ Primarily, the IG team felt inappropriate consideration was given to the safety aspects of the range operation. So, in spite of the 406th's intentions to slowly build up the range, they now had to change directions to respond to the discrepancies of the inspection team. Yet, this inspection had a positive as well as negative effect. While they had to change some priorities, they also had the attention of Headquarters USAF.

FLYING OPERATIONS

Training

In conjunction with the activation of the 406th TFTG in July, HQ USAFE also published its new weapons training plan, called CREEK TALLY. With Zaragoza AB as the lead Weapons Training Site (WTS), USAFE units would also make increased use of other weapons training sites at Aviano AB, Decimomannu AB, and Incirlik AB.²⁰ The plan called for specific units throughout Europe to deploy to a particular WTS (Figure 2). This allowed the command to proportionally distribute the training and develop continuity for the individual unit training programs.

When the four ranges were combined, they provided sufficient capability to meet minimum aircrew weapons training requirements. The command established this level as the minimum weapons training aircrews required to maintain combat proficiency. In 1970, USAFE fighter aircrews needed to accomplish 34,256 events per year on a weapons range to meet their minimum training requirements. The four WTSs could provide 39,464 events annually (Figure 3).

USAFE's goal was to train to the maximum weapons training level and not the minimum. This level allowed the command's aircrews to maintain increased combat proficiency. Thus, to

<u>WTS</u>	<u>Range</u>	<u>Unit</u>
Zaragoza AB	Bardenas	36 TFW
		50 TFW
		401 TFW
Aviano AB	Maniago	20 TFW
		48 TFW
		81 TFW
Decimomannu AB	Capo Frasca	81 TFW
Incirlik AB	Konya	401 TFW

Figure 2. Range Assignments FY 1971²¹

<u>Range</u>	<u>Number of Events</u>
Bardenas	16,256
Maniago	8,880
Konya	8,080
Capo Frasca	6,248
	39,464

Figure 3. WTS Annual Range Capability²²

achieve the maximum level, set at 63,768 events annually, USAFE continued to rely upon the small ranges in the United Kingdom and on the continent to help reduce the shortfall.²³ By this time, USAFE had gained access to six more ranges throughout Europe (Figure 4). With effective scheduling of units, USAFE was again providing a significant amount of weapons training to its aircrews. This entire effort was accomplished within ten months after losing the major weapons training center in Libya.

<u>Name/Controlled By</u>	<u>Location</u>	<u>Type Range</u>
Tain/RAF	210 nm N of RAF Lakenheath	Nuclear
Cowden/RAF	70 nm N of RAF Lakenheath	Conventional/ Nuclear
Helchteren/Belgian Air Force	7 nm S of Kleine Brogel AB, Belg	Conventional/ Nuclear
Suippes/French Air Force	4 nm NE of Suippes, France	Conventional/ Nuclear
Baumholder/German Army	30 nm NW of Ramstein, Germ	Conventional/ Tactical
Capo Frasca/Italian Air Force	30 nm N of Decimomannu Sard	Conventional/ Tactical

Figure 4. New USAFE Weapons Ranges (1970)²⁴

Range Improvements

To meet USAFE training needs, the 406th had to make some immediate improvements to the range. Thus, the old conventional bombing target was completely redone. In addition to a 25 foot high pylon target, range personnel constructed concentric circles of 75 feet, 150 feet, and 300 feet in diameter made of white-painted 50 gallon drums to aid pilots in practicing their weapons deliveries. Also, they built new strafing pits with plowed out areas depicting safety zones. These safety zones allowed pilots to recognize where they should cease firing their guns to reduce the possibility of ricochet damage. Further, the newly constructed range towers provided improved scoring capability for assessing the accuracy of the practice bombs.²⁵ With the few ranges throughout Europe, Bardenas now provided a quality training area for the aircrews. Thus, with the improved range and increased range time, USAFE now started bringing in more aircraft to Zaragoza AB. By the end of the summer 1971, USAFE had up to 31 fighters at the base at one time.²⁶

Another important aspect of weapons training now needed to be addressed--the types of munitions approved for Bardenas. Weapons training is accomplished on a "building block" approach. First, using 25 pound practice bombs, aircrews practice and refine their

delivery techniques. Then, using inert 500 pound bombs, they can simulate actual combat deliveries from a heavily-loaded aircraft. This is very important, since the handling characteristics of the airplane are quite different when 3000-6000 pounds of bombs are attached to it. Finally, the aircrews need to practice releasing 500 pound bombs with live warheads. It is very important to recognize and practice the proper delivery parameters of the live munitions to avoid the weapon's fragmentation pattern. However, at this point in the development of Bardenas, only the 25 pound practice bombs were authorized by the Spanish authorities.²⁷ To make the range truly useful, USAFE personnel needed approval from the Spanish for the other munitions.

Another area of weapons training which required a "building block" approach was the delivery of the weapons. First, aircrews needed to practice delivering their weapons within the required "hit" distances. Then, they practiced tactical deliveries oriented towards combat. While they accomplished these deliveries on the conventional bombing target, the aircrews still needed to practice their delivery techniques on full-sized, tactical targets. These targets are located on a tactics range, normally associated with an air-to-ground range. In September 1971, USAFE took a major step forward, as they began to develop a tactics range on Bardenas.²⁸

The 406th planned the tactics range at Bardenas to include: an airfield, SAM sites, convoys, and bridges. While these targets have the capability to greatly improve training, they are expensive to procure and install. So, to save money, USAFE decided to use nonrepairable salvage items as the simulated targets. In fact, the Spanish Air Force helped by donating old F-86 hulks to be placed on the airfield complex. These actual targets reduced the cost of the tactics range and significantly increased the realistic training value of the range. USAFE took further steps to reduce the cost, of this range when it solicited the support of a US Army Skytrain helicopter to transport and install the F-86s onto the target airfield.²⁹ Other targets were simulated by using old trucks and buses painted and arranged to look like actual SAM sites or truck convoys.³⁰ In spite of the excellent progress made on the range, the inherent dangers of high performance aircraft on a bombing range must always be considered.

Safety

This aspect came to light on 14 March 1972 when two F-4D aircraft from the 52nd TFW, Spangdahlem AB, Germany crashed into a hillside while returning from the range to Zaragoza AB. Aircraft accidents that occur in foreign countries are complicated by the different attitudes, both cultural and

political, of the people in the host nation. Although all four crewmembers lost their lives in this accident, this fact was obscured by the reaction of a local populace influenced by reports in the media. Further complicating the situation was another F-4D aircraft crash just two months later on 8 May 1972. This plane from the 81st TFW, RAF Bentwaters, UK went down while flying to the range from Zaragoza AB.³¹ The people no longer looked at a flying incident in isolation but as a continuing occurrence with cumulative negative effects. Actually, all flying incidents were raised to the political level. Thus, the USAFE, 16 AF, and 406th personnel had to continually inform the Spanish population of the purpose for the US mission in their country. As indicated earlier, all operations overseas were impacted by the host political considerations.³²

IMPORTANCE OF BARDENAS

The range at Bardenas was now firmly established as the most important training location within USAFE. Increased restrictions at Maniago Range made that range marginally effective. Meanwhile, Capo Frasca Range had even less value, and the command ultimately ceased operations there on 15 July 1973.³³ USAFE recognized the importance of Zaragoza AB and reflected this by upgrading the 406th TFTG to a tactical fighter training wing on 15 July 1972. While staff officers at 16 AF and HQ USAFE had to continually monitor the situation throughout the Mediterranean, for the time being, all were satisfied with the current progress in Spain.³⁴

Chapter Three

DEVELOPMENT OF BARDENAS 1972 - 1979

NEGOTIATIONS WITH THE SPANISH

In 1972, the US continued its efforts to improve the training on Bardenas. Range time remained the primary issue of concern. Since USAFE believed it was to receive an increase in range time up to 8 hours a day, they developed the range schedule based on this assumption.¹ Yet, the Spanish were not ready to provide the extra time. Then, in August, they consented. Interestingly, this coincided with Project Peace Alpha, in which the US provided loan guarantees to the Spanish government and supplied them with a wing of McDonnell Douglas F-4C Phantom aircraft.² Unfortunately, the US assistance program did not accompany all US range requests.

In March 1973, 16 AF forwarded four proposals to the Spanish in an effort to improve training. Of the four, the Spanish recommended approval of only one request. They agreed with the proposal to redesignate the bombing range as a restricted zone to keep civilian air traffic out. Yet, they nonconcurred with the remaining proposals which all included increasing the number of training flights over the region. The primary reason for refusal was the numerous flights already being conducted in Spanish airspace.³ Despite the disapproval, USAFE forces continued trying to maximize the training value on Bardenas.

The excellent working relationship existing between the 406th and Spanish range personnel facilitated this. In general, the US worked hard to improve the conditions of the range facilities as well as the range targets. Also, during this period, the 406th secured funding for the new Spanish barracks and a perimeter road around the range.⁴ Both these projects were extremely visible to the Spanish military and local civilian populace. Completing them not only improved the work environment, but it also enhanced the prospects for future initiatives.

The completion of the Spanish barracks was a major success story. Not only was it professionally built but the dedication ceremonies were conducted with style. This tremendously impressed the attending Spanish generals and again boosted relations between the two air forces.⁵ As this project was

completed, another situation developed which diverted everyone's attention.

The political scene in Spain was stable at this time but was on everyone's mind. In spite of poor health and his old age, Generalissimo Francisco Franco remained in control of the Spanish government. El Caudillo, as he was known to all, was not prepared to turn over the government he had led since 1939, although he had stated in 1969 he would return Spain to its previous monarchy under the reign of Prince Juan Carlos.⁶ In July-1974, this did occur for a short period when Franco suffered from a serious case of phlebitis. Yet, he made a complete recovery to resume control.⁷ After decades of dictatorship, there was concern of how the Spanish people would handle this transition.

Throughout 1974, there were articles in Spanish newspapers regarding the "mounting political and social pressures...for the Spanish government of Generalissimo Francisco Franco to liberalize and democratize its policies".⁸ In conjunction with the uncertainty of the transfer of power, the Spanish were questioning the continued presence of the US bases in their country. These occurrences placed USAFE operations in the country into an uncertain position.

To further complicate the evolving political situation, another F-4D Phantom crashed on 16 January 1975 near the town of Carinena. With the US-Spanish negotiations upcoming, several Spanish newspapers took the opportunity to voice their concerns, calling the American planes a "grave danger."⁹ Others stated that Spain was placing itself in danger by associating itself with the US and NATO but not getting any of the benefits of being an actual member of the alliance.¹⁰ Perhaps, the most important area of dissent against the US presence in Spain at this time came from Madrid and not from Zaragoza. While the politicians and people in the capital were carrying on this anti-American rhetoric, the relationships of US personnel and the Spanish people around Bardenas remained very good.¹¹ Thus, this was the setting as the US and Spain prepared to renegotiate their bilateral agreement.¹²

The military agreements between the US and Spain dated back to 1953 when the two countries signed a series of three agreements, providing military and economic assistance, mutual defense, and an air defense system. For this last item, the US received basing rights in the country. After the initial time of the agreements expired in 1968, the two countries conducted extensive negotiations to continue this relationship. Finally, their efforts culminated in the Agreement of Friendship and Cooperation which was signed and put into effect on 26 September 1970. This agreement was good for five years with the option to

extend for another five if both sides agreed.¹³

Now, after more than a year of negotiating, the US and Spain signed the Treaty of Friendship and Cooperation on 24 January 1976. The treaty, negotiated and signed by Secretary of State Henry Kissinger, allowed the US to maintain access to its bases in Spain in return for military assistance. This came in the form of loan credits in which the Spanish could purchase weapons and aircraft.¹⁴ This new treaty came at a time of turmoil for Spain, coinciding with the death of Generalissimo Franco.

King Juan Carlos now had the task to lead Spain through turbulent times, as the country tried to adjust to the death of Franco. Looking towards closer integration with the US, Europe, NATO, and even democracy, Juan Carlos received overwhelming support on the foreign and domestic fronts.¹⁵ Thus, the bilateral treaty benefited Spain by providing it with the support of the free world's strongest democracy and lending credence to their movement. On the US side, it guaranteed access to the important Spanish bases for another five years.¹⁶

FLYING OPERATIONS

Range Usage

There were numerous regulations the Air Force had to comply with to operate an air-to-ground range. To ensure they were conducting the range operations in accordance with the applicable directives, USAFE staffed the range with a USAF Fighter Weapons School Graduate. This officer is a highly trained aircrew member whose specialty is weapons employment. He functioned as Officer In Charge of Bardenas and was responsible for the layout, coordination with the Spanish personnel, and the overall operation of the range. Further, to ensure US safety standards were met, USAFE manned the control tower at the range with a Range Control Officer who was proficient in weapons delivery and knowledgeable on range operations. These individuals were key to managing a program growing as fast as Bardenas. By 1973, Bardenas supported more than half of the command's weapons training events.¹⁷

After the Spanish harvest the first two weeks of July 1973, Zaragoza AB started flying operations again on the 16th. With the arrival of the third F-4 unit on 25 July, there were now 36 fighter aircraft operating at the WTS.¹⁸ Although this was the largest number of aircraft to operate at one time from Zaragoza AB, the total aircraft on the base dropped off later in the year. In fact, Fiscal Year 1974 (1 July 1973 - 30 June 1974) saw the first decrease in usage of Bardenas since USAFE started using the

range in 1970. This was primarily due to a cutback in TDY funds, the money used to pay the costs of the aircrews and support personnel deploying to the Southern Region. Despite the decline in total sorties, Bardenas maintained its importance, as it supported an increase in range training events (Fig 5). Primarily, this was due to the good flying weather and quality training on the range.¹⁹

<u>Period</u>	<u>Total Range Sorties</u>	<u>Bardenas Sorties</u>	<u>Percent</u>
Jan-Jun 74	5,028	2,739	54.4
Jul-Dec 74	<u>5,512</u>	<u>2,452</u>	<u>44.5</u>
Total 1974	10,540	5,191	49.3

<u>Period</u>	<u>Total Range Events</u>	<u>Bardenas Events</u>	<u>Percent</u>
Jan-Jun 74	15,708	10,010	63.8
Jul-Dec 74	<u>18,314</u>	<u>10,343</u>	<u>56.5</u>
Total 1974	34,022	20,353	59.5

Figure 5. Bardenas Range Usage²⁰

The significant factor of these statistics was the effectiveness of Bardenas. Throughout the year, Bardenas maintained an 80% effective rate of sorties flown.²¹ Considering the number of sorties, this made the range extremely valuable. First, it was the only range that met the requirements for all weapons training events. Second, since USAFE units had almost exclusive control of the range, they were able to accomplish almost four different events per range sortie as compared with less than three events per sortie on the other ranges.²² Finally, the general acceptance of the Spanish to USAFE requests enhanced the capabilities of the range.

Range Improvements

To attain such a high rate, the range personnel maintained the targets in top condition. Yet, utilization and effectiveness rates were often not sufficient to convince higher headquarters of this. So, in March 1974, 16 AF conducted a staff assistance visit to Bardenas to view the operation. Specifically, they wanted to ensure the range was complying with the safety precautions, as several years had passed since the HQ USAF IG inspection discovered their discrepancies. They found the range

in excellent condition. A combined effort of US and Spanish Air Force personnel had the range in total compliance with Air Force regulations. Particularly, they were impressed with the condition of the strafe pits which showed the results of regular attention aimed at reducing the bullet ricochet problem.²³ Undoubtedly, the procedure of alternating strafe targets every other day and thoroughly cleaning the pit of the one not in use was successful.²⁴ Again, this showed the close cooperation of the unit-level personnel on the range and their ability to correct this previous deficiency.

In addition to the daily operations and maintenance, the Bardenas crew kept improving the quality of the targets and the capability of the range. While completing a major project to provide a continuous water supply to the range, the range personnel also built a drain to keep water from pooling around the area of the strafe pits. On the tactical range, they camouflaged certain targets to make them more realistic and then began construction of a simulated aircraft shelter, similar to the ones expected at a Warsaw Pact airbase.²⁵ They carried these improvements into the flying operations as well.

In 1974, the 406th instituted a procedure to have all deployment commanders submit an end of tour report following their training on Bardenas.²⁶ This procedure would allow range users to identify the areas they felt needed most attention. This interaction between the deploying and host units helped improve the quality of training on Bardenas. For example, through the inputs of one of the units, Bardenas started to support the training of units equipped with the Maverick missile, an air-to-ground optically guided missile designated the AGM-65.²⁷

Increased Training

Bardenas had a banner year in 1976, as USAFE units flew over 1000 more sorties on Bardenas than they had in 1975. In fact, 8,416 effective sorties were flown compared with the 1975 total of 7,204.²⁸ This increase was important, since Maniago Range was closed for six months due to an earthquake in northern Italy.²⁹ Also, the quality of the training improved. 1976 saw an expansion into other areas of tactical training at Zaragoza AB, such as the Aggressor program. This meant bringing F-5 aircraft to Zaragoza on a TDY basis to fly simulated enemy sorties against USAFE aircraft flying to Bardenas for their weapons training. To further increase this realistic training, USAFE stationed a ground controlled intercept team at the base to provide the fighters radar warning information of the threat aircraft. This operation greatly enhanced the realism of the training sorties.³⁰

The newly formed USAFE Tactics School at Zaragoza AB took this training one step further. To provide the aircrews the large force, integrated training they required to adequately prepare for combat, the 406th developed Exercise Red Star. This exercise coordinated the tactics the aircrews were learning at the school, the weapons deliveries they were practicing on Bardenas, and the F-5 Aggressor aircraft simulating the enemy air threat. Now, units were able to organize composite force strike packages using large numbers of aircraft and combat tactics.³¹ To make complete use of the large numbers of aircraft, the 406th used a group of four uninhabited islands, called El Bergantine Range, off the Mediterranean Coast of Spain as the targets. Originally, the use of these islands was not politically sensitive and USAFE units were able to drop heavyweight inert ordnance including laser guided bombs. This allowed basic weapons training to proceed unimpeded at Bardenas while a "graduate course" was conducted during this exercise. Training at Zaragoza and Bardenas had hit a high point by the end of the year.

Another significant year at Bardenas was 1977. It marked the first time aircraft other than the F-4 flew on the range from Zaragoza AB. Early in the year, the OV-10 Bronco, an aircraft used for forward air control, began training on the range. However, the most important step came in November when the first F-111 unit deployed to Zaragoza AB to use the range. Now, the command's two F-111 units, stationed at RAF Upper Heyford and RAF Lakenheath, had access to the best range in Europe.

Budget Restrictions

The 1976 training peak was just that. Although Bardenas remained the most essential range in USAFE area of operations, effective sorties in 1977 dropped to 5,697 out of 8,350 scheduled for a 68% rate.³² Weather was the primary factor for the drop but other factors contributed. A declining military budget, some scheduling ineffectiveness, a command-wide exercise, and several range closures due to reasons outside USAFE control kept the totals down. One of the extended range closures was a firepower demonstration for King Juan Carlos by the Spanish Air Force.³³ Although this performance was very successful and was supported by USAF range personnel, it did point out an anomaly. The Spanish, who only used the range one hour per day at the maximum, retained the right to drop live ordnance on the range. On the other hand, USAFE units were not authorized to expend any live munitions. This was another political issue the US had to endure while operating in another country.

The late 1970s were an austere period for the military under the Carter regime. Budgets were cut, and there were minimum funds available for units to deploy to the Southern Region ranges

to practice their weapons training.³⁴ Thus, the downward trend seen in 1977 continued in 1978. Only 8,266 sorties were scheduled throughout the year at Bardenas. Yet, weather benefited the command this year and effective sorties rose to 6,417 from the 5,697 the previous year.³⁵ There was a side benefit to the reduced number of WTDs on station at Zaragoza AB.

The 406th worked hard during this period to provide the very best training to the deployed units. With only one unit on station at times during 1978, the 406th instructors could concentrate their training efforts, whereas they previously did not have the time. What resulted was high quality training making the most of the TDYs to Zaragoza AB.³⁶ While the 406th was accomplishing this, HQ USAFE was trying to offset the funding shortages in other areas. They had reverted to using the local ranges in the UK and on the European continent. By 1978, they had access to 17 weapons ranges.³⁷ In addition to those ranges listed previously, the following were added:

<u>Name/Controlled By</u>	<u>Location</u>	<u>Type Range</u>
Donna Nook/RAF	55 nm N of RAF Lakenheath	Conventional/ Nuclear
Otterburn/British Army	115 nm N of RAF Lakenheath	Conventional
Rosehearty/RAF	200 nm N of RAF Lakenheath	Conventional/ Nuclear
Grafenwoehr/US Army	30 nm NE of Nurenborg, Germ	Conventional/ Tactical

Figure 6. New USAFE Weapons Ranges (1978)³⁸

Range Limitations

While Bardenas remained the most effective range in Europe, it still had its limitations. For instance, the Spanish did not allow any night flying, live ordnance, electronic warfare, or laser training on the range.³⁹ For several years, USAFE requested the Spanish Air Force to relax these restrictions, especially in the area of laser training which was becoming increasingly important to the command.⁴⁰ Several units carried laser target designators, used to precisely guide modified bombs to their targets, on their aircraft and needed a location to

train with these systems. Unfortunately, some Spanish officials misunderstood the system and considered it a "death ray" which was far from the truth.⁴¹ In fact, the Spanish stopped all laser training in country when they restricted its use on El Bergantine Range.⁴²

The 406th was not sitting idly by at this time. They accomplished two more milestones in 1978. First, they used the excess time on Bardenas to support a US Navy deployment from the USS Forrestal operating in the Mediterranean. As stated by their deployment commander, the support and the training were outstanding.⁴³ Also, during this year, the 406th worked with the Spanish Air Force to gain approval for USAFE units to drop inert, concrete-filled, 500 pound bombs.⁴⁴ While this was not approval to drop live ordnance, aircrews now had an increased training capability.

Between 1978 and 1979, bomb scoring on Bardenas became a problem to the aircrews. The scoring was accomplished by triangulating from the main and flank towers on the spot where the bomb hit. These two pieces of information were then plotted on a board and a score was determined. However, there were several drawbacks to this system. First, although the towers were approximately 40 feet high, they were still quite far from some of the targets, making the spotters' view of the bomb impact difficult. Second, there was always a great deal of activity in the range tower while trying to control four aircraft in the bombing pattern. Finally, the spotters and the plotter were junior enlisted personnel of the Spanish Air Force who spoke little or no English. Through a combination of these three factors, the acceptable tolerance of poor range scores was exceeded.

The fact that there were valid reasons behind the poor scores did not satisfy the aircrews. While they received quality training at Bardenas, USAFE aircrews also needed a certain percentage of their bombs to land within the required distance of the target. For example, on a 30 degree dive bomb event, the required hit distance was 145 feet. To maintain combat readiness, an aircrew had to drop nine bombs in this event of which six must hit within the required distance. Thus, with poor scoring, the aircrews were having a difficult time maintaining their combat readiness status.

While there were no easy answers, several solutions were proposed. First, the Air Force made a Television Ordnance Scoring System, TOSS, available to the 406th for use at Bardenas. This provides TV scoring of weapons deliveries through the use of remote cameras. Yet, it is a complex, delicate system that did not seem suited for use here. Second, the USAF could replace the spotters with Air Force personnel. However, with a reduced

budget this also was not feasible. Finally, the 406th Officer In Charge of Bardenas did work through his USAF interpreter to gain Spanish cooperation to resolve this matter.⁴⁵

A continuing problem in 1979 was the use of the lasers on Bardenas. While they had limited capability on Konya, all USAF personnel agreed they could conduct the best training at Bardenas if it was available. There were several reasons for this:

1. Units could perform realistic deliveries against realistic targets.
2. Crews could train daily with the laser, as opposed to only once or twice during a deployment.
3. Scoring accuracy would be increased (theoretically).
4. Accurate wind and weather would be available to assist in analyzing delivery results.⁴⁶

Agreeing with the 406th logic, 16 AF forwarded the request to the Spanish authorities, offering a briefing and demonstration on the capabilities of the laser system.⁴⁷ These efforts achieved some success in October when the Spanish authorities attended a briefing and ground demonstration of an F-4 loaded with a Pave Spike pod, the laser target designator system. While favorably impressed with the system and US safety precautions, the Spanish failed to respond to USAF's request to use the laser on Bardenas as 1979 ended.⁴⁸

IMPORTANCE OF BARDENAS

The effects of a declining defense budget were in-place for three years now and were beginning to have a serious effect. Operational training and flying were at a low point across the Air Force. Even at the lower rates, Bardenas supported the majority of the command's weapons training. Only 6,005 sorties were accomplished during the year. Yet, this is significant when compared with the other Southern Region ranges (Konya - 1,930 and Maniago - 336).⁴⁹

As the decade came to a close, Bardenas contributed to US-Spanish relations in a different manner. The Air Force had established a helicopter unit at Zaragoza AB to support range operations and provide a search and rescue capability in case of an aircraft accident. Yet, on 12 July 1979, the unit responded not to an aircraft emergency but to a terrible fire at the Hotel Corona de Aragon in downtown Zaragoza. The crews of two US helicopters saved four people from the upper floors and roof of the hotel in a dramatic rescue.⁵⁰

Chapter Four

BARDENAS MOVES INTO THE EIGHTIES

NEGOTIATIONS WITH THE SPANISH

With the arrival of 1980, the US was concerned over signing another agreement with the Spanish, extending the one from 1976, or losing the basing rights in country altogether. While experiencing internal problems with terrorism and factionalism, the Spanish government remained firm in their goal to integrate with NATO and maintain their relationship with the US.¹ However, a strong Socialist faction was against integration into NATO and wanted the US out of the country. Yet, as the year progressed, the Spanish became less anxious to begin a new round of negotiations, appearing to wait for the results of the upcoming US Presidential elections.²

At this time, relations between the US and the Spanish continued up and down. A negative factor was the inevitable US aircraft accidents which occurred in Spain. In 1980, there were three more crashes of fighters operating out of Zaragoza AB while flying to or from Bardenas.³ While none of the accidents caused any significant damage to Spanish property, the media again became quite vocal. This was especially true when two F-4s went down on successive days in October, within 12 miles of each other. The attacks by the media kept relations tense between the US and the Spanish.⁴

To improve training on Bardenas, 16 AF continued their efforts to remove the host nation restrictions.⁵ Yet, improvements were not going to come easily in the current environment. When the issue of laser training on Bardenas was raised, the Spanish Air Force would not address it until the next Treaty of Friendship and Cooperation was signed.⁶ Unfortunately, another year passed before the Spanish even considered the issue.

The most important issue impacting the range during 1981 was the upcoming negotiations between the US and Spanish governments. The Spanish Air Force was using this to delay any requests for improvements the USAFE personnel raised. So, the range remained in status quo for the year as it had in the previous year. While the US contingent was prepared to start negotiations in January,

the Spanish were not ready to commence until April.⁷

When the negotiations finally began, the US stated that stationing its forces in Spain was necessary to its worldwide defense commitments; however, "both Spain and the United States benefit from this improved Western defense posture."⁸ The chief US negotiator explained the two countries successfully demonstrated this during the numerous joint exercises they conducted. Further, as a key negotiating point, the US exclaimed their support of Spain should it officially seek entrance into NATO. Yet, in spite of the government's stated desire to do so, there were factions in Spain delaying their entry and disrupting the negotiations.⁹

After a year of resolving their differences, the two countries signed the Agreement on Friendship, Defense, and Cooperation Between the United States of America and the Kingdom of Spain on 2 July 1982.¹⁰ Again, it seemed that the US had to guarantee a significant security assistance package to gain the favorable approval of the Spanish. Although this guarantee came in the form of a diplomatic letter apart from the agreement, the timing indicates it was directly linked to the final approval.¹¹ However, Spain had joined NATO this same year demonstrating their commitment to the western alliance.¹²

In spite of their agreement, the relationship between the US and Spain deteriorated during 1983. Throughout Spain and Europe, anti-American protests were occurring. Primarily, the object of the protests was the US decision to deploy intermediate nuclear weapons to Europe. Spain, although now a member of NATO, had a vocal section totally against this, even though these missiles were not coming to their country. Another anti-American sentiment erupted in Spain at this time. US involvement in Nicaragua had increased, and the Spanish tended to side with the Sandinistas, at least in part because Nicaragua was a former colony.¹³

For the first time, 1983 brought direct protests of the Spanish people to close Zaragoza AB. There were speeches, protest marches, and a great deal of coverage in the local media, as well as two terrorist attacks against the forces associated with Bardenas.¹⁴ The first came in April as a US vehicle, used to transport range personnel from the local village to the range, was firebombed while in the village of Tudela. Then, in December, a bomb went off in the Spanish barracks on the range. While both produced only minor damage, they did signify an increase in the violence associated with the protests of the US presence.

In 1983, the Socialist government of Felipe Gonzalez intended to make good on the campaign promise to put Spain's continued

membership in NATO up to a popular vote.¹⁵ This was interpreted by many to be a vote to remove the US forces from Spain. So, the climate in Spain continued to shift from one of support to one of uncertainty. While not linked directly to the national political scene, these events all affected the negotiation of the new Bardenas MOU. Again, there were differences between the two air forces, but at this level it seemed the Spanish were only looking for the US to increase their share of the range costs.¹⁶

The MOU was finally signed in 1985 after it was opened for negotiation in October 1983. While no significant changes were made to improve the US training on the range, neither was the US to provide additional compensation to the Spanish which was their original intent.¹⁷ All things considered, by 1985 everyone was happy with the current agreements regarding Bardenas.

FLYING OPERATIONS

Effectiveness of Bardenas

As alluded to earlier, US military budgets declined through the late 1970s. Yet, in 1980 the budget took a turn upward. New funding enabled units to deploy to WTSs more frequently again. Flying on Bardenas increased significantly. Bardenas was the most valuable training asset the command had in 1980, as units flew 8,003 sorties. This is truly important, since Konya only supported 1,623 sorties and Maniago, almost out of the WTS business due to political pressure and poor weather, contributed 382.¹⁸ In addition to impressive sortie rates, the quality of the training at Bardenas reached new heights.

After attaining their annual weapons training requirements, aircrews were now planning and flying full combat profile missions on Bardenas. "A Bardenas Attack scenario mission provided 50th TFW aircrews with realistic training in conventional weapons employment against a comprehensive cross section of tactical targets in a combat setting."¹⁹ Another unit, from the 52nd TFW, developed Simulated Wartime Attack Tactics for their enhanced training at Bardenas. These scenarios included formation attacks, using tactical weapons deliveries against the targets on Bardenas. The missions were integrated with "enemy" F-5 aircraft, F-4G electronic warfare support aircraft, and search and rescue assets.²⁰ This is the type of quality training Bardenas was now providing. Funding was an important part of this, as units needed the money to have sufficient sorties to train to this level.

Range Improvements

Sorties were not the only area suffering due to a lack of funds in the late 1970s. Since 1974, very little had been done to repair or replace the targets on the range. The wear and tear of dropping thousands of bombs on these targets were now starting to show. Both the Spanish and US range personnel made a commitment to improve the targets. Economically, one of the ways they were able to extend the life of these targets was to continually build new low-cost targets. This spread out the aircrew usage. In 1981, when funding became available, Bardenas personnel added two more significant targets to the tactics range. These were an industrial complex and a simulated command and control center distinguished by its 20 foot high vertical development.²¹ Also, a year long battle ended when the Spanish authorized the use of an electronic warfare threat emitter on the range.

In October, the Spanish finally consented to allow the F-4G Wild Weasel unit from the 52nd TFW to place a radar emitter on the range.²² This emitter provided valuable training to the unit whose mission was the suppression of enemy air defenses. This included finding enemy radars, often associated with surface-to-air missile systems, and destroying them with antiradiation missiles. Unfortunately, this threat emitter could only be located using the sophisticated equipment onboard the F-4G aircraft and was of no use to other units. Yet, it did provide a training capability to this unique unit of Wild Weasels.

By 1982, President Reagan's defense budget had significantly helped the military. This was seen on Bardenas, as money was now available to replace and repair the targets that were on the range since 1974. In fact, the budget was large enough to allow expansion and improvements where the Spanish would authorize them. In April, the 406th developed a Range Improvement Plan (RIP) that would improve the range scoring systems, targets, communications, support equipment, and overall quality of the training.²³

With the increased budget and a new agreement with the Spanish, 16 AF personnel hoped to increase their capability of Bardenas. Yet, as normally happens in the international environment, requests proceeded slower than expected. This was the case in 1982 as most requests sat idle through the remainder of the year.²⁴ Yet, the 406th obtained approval and installed a new target on the range. This target provided aircrews the capability to attack the range from a reciprocal heading. Also, it removed a visibility problem the aircrews experienced when approaching the range toward the early morning sun.²⁵

Continuing to upgrade the range wherever they could, the range personnel became aware of excess M-47 tanks from the French military for only the cost of transportation. Going directly to HQ USAFE for approval, they had the tanks on the range within three months. Then, using funds from the RIP, they also performed badly needed maintenance and repairs on other targets throughout the range.²⁶ Yet, they were not willing to just spend money in the area that needed it the most--range scoring.

Under the Air Force's RIP, another TOSS system came available. Since Bardenas had a chronic problem with poor bomb scoring, this system was earmarked for the range. Yet, when 406th personnel looked into this system in detail, they determined it was not suited for Bardenas. The problem was, "system lacked flexibility, had power supply problems, would increase personnel manning, had low reliability, and was not cost effective when compared to the scoring accuracy it provided."²⁷ Even in a time of increased funding, they made decisions based on what was right and not what was available.

In 1984, the 406th personnel made good decisions on equipment acquisitions and continued to upgrade Bardenas to meet the needs of USAFE's changing fighter force. With the TOSS system cancelled, the 406th ordered a computer system that could be used to increase the scoring accuracy on the range. This system based on a small computer program would enhance the scoring capability at a fraction of the cost of the TOSS system.²⁸ Meanwhile, the range personnel were preparing for the first deployment of A-10 aircraft to Bardenas. This aircraft, equipped with a 30 millimeter gun, had special target requirements due to the size and velocity of the projectile it fired. So, the 406th developed new tactical strafe targets for the A-10 to shoot at from long range.²⁹ This, along with other additions to the range, was approved by the Spanish Air Force in a new spirit of cooperation.

The Spanish demonstrated this spirit when they forwarded the 406th laser request to their higher headquarters. This was the first positive indication the US had received on the issue. Previously, all requests were met with disfavor or tabled. In 1985, they finally received approval from the Spanish to use lasers on Bardenas. Although this was not blanket approval, the clearance to run a laser test during the period of 27 September to 29 November was definitely a breakthrough in this sensitive area.³⁰ Range personnel began preparation for this deployment immediately, since targets had to be built with significant vertical development and proper infrared signature to be picked up by the onboard aircraft sensors. While the initial users of the targets felt they were lacking in both these areas, the 406th used aircrew recommendations to make quick improvements to the targets.³¹

The most important range improvement to Bardenas arrived in 1985. Bomb scoring was the oldest problem area on the range, but the arrival of the new small computer gave range personnel the capability to score more targets, provide the scores more rapidly to the aircrews, and reduce scoring difficulties.³² While it did not eliminate all the range scoring problems, the installation of the new computer scoring system was a significant development at Bardenas.

Range Usage

The 1981 usage of Bardenas was down for the first time in three years. While the command only flew 6,397 sorties on Bardenas, the extra sorties were picked up at Konya where 3,009 were conducted, almost a 50% increase. The 454 sorties on Maniago indicate the minimal impact this range continued to have on USAFE weapons training.³³ The probability of this switch to Konya was due to the availability of laser training. While the Bardenas totals were down, the overall training on Southern Region ranges remained fairly constant.

By 1982, the command took a major step towards modernizing its aircraft. The first F-16 unit in Europe from the 50th TFW, Hahn AB deployed to Zaragoza AB to conduct initial weapons training in February. The training on Bardenas was highly regarded except for the ongoing saga of the poor bomb scoring.³⁴ While the Air Force was able to modernize its fleet of aircraft, it was having difficulty procuring equipment to properly score the bombs on Bardenas.

In conjunction with the modern fighter force and increased budgets, USAFE units flew 7,613 sorties on Bardenas during 1982 for a 79% effectiveness rate. This rate remained consistent over the first decade of flying on Bardenas. The total represented an increase over 1981 and was accomplished in spite of the range closure of an entire month for the summer harvest. Konya totals for the year fell back to 1,872 reflecting the difficulties the command experienced when scheduling range time with the Turkish Air Force.³⁵

USAFE units continued to enjoy the finest conventional and tactical range in Europe. Effective Bardenas sorties reached 7,358 for 1983. This was in comparison to the 1,564 sorties on Konya and 640 sorties on Maniago.³⁶ The continued high number of effective sorties on a quality range was the reason everyone recognized the value of Bardenas and why they felt operations there must continue in spite of the ongoing protests.

During these protests, talks, campaign promises, and negotiations, Bardenas remained a crucial asset to the USAFE fighter units. In 1984, units flew 7,753 effective sorties on

Bardenas.³⁷ This high usage allowed the units to complete their basic weapons training requirements and progress to increased levels of readiness.³⁸ One factor directly contributing to the large number of sorties was the 58 aircraft operating out of Zaragoza AB in mid May. In fact, this was the most USAFE tactical fighters to ever operate out of Zaragoza AB at one time. It also was the authorized limit set by 1982 agreement.³⁹ While this was not a normal amount of fighters, it demonstrated the base's capability to handle increased aircraft for short periods.

While only 7,256 effective sorties were flown on the range in 1985, this was not due to a decline in the importance of the range. Rather, weather caused 455 noneffective sorties.⁴⁰ The total sorties flown to the range for the year still exceeded 8,000.

IMPORTANCE OF BARDENAS

Steady progress was the key term for Bardenas during the 1980s. Personnel at all levels worked to make the range the most useful bombing facility in Europe. For example, the months of preparation for the first A-10 deployment from RAF Bentwaters UK culminated in a successful TDY in January 1985.⁴¹ This truly was a big effort to provide quality training for this unique aircraft with its distinctively powerful gun. Yet, providing quality training and support to unique units had become standard for the 406th personnel.

Force modernization had brought new aircraft, with special requirements, to Europe in the 1980s. In the 1970s, the tactical fighter force was dominated by the F-4 aircraft. In fact, for several years, this aircraft was assigned to every fighter unit in USAFE. Now, there were four different types of fighters with an air-to-ground mission requiring training time on Bardenas. These included the F-4, F-16, F-111, and A-10. Thus, the challenge for the 406th was to ensure Bardenas provided the training capability for each.

The unit supported these unique requirements while also continuing to provide weapons training on a daily basis. This ability was definitely apparent in the last three months of 1985 when five separate wings were represented at Zaragoza AB by a total of 14 different squadrons.⁴² This demonstrated the value the command placed on the range and indicated the quality of training now being provided.

Chapter Five

CONCLUSION

Bardenas was developed in 1970 to fill a critical void in USAFE weapons training. From a plowed out circle on the ground, USAFE personnel built the finest conventional and tactical range in Europe. Figure 7 depicts a layout of the range targets. This is a range that supports all conventional weapons delivery events performed by US aircrews. Also, the tactical range offers realistic training to include attacks by multi-aircraft formations using their combat delivery profiles. With the new computer scoring system, range personnel provide the feedback necessary to proper training. However, the most significant development was the flexibility and responsiveness of the Bardenas personnel to support the new and unique training requirements of USAFE's new aircraft and weapons.

This is by no means an unqualified statement of support for the range. This study began with an examination of how the range developed and if it was sufficient to meet the training requirements of the Air Force's largest overseas command. Its primary detractor is its location in a foreign country with the necessity to gain host nation approval for all training actions. Added to this is its small size when compared to the vast gunnery ranges existing in the US. These are the two primary factors that arise when discussing the limitations of the range. These limitations are: no live ordnance, no night training, a lack of electronic warfare emitters, and restrictions based on the small size of the range. Yet, after an examination of the range, it provides a vital function with the benefits far outweighing the limitations.

The range is vitally important to USAFE weapons training. The entire training program revolves around using Bardenas, and, although not apparent, the quality training attained on the range increases its value. While political considerations and host nation restrictions will always impact range operations, USAFE units will continue to obtain excellent training on Bardenas.

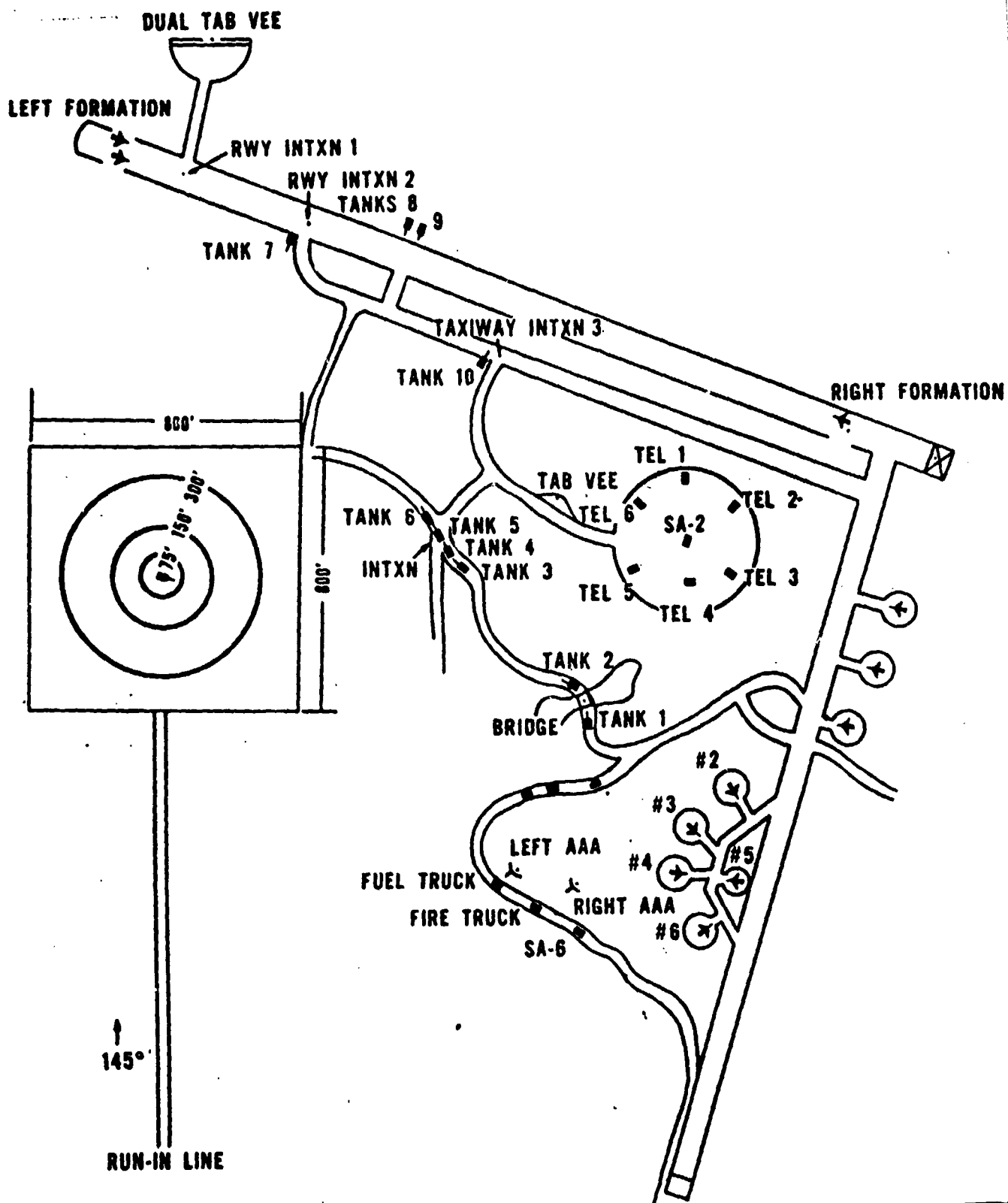


Figure 7. Bardenas Range Targets¹

FOOTNOTES

Chapter One

¹United States Air Forces in Europe, History of United States Air Forces in Europe, 1 January 1982 - 31 December 1982, (Ramstein AB, Germany: not dated), 250.

²Clifford C. Clark, "The Need For A New Weapons Training Center In The European Theater," unpublished material, (Maxwell AFB, Alabama: May 1972), 12.

³R. Bruce Harley, The Historical Monograph on USAFE Training Ranges Acquisition and Development 1945 - 1975, (Ramstein AB, Germany: 21 December 1976), 54.

⁴Clark, "Need For a New Weapons Training Center," 12.

⁵Felicily Hallanan, "Wheelus Ends 26 Year Operation," Air Force Times, 17 June 1970, 15.

⁶Joel T. Hall, "Tactical Aircrew Weapons Training In The European Environment," unpublished material (Maxwell AFB, Alabama: May 1973), 1.

⁷R. Bruce Harley, The Historical Monograph of USAFE Operations in the Mediteranean 1945 - 1975, (Ramstein AB, Germany: 21 December 1976), 87.

⁸Harley, Monograph on USAFE Ranges, 46, 48.

⁹Ibid., 51.

¹⁰Sixteenth Air Force, History of Sixteenth Air Force, 1 July 1969 - 30 June 1970, (Torrejon AB, SP: not dated), 226.

¹¹Ibid., 228.

¹²Clark, "Need For a New Weapons Training Center," 2.

¹³Harley, Monograph on USAFE Ranges, 118.

¹⁴Clark, "Need For a New Weapons Training Center," 1.

¹⁵History of Sixteenth Air Force, 141.

¹⁶Ibid., 142.

CONTINUED

¹⁷Ibid., 144.

¹⁸Clark, "Need For a New Weapons Training Center," 13.

¹⁹Harley, Monograph on USAFE Ranges, 58.

²⁰406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 July 1972 - 31 December 1972, (Zaragoza AB, Spain: not dated), 17.

²¹History of Sixteenth Air Force, 230.

Chapter Two

¹406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 July 1972 - 31 December 1972, (Zaragoza AB, Spain: not dated), 20.

²Sixteenth Air Force, History of Sixteenth Air Force, 1 July 1971 - 30 June 1972, (Torrejon AB, Spain: not dated), 134.

³History of 406th, 20.

⁴Sixteenth Air Force, History of Sixteenth Air Force, 1 July 1969 - 30 June 1970, (Torrejon AB, Spain: not dated), 149.

⁵Ibid., 150.

⁶Sixteenth Air Force, History of Sixteenth Air Force, 1 July 1970 - 30 June 1971, (Torrejon AB, Spain: not dated), 109.

⁷Ibid., 107.

⁸R. Bruce Harley, The Historical Monograph on USAFE Training Ranges Acquisition and Development 1945 - 1975, (Ramstein AB, Germany: 21 December 1976), 60.

⁹History of Sixteenth Air Force, 1 July 1970 - 30 June 1971, 109.

CONTINUED

¹⁰Harley, Monograph on USAFE Ranges, 60.

¹¹Ibid.

¹²History of Sixteenth Air Force, 1 July 1970 - 30 June 1971, 110.

¹³Harley, Monograph on USAFE Ranges, 61.

¹⁴History of Sixteenth Air Force, 1 July 1971 - 30 June 1980, 131.

¹⁵Ibid., 135.

¹⁶Harley, Monograph on USAFE Ranges, 29.

¹⁷History of Sixteenth Air Force, 1 July 1969 - 30 June 1970, 229.

¹⁸Ibid, 231.

¹⁹Harley, Monograph on USAFE Ranges, 60.

²⁰History of Sixteenth Air Force, 1 July 1970 - 30 June 1971, 102.

²¹Ibid., 106.

²²Ibid., 106.

²³Ibid., 105.

²⁴United States Air Forces in Europe Regulation 55-45, USAFE Range Procedures, (Ramstein AB, Germany: 19 May 1986), 18, 25, 37, 56.

²⁵History of Sixteenth Air Force, 1 July 1971 - 30 June 1980, 135.

²⁶Ibid., 134.

²⁷Ibid., 136.

²⁸Ibid., 138.

CONTINUED

²⁹Ibid., 138.

³⁰Harley, Monograph on USAFE Ranges, 63.

³¹History of Sixteenth Air Force, 1 July 1971 - 30 June 1972, 139.

³²Bruce Farley, The Historical Monograph of USAFE Operations in the Mediteranean 1945 - 1975, (Ramstein AB, Germany: 21 December 1976), 87.

³³Sixteenth Air Force, History of Sixteenth Air Force, 1 July 1973 - 30 June 1974, (Torrejon AB, Spain: not dated), 134.

³⁴History of Sixteenth Air Force, 1 July 1971 - 30 June 1972, 154.

Chapter Three

¹Sixteenth Air Force, History of Sixteenth Air Force, 1 July 1972 - 30 June 1973, (Torrejon AB, Spain: not dated), 120.

²Ibid., 121.

³Ibid., 123.

⁴Sixteenth Air Force, History of Sixteenth Air Force, 1 July 1973 - 30 June 1974, (Torrejon AB, Spain: not dated), 56.

⁵406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 October 1973 - 31 December 1973, (Zaragoza AB, Spain: not dated), 15.

⁶United States Air Forces in Europe, History of United States Air Forces in Europe, 1 July 1974 - 30 June 1975, (Ramstein AB, Germany: not dated), 25.

⁷Sixteenth Air Force, History of Sixteenth Air Force, 1 July 1974 - 30 June 1975, (Torrejon AB, Spain: not dated), 55.

⁸406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 January 1975 - 31 March 1975,

CONTINUED

(Zaragoza AB, Spain: not dated), 38.

⁹Ibid., 39.

¹⁰Ibid., 39.

¹¹Ibid., 41.

¹²History of Sixteenth Air Force, 1 July 1974 - 30 June 1975, 55.

¹³Ibid., 56.

¹⁴Sixteenth Air Force, History of Sixteenth Air Force, 1 January 1976 - 31 December 1976, (Torrejon AB, Spain: not dated), 11.

¹⁵Ibid., 61.

¹⁶Ibid., 64.

¹⁷History of Sixteenth Air Force, 1 July 1972 - 30 June 1973, 119.

¹⁸406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 July 1973 - 30 September 1973, (Zaragoza AB, Spain: not dated), 6.

¹⁹United States Air Forces in Europe, History of United States Air Forces in Europe, 1 July 1973 - 30 June 1974, (Ramstein AB, Germany: not dated), 133.

²⁰History of United States Air Forces in Europe, 1 July 1974 - 30 June 1975, 129.

²¹History of Sixteenth Air Force, 1 July 1974 - 30 June 1975, 117.

²²History of United States Air Forces in Europe, 1 July 1974 - 30 June 1975, 219.

²³History of Sixteenth Air Force, 1 July 1973 - 30 June 1974, 55.

²⁴History of 406th Tactical Fighter Training

CONTINUED

Wing, 1 July 1973 - 30 September 1973, 17.

²⁵History of 406th Tactical Fighter Training Wing, 1 October 1973 - 31 December 1973, 17.

²⁶History of 406th Tactical Fighter Training Wing, 1 July 1973 - 30 September 1973, 12.

²⁷406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 July 1974 - 30 September 1974, (Zaragoza AB, Spain: not dated), 12.

²⁸History of Sixteenth Air Force, 1 January 1976 - 31 December 1976, 131.

²⁹Ibid., 143.

³⁰Ibid., 130.

³¹United States Air Forces in Europe, History of United States Air Forces in Europe, 1 January 1976 - 31 December 1976, (Ramstein AB, Germany: not dated), 174.

³²Sixteenth Air Force, History of Sixteenth Air Force, 1 January 1977 - 31 December 1977, (Torrejon AB, Spain: not dated), 81.

³³Ronald O. Barker, "Quarterly Historical Report," unofficial document, (Zaragoza AB, Spain: 8 July 1977).

³⁴406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 April 1978 - 30 June 1978, (Zaragoza AB, Spain: not dated), 4.

³⁵Sixteenth Air Force, History of Sixteenth Air Force, 1 January 1978 - 31 December 1978, (Torrejon AB, Spain: not dated), 94.

³⁶406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 January 1978 - 31 March 1978, (Zaragoza AB, Spain: not dated), 7.

³⁷United States Air Forces in Europe, History of United States Air Forces in Europe, 1 January 1978 - 31 December 1978, (Ramstein AB, Germany: not dated), 232.

CONTINUED

³⁸Ibid.

³⁹Ibid., 231.

⁴⁰Ibid., 251.

⁴¹Ibid., 250.

⁴²Ibid., 246.

⁴³History of 406th Tactical Fighter Training Wing, 1 April 1978 - 30 June 1978, 5.

⁴⁴406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 July 1979 - 30 September 1979, (Zaragoza AB, Spain: not dated), 11.

⁴⁵Sixteenth Air Force, History of Sixteenth Air Force, 1 January 1980 - 31 December 1980, (Torrejon AB, Spain: not dated), 17.

⁴⁶406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 January 1979 - 31 March 1979, (Zaragoza AB, Spain: not dated), 13.

⁴⁷Ibid.

⁴⁸United States Air Forces in Europe, History of United States Air Forces in Europe, 1 January 1979 - 31 December 1979, (Ramstein AB, Germany: not dated), 293.

⁴⁹Sixteenth Air Force, History of Sixteenth Air Force, 1 January 1979 - 31 December 1979, (Torrejon AB, Spain: not dated), 104.

⁵⁰History of United States Air Forces in Europe, 1 January 1979 - 31 December 1979, 247.

Chapter Four

¹Sixteenth Air Force, History of Sixteenth Air Force, 1 January 1980 - 31 December 1980, (Torrejon AB, Spain: not dated), 74.

CONTINUED

²Ibid., 75.

³Ibid., 150.

⁴406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 October 1980 - 31 December 1980, (Zaragoza AB, Spain: not dated), 57.

⁵History of Sixteenth Air Force, 1 January 1980 - 31 December 1980, 134.

⁶History of 406th Tactical Fighter Training Wing, 1 October 1980 - 31 December 1980, 17.

⁷Sixteenth Air Force, History of Sixteenth Air Force, 1 January 1980 - 31 December 1980, (Torrejon AB, Spain: not dated), 77.

⁸Ibid., 78.

⁹Ibid.

¹⁰United States Air Forces in Europe, History of United States Air Forces in Europe, 1 January 1982 - 31 December 1982, (Ramstein AB, Germany: not dated), 102.

¹¹Ibid., 104.

¹²Sixteenth Air Force, History of Sixteenth Air Force, 1 January 1982 - 31 December 1982, (Torrejon AB, Spain: not dated), 108.

¹³Sixteenth Air Force, History of Sixteenth Air Force, 1 January 1983 - 31 December 1983, (Torrejon AB, Spain: not dated), 30.

¹⁴Ibid., 81.

¹⁵Sixteenth Air Force, History of Sixteenth Air Force, 1 January 1984 - 31 December 1984, (Torrejon AB, Spain: not dated), 27.

¹⁶Ibid., 92.

CONTINUED

¹⁷Sixteenth Air Force, History of Sixteenth Air Force, 1 January 1985 - 31 December 1985, (Torrejon AB, Spain: not dated), 71.

¹⁸History of Sixteenth Air Force, 1 January 1980 - 31 December 1980, 134.

¹⁹406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 January 1980 - 31 March 1980, (Zaragoza AB, Spain: not dated), 10.

²⁰406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 July 1980 - 30 September 1980, (Zaragoza AB, Spain: not dated), 15.

²¹406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 January 1981 - 31 March 1981, (Zaragoza AB, Spain: not dated), 15.

²²406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 July 1981 - 30 September 1981, (Zaragoza AB, Spain: not dated), 16.

²³406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 April 1982 - 30 June 1982, (Zaragoza AB, Spain: not dated), 16.

²⁴History of Sixteenth Air Force, 1 January 1982 - 31 December 1982, 108.

²⁵406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 October 1982 - 31 December 1982, (Zaragoza AB, Spain: not dated), 16.

²⁶406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 July 1983 - 31 December 1983, (Zaragoza AB, Spain: not dated), 16.

²⁷Ibid., 15.

²⁸406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 January 1984 - 31 March 1984, (Zaragoza AB, Spain: not dated), 21.

²⁹406th Tactical Fighter Training Wing, History of 406th

CONTINUED

Tactical Fighter Training Wing, 1 October 1984 - 31 December 1984, (Zaragoza AB, Spain: not dated), x.

30406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 April 1985 - 30 June 1985, (Zaragoza AB, Spain: not dated), 16.

31406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 October 1985 - 31 December 1985, (Zaragoza AB, Spain: not dated), 17.

32406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 January 1985 - 31 March 1985, (Zaragoza AB, Spain: not dated), 19.

33History of Sixteenth Air Force, 1 January 1980 - 31 December 1980, 136.

34406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 January 1982 - 31 March 1982, (Zaragoza AB, Spain: not dated), 9.

35History of Sixteenth Air Force, 1 January 1982 - 31 December 1982, 106.

36History of Sixteenth Air Force, 1 January 1983 - 31 December 1983, 78B.

37History of Sixteenth Air Force, 1 January 1984 - 31 December 1984, 108.

38History of 406th Tactical Fighter Training Wing, 1 January 1984 - 31 March 1984, 12.

39406th Tactical Fighter Training Wing, History of 406th Tactical Fighter Training Wing, 1 April 1984 - 30 June 1984, (Zaragoza AB, Spain: not dated), 20.

40History of Sixteenth Air Force, 1 January 1985 - 31 December 1985, 122.

41History of 406th Tactical Fighter Training Wing, 1 January 1985 - 31 March 1985, 11

42History of 406th Tactical Fighter Training Wing.

CONTINUED

1 October 1985 -31 December 1985, 16.

Chapter Five

¹Zaragoza Air Base, Zaragoza Air Base Regulation 55-10,
Aircrew Operational Procedures, (Zaragoza Air Base, Spain:
1 January 1986), 4-2.

BIBLIOGRAPHY

Books

Carr, Raymond, and Juan Pablo Fusi Aizpurua. Spain: Dictatorship to Democracy. London: George Allen & Unwin Ltd, 1979.

Eaton, Samuel D., The Forces of Freedom in Spain, 1974-1979. Stanford University, Stanford, California: Hoover Institution Press, 1981.

Gunther, Richard, Giacomo Sani, and Goldie Shabad. Spain After Franco. Berkeley, California: University of California Press, 1986.

Harley, R. Bruce. The Historical Monograph of USAFE Operations in the Mediterranean 1945-1975. Ramstein Air Base, Germany: Private printing, 21 December 1976. SECRET. Classified by multiple sources. Unclassified information only used from this source.

_____. The Historical Monograph on USAFE Training Ranges Acquisition and Development 1945-1975. Ramstein Air Base, Germany: Private printing, 21 December 1976. SECRET. Classified by multiple sources. Unclassified information only used from this source.

Salisbury, William T., and James D. Theberge, eds. Spain in the 1970s. New York: Praeger Publishers, 1976.

Share, Donald. The Making of Spanish Democracy. New York: Praeger Publishers, 1986.

Articles

Hallanan, Felicily. "Wheelus Ends 26 Year Operation," Air Force Times. 17 June 1970.

Official Documents

406th Tactical Fighter Training Wing. History of 406th Tactical Fighter Training Wing, 1 July 1972 - 31 December 1972. Vol. I, Narrative. Zaragoza Air Base: (not dated). SECRET. Classified by multiple sources. Unclassified

CONTINUED

information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical Fighter Training Wing, 1 January 1973 - 31 March 1973.
Vol. I, Narrative. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical Fighter Training Wing, 1 July 1973 - 30 September 1973.
Vol. I, Narrative. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical Fighter Training Wing, 1 October 1973 - 31 December 1973.
Vol. I, Narrative. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical Fighter Training Wing, 1 July 1974 - 30 September 1974.
Vol. I, Narrative. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical Fighter Training Wing, 1 January 1975 - 31 March 1975.
Vol. I, Narrative. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical Fighter Training Wing, 1 October 1977 - 31 December 1977.
Vol. I, Narrative. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical Fighter Training Wing, 1 January 1978 - 31 March 1978.
Vol. I, Narrative. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical

CONTINUED

Fighter Training Wing. 1 April 1978 - 30 June 1978.
Vol. I, Narrative. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified
information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical
Fighter Training Wing. 1 January 1979 - 31 March 1979.
Vol. I, Narrative. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified
information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical
Fighter Training Wing. 1 July 1979 - 30 September 1979.
Vol. I, Narrative. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified
information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical
Fighter Training Wing. 1 January 1980 - 31 March 1980.
Vol. I, Narrative. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified
information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical
Fighter Training Wing. 1 July 1980 - 30 September 1980.
Vol. I, Narrative. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified
information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical
Fighter Training Wing. 1 October 1980 - 31 December 1980.
Vol. I, Narrative. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified
information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical
Fighter Training Wing. 1 January 1981 - 31 March 1981.
Vol. I, Narrative. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified
information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical
Fighter Train g Wing. 1 July 1981 - 30 September 1981.
Vol. I, Narra e. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified

CONTINUED

information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical Fighter Training Wing. 1 January 1982 - 31 March 1982.

Vol. I, Narrative. Zaragoza Air Base: (not dated).

SECRET. Classified by multiple sources. Unclassified information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical Fighter Training Wing. 1 April 1982 - 30 June 1982.

Vol. I, Narrative. Zaragoza Air Base: (not dated).

SECRET. Classified by multiple sources. Unclassified information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical Fighter Training Wing. 1 October 1982 - 31 December 1982.

Vol. I, Narrative. Zaragoza Air Base: (not dated).

SECRET. Classified by multiple sources. Unclassified information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical Fighter Training Wing. 1 July 1983 - 31 December 1983.

Vol. I, Narrative. Zaragoza Air Base: (not dated).

SECRET. Classified by multiple sources. Unclassified information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical Fighter Training Wing. 1 January 1984 - 31 March 1984.

Vol. I, Narrative. Zaragoza Air Base: (not dated).

SECRET. Classified by multiple sources. Unclassified information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical Fighter Training Wing. 1 April 1984 - 30 June 1984.

Vol. I, Narrative. Zaragoza Air Base: (not dated).

SECRET. Classified by multiple sources. Unclassified information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical Fighter Training Wing. 1 July 1984 - 30 September 1984.

Vol. I, Narrative. Zaragoza Air Base: (not dated).

SECRET. Classified by multiple sources. Unclassified information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical

CONTINUED

Fighter Training Wing. 1 October 1984 - 31 December 1984.
Vol. I, Narrative. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified
information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical
Fighter Training Wing. 1 January 1985 - 31 March 1985.
Vol. I, Narrative. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified
information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical
Fighter Training Wing. 1 April 1985 - 30 June 1985.
Vol. I, Narrative. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified
information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical
Fighter Training Wing. 1 July 1985 - 30 September 1985.
Vol. I, Narrative. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified
information only used from this source.

406th Tactical Fighter Training Wing. History of 406th Tactical
Fighter Training Wing. 1 October 1985 - 31 December 1985.
Vol. I, Narrative. Zaragoza Air Base: (not dated).
SECRET. Classified by multiple sources. Unclassified
information only used from this source.

Sixteenth Air Force. History of Sixteenth Air Force.
1 July 1969 - 30 June 1970. Vol. I, Narrative.
Torrejon Air Base, Spain: (not dated). SECRET. Classified
by multiple sources. Unclassified information only used
from this source.

Sixteenth Air Force. History of Sixteenth Air Force.
1 July 1970 - 30 June 1971. Vol. I, Narrative.
Torrejon Air Base, Spain: (not dated). SECRET. Classified
by multiple sources. Unclassified information only used
from this source.

Sixteenth Air Force. History of Sixteenth Air Force.
1 July 1971 - 30 June 1972. Vol. I, Narrative.
Torrejon Air Base, Spain: (not dated). SECRET. Classified
by multiple sources. Unclassified information only used

CONTINUED

from this source.

Sixteenth Air Force. History of Sixteenth Air Force.

1 July 1972 - 30 June 1973. Vol. I, Narrative.

Torrejon Air Base, Spain: (not dated). SECRET. Classified by multiple sources. Unclassified information only used from this source.

Sixteenth Air Force. History of Sixteenth Air Force.

1 July 1973 - 30 June 1974. Vol. I, Narrative.

Torrejon Air Base, Spain: (not dated). SECRET. Classified by multiple sources. Unclassified information only used from this source.

Sixteenth Air Force. History of Sixteenth Air Force.

1 July 1974 - 30 June 1975. Vol. I, Narrative.

Torrejon Air Base, Spain: (not dated). SECRET. Classified by multiple sources. Unclassified information only used from this source.

Sixteenth Air Force. History of Sixteenth Air Force.

1 January 1976 - 31 December 1976. Vol. I, Narrative.

Torrejon Air Base, Spain: (not dated). SECRET. Classified by multiple sources. Unclassified information only used from this source.

Sixteenth Air Force. History of Sixteenth Air Force.

1 January 1977 - 31 December 1977. Vol. I, Narrative.

Torrejon Air Base, Spain: (not dated). SECRET. Classified by multiple sources. Unclassified information only used from this source.

Sixteenth Air Force. History of Sixteenth Air Force.

1 January 1978 - 31 December 1978. Vol. I, Narrative.

Torrejon Air Base, Spain: (not dated). SECRET. Classified by multiple sources. Unclassified information only used from this source.

Sixteenth Air Force. History of Sixteenth Air Force.

1 January 1979 - 31 December 1979. Vol. I, Narrative.

Torrejon Air Base, Spain: (not dated). SECRET. Classified by multiple sources. Unclassified information only used from this source.

Sixteenth Air Force. History of Sixteenth Air Force.

CONTINUED

1 January 1980 - 31 December 1980. Vol. I, Narrative.
Torrejon Air Base, Spain: (not dated). SECRET. Classified
by multiple sources. Unclassified information only used
from this source.

Sixteenth Air Force. History of Sixteenth Air Force.
1 January 1981 - 31 December 1981. Vol. I, Narrative.
Torrejon Air Base, Spain: (not dated). SECRET. Classified
by multiple sources. Unclassified information only used
from this source.

Sixteenth Air Force. History of Sixteenth Air Force.
1 January 1982 - 31 December 1982. Vol. I, Narrative.
Torrejon Air Base, Spain: (not dated). SECRET. Classified
by multiple sources. Unclassified information only used
from this source.

Sixteenth Air Force. History of Sixteenth Air Force.
1 January 1983 - 31 December 1983. Vol. I, Narrative.
Torrejon Air Base, Spain: (not dated). SECRET. Classified
by multiple sources. Unclassified information only used
from this source.

Sixteenth Air Force. History of Sixteenth Air Force.
1 January 1984 - 31 December 1984. Vol. I, Narrative.
Torrejon Air Base, Spain: (not dated). SECRET. Classified
by multiple sources. Unclassified information only used
from this source.

Sixteenth Air Force. History of Sixteenth Air Force.
1 January 1985 - 31 December 1985. Vol. I, Narrative.
Torrejon Air Base, Spain: (not dated). SECRET. Classified
by multiple sources. Unclassified information only used
from this source.

United States Air Forces in Europe. History of United States Air
Forces in Europe, 1 July 1973 - 30 June 1974. Vol. I,
Narrative. Ramstein Air Base, Germany: (not dated).
SECRET. Classified by multiple sources. Unclassified
information only used from this source.

United States Air Forces in Europe. History of United States Air
Forces in Europe, 1 July 1974 - 30 June 1975. Vol. I,
Narrative. Ramstein Air Base, Germany: (not dated).
SECRET. Classified by multiple sources. Unclassified

CONTINUED

information only used from this source.

United States Air Forces in Europe. History of United States Air Forces in Europe, 1 January 1976 - 31 December 1976.

Vol. I, Narrative. Ramstein Air Base, Germany:
(not dated). SECRET. Classified by multiple sources.
Unclassified information only used from this source.

United States Air Forces in Europe. History of United States Air Forces in Europe, 1 January 1978 - 31 December 1978.

Vol. I, Narrative. Ramstein Air Base, Germany:
(not dated). SECRET. Classified by multiple sources.
Unclassified information only used from this source.

United States Air Forces in Europe. History of United States Air Forces in Europe, 1 January 1979 - 31 December 1979.

Vol. I, Narrative. Ramstein Air Base, Germany:
(not dated). SECRET. Classified by multiple sources.
Unclassified information only used from this source.

United States Air Forces in Europe. History of United States Air Forces in Europe, 1 January 1982 - 31 December 1982.

Vol. I, Narrative. Ramstein Air Base, Germany:
(not dated). SECRET. Classified by multiple sources.
Unclassified information only used from this source.

United States Air Forces in Europe. United States Air Forces
in Europe Regulation 55-45, USAFE Range Procedures.

Ramstein Air Base, Germany: 19 May 1986.

Zaragoza Air Base. Zaragoza Air Base Regulation 55-10, Aircrew Operational Procedures. Zaragoza Air Base, Spain:
1 January 1986.

Letters

Barker, Ronald O. Letter to the 406th Tactical Fighter Training
Wing Historian on "Quarterly Historical Report (1 April -
30 June 1977)." Zaragoza Air Base, Spain: 8 July 1977.

Unpublished Material

Clark, Clifton C., Major, United States Air Force. "The Need for

CONTINUED

a Weapons Training Center in Europe," Air Command and Staff College Study. Maxwell Air Force Base, Alabama: May 1972.

Hall, Joel T., Major, United States Air Force. "Tactical Aircrew Weapons Training in the European Environment," Air Command and Staff College Study. Maxwell Air Force Base, Alabama: May 1973.

Klepak, H.P. "Spain NATO or Neutrality," Defense Technical Information Center Technical Report. Cameron Station, Alexandria, Virginia: April 1980.