FOREIGN INTERNAL DEFENSE

DOES AIR FORCE SPECIAL OPERATIONS HAVE WHAT IT TAKES?

BY MICHAEL C. KOSTER MAJ, USAF

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This publication has been reviewed by security and policy review authorities and is cleared for public release.

To my wife, Nancy,

and son, David

Contents

Appendix		Page

Illustrations

Figure

Foreword

As the cold war fades into history and regional concerns replace a 45-year-old strategy of Soviet containment focused primarily on central Europe, the prospects for a future free of violence and intimidation seem more remote than ever. Following the removal of Soviet controls across their southern tier and in client states bordering the former empire, mounting ethnic, religious, and nationalist pressures are venting themselves through succession, war, and terrorism. Even apart from Soviet assistance once rendered to revolutionary clients, insurgency continues to threaten many countries of the developing world. Other forms of internal conflict threaten the stability of friends and allies.

Heavily armed international drug cartels with operational and financial links to organized crime, terrorists, and insurgent organizations can function subversively within states, threatening not only the lives of citizenry and civil law enforcement personnel but also the stability and survival of elected governments. The use of increasingly sophisticated weapons, intelligence, and communications technology by subnational groups operating outside the law make it extremely difficult for governments to deal with a variety of internal threats extending from blackmail and extortion to assassination, drug trafficking, and armed insurrection.

Lacking the cold war imperatives imposed by win-lose competition between the United States and the Soviet Union, US interests in foreign internal crises will be defined by different criteria, and the decision to support host governments with US resources will be more carefully reasoned. There will likely be situations, however, when assistance to a friend or ally will be needed to prevent conflict, maintain stability, and professionalize host-military organizations in a given country or region. Anticipating these situations, Congress mandated foreign internal defense (FID) in 1986 legislation as one of the primary missions of the United States Special Operations Command (USSOCOM).

The commander in chief, US Special Operations Command (USCINCSOC) has designated the commander, Air Force Special Operations Command (COMAFSOC), as proponent for Aviation-FID. As stated in the applicable terms of reference, "COMAFSOC serves as USCINCSOC's senior advisor on employment of special operations aviation to support friendly governments' internal defense and development (IDAD) programs."

Carrying out CINCSOC's instructions, AFSOC has activated a small cadre of language-trained, area-oriented aviation specialists whose principal mission is to train, advise, and assist foreign friends and allies in the employment and sustainment of air operations. Focusing primarily on hands-on, adaptive training and advisory support geared to practical applications in host countries, the organization's principal objective is to train or advise host governments on how to best employ their own aviation resources in support of national strategies.

Major Mike Koster's study explores a portion of the Aviation-FID mission and the capabilities AFSOC needs to operate in the FID arena. The study provides an overview of basic aviation roles for FID and questions whether the mission can be accomplished with the current AFSOC aircraft inventory.

The monograph establishes the basics of Aviation-FID and reviews AFSOC's current mission characteristics and capabilities for those unfamiliar with these areas. The study also injects several interesting Aviation-FID concepts and weaves them into an assessment of AFSOC's potential to conduct these type operations in developing nations. Finally, Major Koster explores the utility of inexpensive, easy-to-maintain aircraft that are not only suitable for Aviation-FID training and operations, but also appropriate to the needs and capabilities of developing nations, a subject worthy of further scrutiny and debate.

Jerome W. Klingaman

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Maj Michael C. Koster was the Air Force Special Operations Command-sponsored research fellow for 1992-93 at the Airpower Research Institute, Air University Center for Aerospace Doctrine, Research, and Education, Maxwell Air Force Base, Alabama. He is a senior pilot and instructor with more than 3,700 hours flying the T-38A Talon and MC-130E Combat Talon I.

A 1973 Falcon Scholarship winner, Major Koster attended Millard School at Bandon, Oregon, a military academy preparatory institution. He graduated from the United States Air Force Academy in 1978 with a degree in mechanical engineering, and holds a master's degree in counseling and human development from Troy State University. An in-residence graduate of Squadron Officer School, Academic Instructor School, and Air Command and Staff College, he instructed on the staff of Squadron Officer School as a section commander and leadership manager of their nonresident course.

Major Koster currently flies the MC-130H Combat Talon II with the 15th Special Operations Squadron at Hurlburt Field, Florida. During his three previous special operations tours, he flew the MC-130E Combat Talon I in operations and exercises within the United States, Europe, Africa, the Middle East, and the Pacific. In 1990 he deployed to Incirlik Air Base, Turkey, in support of Operations Desert Shield and Desert Storm. Later in 1991 he returned to Incirlik with Operation Provide Comfort in operational and staff positions. In this humanitarian effort, he commanded one of the first aircrews airdropping relief supplies to Kurdish refugees. Returning two other times, he served as the deputy commander for operations, J-3, Joint Special Operations Task Force, to control Army and Air Force special operations forces (SOF) in successful combat search and rescue and disaster relief efforts in northern Iraq and Turkey. He is married to the former Nancy Jo Peters of Harris, Iowa. They have one child, a son, David.

Preface

As if it were yesterday, I remember where and how this research fellowship project started for me. While on tour in Germany during 1992, I asked Lt Col William "Slim" Conners for his suggestion on a topic that would compete in Air Force Special Operations Command's (AFSOC) Fellowship Research Program at Air University. Always noted for his sharp advice, Slim suggested foreign internal defense (FID), and went on to explain the mission and the basic issues making it a very important concern for AFSOC. With his encouragement and suggestions, I drafted a proposal while deployed in Turkey under Operation Provide Comfort. Months later, Brig Gen C. Jerome Jones, vice commander of AFSOC, selected me for the fellowship because, as he put it, my topic was of extreme importance not only to AFSOC but to all commands and other services. I soon found myself stationed at Air University researching studies, questioning the concept of aviation support to FID, and examining the logic in AFSOC's particular role.

I took my research questions to many corners of Air University, and while heads bobbed up and down during discussions, many academics were not conversant with the re-emerging FID mission, let alone AFSOC's particular role. The more I questioned, the more frustrating and confusing the search became—that is, until I asked at what is now AFSOC's Security Assistance and FID directorate, Detachment 7. My persistent searching led me to the experts—Mr Jerome W. Klingaman, Lt Col Steven S. Whitson, and Maj H. Scott Murphy (Ret.)—who have either flown in support of FID missions or prepared, taught, and written about FID concepts for years. In what then became an ongoing relationship, they shared their insight and personal experiences and offered well-founded advice for my research.

The more I learned, the more irrelevant AFSOC's increasingly specialized aircraft seemed for this particular mission. While there is no denying the utility of today's systems, could the aircraft in AFSOC's inventory be of use for helping third world countries improve their own internal security and development? Or even more directly, could AFSOC step in with its inventory to support these countries during their times of need? If these aircraft are inappropriate for the FID mission, which aircraft are more suitable? My monograph was an opportunity to address these questions by generally recreating the process in which I first came to understand the concept of aviation support for FID, portraying the setting in which FID must take place, and describing the unique capability and characteristics of AFSOC aircraft. Only with a sound understanding of these basics could I then assess the relevance of AFSOC aviation for FID and, if necessary, render judgment on alternative types of aviation.

Beyond the dedication and guidance of FID experts, I am deeply grateful to several people who fostered and enabled my project accomplishment. To Mr Klingaman: only for your personal support and counsel in all aspects of my research was I able to finish, and I am thankful for both. I am also grateful to Cols John Bridges and Tim Davidson for nominating and continually supporting me in this project. I am similarly indebted to the AFSOC doctrine staff, and in particular, Maj Aryea Gottlieb, navigator, doctrine analyst, staff officer, and friend. Their words of personal encouragement, clear thought, and steady support were most valuable, especially during my most difficult times. Warm thanks also go to Dr Lewis Ware, my research advisor, for insightful suggestions and his talent for putting ideas in good order. I want to express sincere appreciation to my editor, Ms Marion Gorrie, who worked tirelessly to improve my grammar while leaving original ideas even more clear than when I first wrote them. Special thanks also go to Mrs Dorothy McCluskie and her staff for their outstanding help during the production phase.

As with all endeavors, my family consistently supports me and the Air Force mission. This was a most challenging year for me and my family, as I dedicated my time to completing Air Command and Staff College in residence during the day, and researching and writing in the evenings and on weekends and holidays. For their loving support and understanding, in these times, I am most grateful.

Michael C. Koster

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Introduction

We could easily end up with more than we need for contingencies that are no longer likely, and less than we must have to meet emerging challenges.

President George Bush
2 August 1990

The failure of the Iranian hostage rescue mission at Desert One in April 1980 became the catalyst for change to special operations forces (SOF). Surprisingly, though, this tragedy alone did not bring immediate improvements. The low in national SOF capability continued, and few policymakers actively supported even the most basic equipment and training needs. Frustrated by Department of Defense (DOD) and service unwillingness to prioritize and resolve these problems, Congress passed an amendment to the National Defense Authorization Act of 1986 to revitalize SOF.[1] The Cohen-Nunn Amendment put purpose, power, and direction into SOF with the creation of United States Special Operations Command (USSOCOM), a unified command responsible for organizing, training, and equipping worldwide SOF. This amendment also created the office of the assistant secretary of defense for special operations and low-intensity conflict (ASD/SO-LIC) to provide institutionalized civilian oversight over this important mission area.

In response to the legislation, the services created their own special operations commands to serve as components to USSOCOM. The Air Force component of USSOCOM is Air Force Special Operations Command (AFSOC), which became an Air Force major command in May 1990.[2] With a clear national strategy, a newfound direction, and support from USSOCOM and the Air Force, AFSOC began training and equipping a newer and stronger air power arm. In the midst of reshaping Air Force special operations forces (AFSOF), USSOCOM witnessed a dramatic shift in world events. Major changes occurring in Europe favored a careful review of national strategy and defined new conflicts and challenges for AFSOC and its force structure.

On 2 August 1990 in a speech in Aspen, Colorado, President George Bush spoke of the dramatic, peaceful changes overtaking Europe. He welcomed a new openness between superpowers and the end of nearly 45 years of cold war tension.[3] A year later, in his *National Security Strategy of the United States* for 1991, President Bush proclaimed an end to the long, bitter cold war. He said the nation had "entered a new era . . . unimaginable only three years ago."[4] His emphasis carried the nation beyond the former Soviet threat to focus on *instability and uncertainty*, the causes of low-level conflict in a "world of ethnic antagonisms, national rivalries, religious tensions, spreading weaponry, personal ambitions, and lingering authoritarianism."[5]

To prepare for these conflicts, the chairman of the Joint Chiefs of Staff, depends on a tailored SOF as well as other forces. In *The National Military Strategy of the United States* for 1992, Gen Colin L. Powell warned of regional conflicts instead of global war and verified the value of SOF capabilities to meet any contingency.[6] "Our strategy for the 'come-as-you-are' arena of spontaneous, often unpredictable crises, requires fully-trained, highly-ready forces that are rapidly deliverable, and initially self-sufficient."[7] Much of the strength for a quick response to conflicts depends on the unique capabilities of forward-deployed SOF.[8]

SOF must prepare for conflict worldwide, especially in the third world.[9] One 1992 study in *Jane's Defence Weekly* charted 74 locations worldwide where low-level conflicts threaten (see appendix A). Most of these are centered in the third world, and many are being increasingly sponsored by terrorists and drug traffickers.[10] It is to these third world areas that Gen Carl W. Stiner, former commander in chief of USSOCOM, looked in 1991 when he prepared for future challenges.[11] SOF involvement will center in South America, Central America, Africa, the Golden Triangle of Southeast Asia, and the Philippines.[12] In these regions, conflict will be dangerous and potentially explosive in combination and may damage US interests and international order.[13] Former ASD/SO-LIC James R. Locher III viewed these conflicts as *military operations other than war*: "the form of warfare that we will have to fight."[14]

Forthcoming challenges demand a critical rethinking of AFSOF's ability to conduct military operations other than war, especially foreign internal defense (FID), in the third world. The purpose of this study is to assess AFSOF's ability to conduct air operations *within* the third world, to include training and advising host air force units while simultaneously meeting other global responsibilities.[15] This FID mission, rarely well understood, *centers on host-country needs and regional factors*, which I will relate through various examples, primarily of South America and Africa. These varying needs and factors should decide the kinds of aircraft appropriate for FID, not the other way around. This study uses South American and African examples because they replicate the problems that we will see in other third world locations as well. Further, according to USSOCOM's recent Joint Mission Analyses (JMA) and independent studies, many of the most urgent needs lie within these two continental areas.[16]

For this FID mission and its relative operating locations, AFSOC's aircraft simply do not have the necessary operating capability to fulfill their preeminent requirements. Rather, AFSOC and host countries currently require smaller aircraft of the fixed-wing type somewhere between the size and capability of a helicopter and a Lockheed C-130. I am not advocating aircraft such as the

Bell/Boeing CV-22 tilt-rotor Osprey or Alenia C-27 Spartan, which are too expensive and complex for this mission. More appropriate examples are such as the Pilatus PC-6 Turbo-Porter, Basler 67 Turbo, Cessna U-27A Caravan, and others, some of which I detail later.

The first step in determining AFSOF ability is to become familiar with the FID mission, the solid basis this mission has in the host-country's internal defense and development (IDAD) plan, and the traditional uses of aircraft to accomplish air power missions that support FID activities.

Another critical aspect is recognizing the basic factors present in this composite (third world) setting of South America and Africa that have considerable influence on aviation. The particular environment, decayed infrastructure, underdeveloped societal conditions, and operational considerations all mean challenges for aviation. These critical challenges within this general setting become a basis for thoughtfully assessing aircraft appropriate for sustained FID operations.

Where the first two chapters present the FID operational concept and the third world setting, chapter 3 describes each of AFSOC's six aircraft by identifying their sizes, capacities, complexities, and unique capabilities. To support these aircraft requires a tremendous logistical and maintenance support structure that relies on numerous technically-oriented personnel. Appendix C offers more in-depth specifics for each aircraft.

A primary challenge for these AFSOC aircraft is to contend with this re-emerging FID mission and the constraints of the third world setting. Chapter 4 assesses the capability of AFSOF aircraft for conducting these FID operations. What begins to emerge is a picture of all that aircraft must provide within the context of aviation support to FID. This chapter first identifies AFSOC aircraft limitations within the third world, and then relates the impact of these deficiencies.

Where AFSOF aircraft are limited in FID applications, five alternative-*like* aircraft have the tremendous potential to help host countries realize their own IDAD programs. Chapter 5 describes these promising alternatives and the characteristics and capabilities that are central to their practical use in these third world challenges.

Chapter 6 concludes from this systematic analysis by recognizing the improved potential within alternative-*like* aircraft. However, the conditions within host countries are so varied that no single analysis will adequately explain aviation needs. Though this study takes a broad look, it does not attempt to directly address the *global* FID environment or requirements. However because the study is representative of other regions, it can recommend specific action for USSOCOM that will have application beyond FID. As AFSOC's responsibility in this FID mission and the needs within each host-country further evolve, both participants will require aircraft that can contend with these factors. The only certainty is that *FID opportunities are global*, and the right aviation *answers remain specific to each country*. Keep in mind that while this study concentrates on the FID mission, many of the ideas and recommendations apply equally well to another of AFSOC's long-term third world missions, unconventional warfare.

Notes

1. R. Lynn Rylander, "Congress Takes Action to Modernize Forces for Special Operations," *Amphibious Warfare Review* 6, no. 3 (Summer 1988): 60-65. The Holloway Commission also identified inadequate SOF capabilities, as did the two-volume low-intensity conflict study entitled *Analytical Review of Low-Intensity Conflict*.

2. The Air Force component was 23rd Air Force, which later became AFSOC.

3. George Bush, president of the United States, *Weekly Compilation of Presidential Documents* 26, no. 31, remarks at the Aspen Institute Symposium in Aspen, Colorado, 2 August 1990 (Washington, D.C.: Office of the Federal Register, National Archives and Records Administration): 1190-4.

4. The White House, *National Security Strategy of the United States* (Washington, D.C., Government Printing Office, August 1991), 1.

5. Ibid., v; James R. Locher III, assistant secretary of defense for special operations and low-intensity conflict, "Low-Intensity Conflicts Require New Strategies," *Defense Issues* 6, no. 25, address to West Point Society of Washington, D.C., 22 May 1991 (Washington, D.C.: American Forces Information Service): 2.

6. Colin L. Powell, chairman of the Joint Chiefs of Staff, *The National Military Strategy of the United States* (Washington, D.C.: Government Printing Office, January 1992), 11, 23.

7. Ibid., 23.

8. Ibid., 7, 23.

9. Locher, "Low-Intensity Conflict: Challenge of the 1990s," *Defense 91*, July/August 1991, 18. Locher does not specifically reference the third world when characterizing worldwide threats or world stability. However, Locher's description, in conjunction with Paul Beaver's study in *Jane's Defence Weekly* and others, clearly point to the third world. See Paul Beaver, "Flash Points: Confusion, Chaos and Conflict," *Jane's Defence Weekly* 17, no. 2 (11 January 1992): 53-8. The term *third world* is becoming increasingly problematic after disintegration of the *second world*, the former Soviet Union and associated territories. It is also complicated by dramatic growth of previously poor nations and the rapid decay of others. I use this term to help characterize countries with weak or deteriorating infrastructure, economy, education, politics, and the like.

10. Beaver, 53-8; Locher, "Challenge of the 1990s," 18.

11. Gen Carl W. Stiner, "The Strategic Employment of Special Operations Forces," *Military Review* 71, no. 6 (June 1991): 4.

12. Robert H. Williams, "Special Operations Gear for 1990s Role," *Signal* 45, no. 9 (May 1991): 88.

13. Locher, "Challenge of the 1990s," 19.

14. Locher, "Low-Intensity Conflicts Require New Strategies," 2. Locher actually uses the term *low-intensity conflict* in his address. More recently, low-intensity conflict (LIC) has come to be known as *military operations other than war*. See Joint Pub 3-07 (Draft Final), *Joint Doctrine for Military Operations Other than War,* April 1993, I-1. Military operations other than war (fig. 1) include hostilities other than war and peacetime military operations.

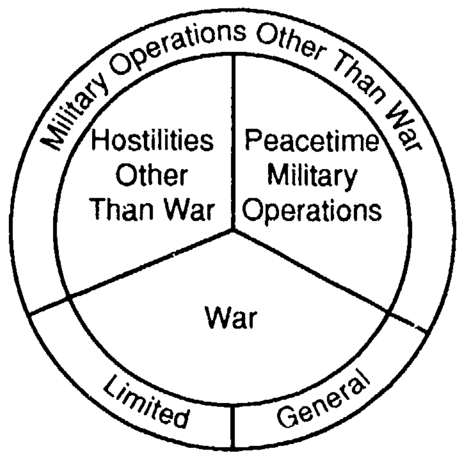


Figure 1. Spectrum of Conflict

15. Throughout this study *conduct*, in terms of FID, implies *initiate and sustain*. FID and unconventional warfare (UW) are the two most likely AFSOC missions for sustained air operations within the third world. FID is seemingly one of the most challenging of AFSOC's missions and yet is one for which the command is least well structured. Many considerations appropriate for FID will apply equally to UW, for both missions take place within the same general operational setting. Other AFSOC missions, however, do not similarly apply. Examples of those not appropriate are direct action, counterterrorism, and special reconnaissance. These activities are considered either short-term missions or missions that may base and operate from areas primarily outside the third world.

16. Maj H. Scott Murphy and Lt Col William Pailes, *AFSOC: Foreign Internal Defense* (Hurlburt Field, Fla.: Headquarters Air Force Special Operations Command, July 1991), ii. AFSOC's FID study notes that the Joint Staff, ASD/SO-LIC, USSOCOM, and research by theater command staffs identify a FID requirement for Central and South America; Terry D. Bearce, special applications technology division, Los Alamos National Laboratory, *USSOUTHCOM-USSOCOM Joint Mission Analysis Final Report, vol. 2, Main Report (U), Appendix E, Red Team Final Report (U)* (MacDill AFB, Fla.: 1 August 1990): E-17. (Secret) Information extracted is unclassified. Bearce suggests Congress would favor USSOUTHCOM's theater as a testing ground for USSOCOM interagency efforts in low-intensity conflict. From the author's readings, Africa, too, has become a serious candidate for US FID efforts as the US moves to support young countries struggling with democratic ideals amid rampant instability and insurgency.

CHAPTER 1

AVIATION SUPPORT TO FOREIGN INTERNAL DEFENSE

The success of aircraft in establishing and maintaining the necessary degree of law and order in a wild country cannot be complete unless it is possible to follow up operations by using the air to the full as a means of maintaining contact with the natives and improving their lot.

C. F. A. Portal, Air Commodore,
on British air control experiences
in the 1920s and 1930s

Contrary to some beliefs, providing aviation support to foreign internal defense (FID) is not a new mission for special operations, but has re-emerged from years of inactivity to again address the rising need in certain third world areas.[1] This chapter describes the basis and scope of FID operations. It links the aviation FID efforts of Air Force special operations forces (AFSOF) to the recipient's needs and capabilities, and explains traditional roles for the supporting aircraft. When providing assistance, AFSOF must be able to tailor support to any one of three separate levels—indirect, direct not involving combat, or combat. The most demanding aspect is sustaining these FID operations for the long term.

What Is Foreign Internal Defense?

FID operations begin when the national command authorities (NCA) determine US national interests and objectives are sufficiently involved to honor a host-country request for assistance. A US decision to offer FID assistance can include a broad range of possible options.[2] These options allow commanders to prepare FID support that will mesh with the particular desires and strategy of the host country. Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, defines FID as "participation by civilian and military agencies of a government in any of the action programs taken by another government to free and protect its society from subversion, lawlessness, and insurgency."[3] The principal goal of FID is to help a host country acquire the means to free and protect its society from the basic causes and problems of internal strife. The actual methods necessary to help host countries become *clear only after* examining their particular political, economic, and social conditions, and internal capabilities. With this help, eligible friends and allies grow stronger and more self-dependent, and the US ultimately minimizes its involvement should conflict later erupt.[4]

Over 30 years ago, threats of Communist-sponsored subversion to fledgling democracies encouraged President John F. Kennedy to authorize creation of the 4400th Combat Crew Training Squadron, Jungle Jim. It was quickly expanded to the Special Air Warfare Center, and the Air Force Air Commandos soon began flying and training in underdeveloped areas of Latin America, Africa, and Southeast Asia.[5] As agents of counterinsurgency and revolutionary warfare, the air commandos flew *vintage* T-28, B-26, C-7, C-47, and C-123 aircraft on early FID operations. These planes were old and inadequate for many other conventional US requirements at the time, but they were very appropriate for the needs and operating environments of these host countries. According to one air commando, "Our planes may be obsolete and unsophisticated, but they can do our kind of job."[6] The aircraft needed for FID were simple, reliable, and rugged, and they enabled host-country air forces to reach remote areas and remain in contact with their people. These FID assistance efforts of the early sixties declined almost as rapidly as they began. In the mid-sixties, political, military, and economic turmoil, and the absence of supporting doctrine allowed attention and funding to shift away from SOF as US national interests changed.[7] The prevailing feeling coming from many senior Air Force leaders at the time, as Col Dennis Drew found in his research, is that "the American military should not be distracted by 'those kind of wars' [low-intensity conflict] since we can always just 'muddle through.'"[8]

Today's renewing interest in military operations other than war has again made FID a priority mission. Beginning in 1986, Congress legislated a FID mission for United States Special Operations Command (USSOCOM) under the National Defense Authorization Act. In 1991 the Joint Chiefs of Staff (JCS) refined Joint Publication 3-07.1, *JTTP for Foreign Internal Defense*, and in 1992 the Air Force produced its first official FID doctrine in Air Force Manual (AFM) 2-11, *Air Force Operational Doctrine: Foreign Internal Defense Operations*. From this authority and these corporate experiences, the FID capability is emerging after twenty years of disuse to help meet today's challenges. New AFSOC aircraft have replaced the vintage planes of the air commandos, but these new aircraft are part of a force structure that the Department of Defense (DOD) acquired to meet cold war challenges, not re-emerging FID demands.

Basics of the Host-Country Strategy

The host-country's internal defense and development (IDAD) strategy is the key to applying air power in FID. This strategy is their plan to achieve internal security so their society can continue to grow and develop normally. It must have the complete support and involvement of all levels of government—a unity of effort philosophy—to ensure its viability. To carry out the plan, national resources must be available and properly applied to the problem. According to Col August G. Jannarone and Mr Ray E. Stratton, this requires the similar support and dedication of aviation. In their article, "Building a Practical United States Air Force Capability for Foreign Internal Defense (FID)," they recognize, "with respect to internal defense and development, aviation is a supporting activity—for ground or maritime security forces, logistics systems, distressed civilian populations, intelligence collection needs, nation-building projects, etc."[9] This means, aviation must provide a broad base of support to all four functions of IDAD strategy. These functions include balancing the development of social, economic, and political institutions; mobilizing manpower and resources; securing people and resources; and neutralizing the effects of hostile elements.[10] The air power supporting these functions must be both versatile and flexible, and, within the context of IDAD, be able to shift between civilian and military roles as the situations dictate.[11]

To enhance the *development* and *mobilization* of society, aerospace forces must focus on both administrative and nation-building efforts. The host-country's ability to develop and mobilize society becomes deficient when ground lines of communication (LOC) cannot support the required flow of services, information, and governmental programs to all the people.[12] This deficiency is quite pronounced when people are scattered throughout remote, inaccessible areas or if hostile forces should disrupt the transportation networks. For whatever reason, when people are isolated from organized society, they begin to lose confidence in their government and instead come to rely on other means, even helpful insurgent forces. This occurred in the highlands of Peru where some seemingly isolated citizens turned to radical Maoist Sendero Luminoso (Shining Path) insurgents for the basic support and protection unavailable from their distant authorities.[13] Airlift can effectively support activities counter to Sendero efforts and help restore government influence by mobilizing medical aid, government assistance, civil affairs activities, and security forces into displaced areas. In the twenties and thirties, the Royal Air Force (RAF) in Aden (Yemen) used air power for such counterinsurgency operations. The British focused airlift efforts on keeping natives under their colonial influences. The intent was to improve native living standards by providing medical care, schools, and other social services. Over time, the supporting role of airlift succeeded in both developing the society and mobilizing the natives.[14]

Aerospace forces must also function as an integrated, joint team with other participants in the IDAD plan to carry out *security* and *neutralization* functions. These two functions depend upon integrated efforts. They will be ineffective if forces and organizations undertake separate efforts.[15] Joint efforts will result in more synergistic effects. For example, a surveillance aircraft on patrol discovers active insurgent camps. It then radios this information forward to start a coordinated air mobility response of ground security forces and assists air firepower to bring a quick, decisive assault on these usually mobile and well-concealed hostile forces. In this scenario, air is the common theme. Air operations first discover the insurgents, then inform and deploy and later sustain and support the security forces until they neutralize the hostile forces. However, decisively neutralizing forces is not possible using air power alone.

Missions for Air Power

Air Force FID doctrine states air power can use several traditional missions to support IDAD strategy. An air arm, appropriately equipped, should be able to conduct reconnaissance and surveillance, airlift, close air support (CAS) and interdiction, and psychological operations (PSYOP).[16] The aircraft must equally be able to accommodate military and nonmilitary applications.

Aircraft conducting FID support through *reconnaissance and surveillance* operations are equipped depending upon the need for particular types of intelligence. Sometimes special equipment designed to collect signals intelligence (SIGINT) or imagery intelligence (IMINT) over regular intervals of time will fulfill these needs.[17] Although national assets and other sources beyond the scope of this research can collect valuable information, only aircraft equipped for visual, infrared (IR), or electronic monitoring can make the many necessary time-critical observations and answer special needs. Aircraft are advantageous because they can respond quickly and fly at altitudes conducive to gauging troop movement, operational patterns, and infrastructure even in areas beyond the range and time capability of ground force reconnaissance. Yet, slow and low-flying high-wing aircraft and helicopters have the advantage over faster aircraft in locating and observing insurgent/terrorist forces, because fast aircraft have difficulty spotting small, mobile ground activity from their higher speeds and altitudes.[18] Aircraft equipped for reconnaissance and surveillance also have practical use beyond such military functions, as they can monitor conservation, poaching, coastal fishing limits, and even natural disasters. Clearly, certain aircraft are valuable, sometimes crucial, for reaching into remote areas to gather time-sensitive human intelligence (HUMINT). HUMINT is most available to those aircraft that can first assess the activity and then quickly land to fully exploit the possibilities. During the twenties, the RAF tested these aerial observation tactics of assessing and then landing to further explore promising situations. During one occasion in Iraq, the RAF was remarkably successful at aerial observation of tribal areas. Reading the ground signs and activity as indicative of imminent tribal war, an RAF aircrew landed, interrupted the tribal preparations, and suggested peaceful alternatives.[19] With today's technology enabling important, simple advancements, even moderately equipped aircraft are more appropriate and effective for the FID reconnaissance and surveillance missions, and they are equally capable of reliable, all-source, all-weather information collection. A goal of FID is to help the host country find ways to solve its own reconnaissance needs. This reality pushes solutions away from the complex, leading-edge components of US national assets to the practical options found within moderately instrumented aircraft that in some circumstances have the ability to land even in austere locations to properly exploit time-critical opportunities.

Airlift, even of modest capacity, is critical to the development and security of third world countries.[20] Airlift can open remote or otherwise inaccessible areas to people, government, and the flow of goods and services. It allows authorities to administer security, economic, informational, social, and other service programs.[21] For example, small capacity aircraft enable doctors and dentists to make regular medical visits into remote areas, and they provide rapid response ambulance operations during disasters. Larger aircraft are the basis for regular transport of personnel, materials, and a greater volume of equipment otherwise isolated by rugged countryside. Yet, as H. Scott Murphy puts it, "It is not realistic to think a third world country with limited air assets will use these large airlift aircraft as a regular means of transport of all people and goals to and from remote areas."[22] The size and capability of these aircraft must be appropriate to the needs and particular resources, such as runways, found within the individual countries.

CAS and *interdiction* (attack) missions permit governmental authorities to put hostile forces and their equipment at risk. French forces in Indochina used the slow flying Morane 500 Criquet airplane to locate guerrillas, but by the time the Criquet could order up attack aircraft, the Vietminh had long since melted away.[23] Assuredly, then, these air attack missions require aircraft with the ability to seek and attack on the spot. They must respond rapidly and deliver weapons accurately in area defense, conduct armed escort duties, and provide fire for troops who are in contact. Aircraft must carry weapons capable of measured, discriminating firepower that can target hostile forces, yet at the same time not endanger friendly people or security forces.[24] In other words, such aircraft must not use munitions intended to inflict massive casualties, for this poses collateral risk to civilians. One misplaced bomb could do more harm to the government's efforts than several well-placed bombs could ever do to support it. Instead, aircraft for CAS must bring accurate firepower to suppress, shock, and intimidate; but avoid maximum casualties.[25] This need for accurate, measured-response weapons means the aircraft appropriate for FID attack are side-firing; slow-flying, forward-firing aircraft. To interdict targets at the enemy's fewer strategic centers of gravity—leadership, logistics storage, or vital LOCs—may require different munitions, yet still fall within the means of aircraft chosen for in-country attack.

Last, the *PSYOP* mission helps a nation distribute information into specific areas in a timely manner, where other distribution methods are perhaps not as effective. Aircraft can deliver information relatively quickly by transporting people who can speak to the situation, dispensing instructive leaflets, conducting speaker operations, or broadcasting information over radio and television (TV) frequencies. These methods for passing information are at times very valuable to maintaining continual influence over citizens and the enemy. Information available at the right times and places can win the hearts and minds of the people in such ways as identifying government support programs and then highlighting egregious insurgent activities. In 1952 the RAF experimented in Malaya with Operation Loudhailer, psychological warfare broadcasting over aircraft loudspeakers. This psychological warfare proved useful against guerrilla forces (many of whom were prohibited from reading airdropped literature), and eventually influenced some 70 percent to surrender.[26] An effective PSYOP program, supported by aircraft, can work in many ways to help isolate hostile elements from the citizens, advancing a government's image before the people.

Levels for AFSOF Involvement

AFSOF must be able to commit forces at a level of effort in synch with the host-country's needs, capabilities, and sensitivities. Specifically, AFSOF must be able to assist at any of three broad levels.[27] Each level is an opportunity to tailor assistance appropriate for the host country through an array of programs requiring either long- or short-term AFSOF aviation commitments.[28] These levels of AFSOF involvement are indirect support, direct support not involving combat, and combat operations.

Indirect support, the preferred US level of assistance, means a long-term AFSOF commitment. At this level, security assistance programs and joint/combined exercises help foster host-country self-sufficiency. If FID results in a properly equipped and trained host country to deal with internal problems, the efforts may preclude the necessity for more direct US involvement later. As an agent of the security assistance process, AFSOF can help in this process by transferring defense-related articles and services. For example, if El Salvador decided to upgrade its fixed-wing gunships with newer equipment through the foreign military sales (FMS) program, US authorities could task one of AFSOC's AC-130 gunship units to help show the aircraft and train an initial cadre of El Salvadoran instructors. Besides helping in the transfer of equipment, AFSOF's role in security assistance may also include providing advice and conducting training within the country on pertinent tactics and procedures. Responding to a host's follow-on request for assistance, US military services could additionally fund in-country exercises to complement prior security goals to improve host-country capabilities and evaluate the combined abilities of US and host forces.[29] The primary emphasis of indirect support is to ensure the host country has an effective aviation force structure capable of fulfilling traditional air power roles, thereby supporting its own needs. Indirect support also ensures US and host-country compatibility if future US assistance is necessary.

If overwhelming turmoil interferes with a host-country's ability to oppose an internal threat, the host country can ask the US for help. Depending on the circumstances, the US may then direct AFSOF to provide temporary support at a level that does not commit US troops to combat—*direct operations not involving combat*.[30] At this level, AFSOF plans its activities to support areas of weakness in the host's air forces, but never to supplant their efforts. Likely activities could contribute aerial surveillance, reconnaissance to share information, and secure airborne communication links to assist command and control of combined forces. AFSOF may also help support such activities as civil-military operations, aerial photography and mapping, strategic airlift, or counterdrug operations.[31] These direct operations are necessarily shorter-term AFSOF commitments intended primarily to help stabilize a temporary shortfall in host capability, allowing them time to regain their self-sufficiency.

The highest level of commitment for AFSOF is to conduct *combat operations* when the NCA directs. Through joint/combined operations, AFSOF must provide aircraft able to support defensive operations or pursue limited offensive measures. This is not an opportunity for AFSOF to wrest the initiative from its host unit. However, appropriate AFSOF activities may contribute tactical mobility for US and host forces while also providing reconnaissance, attack, forward air control, and electronic communications and other forms of jamming.[32] Whatever the particulars, AFSOF actions at this level must provide the host country an opportunity to reorganize and then resume unilateral operations.[33] Smooth US and host-country combat operations depend upon the coordination, familiarity, and joint/combined exercises and training that all parties practiced during operations at indirect levels of support.

Conclusion

FID is a re-emerging AFSOC mission that brings special challenges to our current AFSOC force structure. FID is an action program joined by other military and civilian agencies with a common purpose to help friendly nations guard against internal strife. AFSOC's role in this regard is to guide, shape, and help host countries employ aviation for their particular IDAD needs and capabilities. Air Force doctrine identifies the four missions AFSOF and host forces must be able to conduct during FID operations—reconnaissance and surveillance, airlift, attack, and PSYOP. Although these missions may blend into all three levels of US involvement, effort and attention are most necessary and important at the lowest level—indirect assistance. This means AFSOC must prepare to conduct long-term, indirect support operations for ultimate success in FID. Failure to operate proper aircraft at this level that build host-country capability and self-sufficiency will leave the host country open to potential conflicts beyond their capabilities. This situation will also lead, inevitably, to US military involvement at higher conflict levels.

This basic aviation FID approach flows from every host-country's IDAD strategy. The IDAD strategy in turn arises from the unique environmental, societal, and operational particulars within the host's setting. Any decisions concerning a force structure appropriate for FID must carefully consider the settings in which aircraft will need to operate. In general, aircraft for AFSOC's FID focus would seem to be the same as those appropriate to the host-country's needs. These are inexpensive, off-the-shelf, maintainable, turboprop aircraft capable of operating from short, remote, unprepared areas with a defensive capability for small arms and limited man-portable surface-to-air missiles (SAM).

Notes

1. AFSOC's five primary missions are FID, unconventional warfare, direct action, special reconnaissance, and counterterrorism. AFSOC also conducts collateral mission activities. Collateral activities derive from AFSOF unique equipment, training, and inherent capabilities for its primary missions. Some collateral activities in which AFSOF have contributed successfully and may be tasked again include security assistance, humanitarian assistance, antiterrorism, counternarcotics, search and rescue/personnel recovery, psychological operations, coalition warfare, and special activities. AFSOC's primary and collateral mission activities are discussed in Air Force Manual (AFM) 2-10, *Aerospace Operational Doctrine, Special Operations*, 25 October 1991, 9-12.

2. AFM 2-11, *Air Force Operational Doctrine: Foreign Internal Defense Operations*, 3 November 1992, 3, 12. This chapter draws heavily upon the first official doctrine for Air Force FID operations, written by Jerome W. Klingaman.

3. Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 1 December 1989, 150.

4. AFM 2-11, 9. FID doctrine establishes a clear link between air power operations and the host-country IDAD priorities.

5. Maj Richard D. Newton, *Reinventing the Wheel: Structuring Air Forces for Foreign Internal Defense* (Maxwell AFB, Ala.: Air University Press, August 1991), 5-6.

6. Robert Zaiman, "Air Commandos TAC-Style," *Flying Review International* 19, no. 1 (October 1963): 22.

7. Maj H. Scott Murphy and Lt Col William Pailes, *AFSOC: Foreign Internal Defense* (Hurlburt Field, Fla.: Headquarters Air Force Special Operations Command, July 1991), 3-6.

8. Col Dennis M. Drew, *Insurgency and Counterinsurgency: American Military Dilemmas and Doctrinal Proposals* (Maxwell AFB, Ala.: Air University Press, March 1988), 3.

9. Col August G. Jannarone and Mr Ray E. Stratton, "Building a Practical United States Air Force Capability for Foreign Internal Defense (FID)," *The Disam Journal* 13, no. 4 (Summer 1991): 83-4. Colonel Jannarone was the European, Atlantic, and Southern Command Theater Team Chief for the Joint Mission (SOF) Analysis at USSOCOM. He has an extensive background in FID and unconventional warfare and was a Senior USAF Research Fellow at the RAND Corporation. Colonel Jannarone also served as chief of the US Military Assistance and Advisory Group in Peru. Mr Stratton is a former commandant of the USAF Special Operations School at Hurlburt Field, Florida. He flew extensive combat operations during Southeast Asia and directed within the Air Staff as a chief in Security Assistance Policy and Management. Mr Stratton currently serves as the Lockheed Corporation representative to USSOCOM.

10. Field Manual 100-20, *Military Operations in Low Intensity Conflict*, 5 December 1990, E-2.

11. Jannarone and Stratton, 81.

12. AFM 2-11, 9.

13. Maj Ramon Gamarra, Peruvian Air Force, Air Command and Staff College (ACSC) Faculty, "Peru Case Study—1992" (Academic paper presented in the curriculum of the Class of 1993 at ACSC, Maxwell AFB, Ala., 1992).

14. Air Commodore C.F.A. Portal, "British Air Control In Underdeveloped Areas," in *The Impact of Air Power: National Security and World Politics*, ed. Eugene M. Emme (Princeton, NJ: D. Van Nostrand Company, Inc., 1959), 362.

15. AFM 2-11, 9-10.

16. Ibid., 10-11; See also Murphy and Pailes, 11. AFSOC's FID study indicates three basic missions appropriate for aviation FID. These are tactical airlift, attack, and reconnaissance and surveillance. Authors of the study assume PSYOP is possible through aircraft suitable for the first three missions. I find nothing to dispel this assumption.

17. AFM 2-11, 10.

18. Philip Anthony Towle, *Pilots and Rebels: The Use of Aircraft in Unconventional Warfare 1918-1988* (London: Brassey's Defence Publishers, 1989), 210.

19. Lt Gen Sir John Bagot Glubb, *War in the Desert: An R.A.F. Frontier Campaign* (London: Hodder and Stoughton, 1960), 83-7.

20. Capt George C. Morris, "The Other Side of the COIN: Low-Technology Aircraft and Little Wars," *Airpower Journal* 5, no. 1 (Spring 1991): 62. Capt Morris comments that in many situations, having some type of airlift available may even outweigh the need to have aircraft of the right capacity.

21. AFM 2-11, 10.

22. Maj H. Scott Murphy (Ret.), Niceville, Fla., interview with the author, 12 August 1993. Murphy has conducted extensive Air Force research on foreign internal defense and was one of the founding members of AFSOC's Security Assistance and FID Office.

23. Towle, 115.

24. AFM 2-11, 10-11.

25. Ibid., 11. Close paraphrasing is used here to avoid loss of meaning.

26. Towle, 91.

27. AFM 2-11, 12.

28. David J. Dean, *The Air Force Role in Low-Intensity Conflict* (Maxwell AFB, Ala.: Air University Press, October 1986), 78.

29. AFM 2-11, 13.

30. Ibid., 14.

31. Ibid., 15.

32. Ibid.

33. Ibid., 28-9.

CHAPTER 2

THIRD WORLD SETTING

One thing the Cold War did for us was give us a clear focus. We knew who our principal adversary was and could make our plans accordingly. Now, we must broaden our focus.

Adm David E. Jeremiah
Vice Chairman
Joint Chiefs of Staff

For years, United States forces have prepared for conventional conflict in Europe, but until the Gulf War we had dedicated considerably less effort to studying and preparing for third world operations. As a result, there is still much to understand about the third world setting and how to apply our operations. To make decisions over the future of Air Force Special Operations Command in its third world foreign internal defense role, we must first appreciate the situation in South America and Africa by considering environmental, societal, and operational aspects. With this understanding, we can then foresee the ways for air power to best complement their varied situations.

Environmental Considerations

The third world setting that awaits sustained Air Force special operations forces efforts constitutes various geographic and climatic complexities and challenges. This analysis highlights only a few of the more noteworthy aspects that influence air power.

Geography. Although sheer geographic size can impede surface travel, significant obstacles over short distances can be as disruptive. Consider that Africa is over three times the size of the US, and South America is nearly twice the size of the US.[1] Together they stretch as far north as the state of Virginia and south to within 400 miles of Antarctica. Within these immense continents, terrain changes dramatically, and often frustrates any serious movement. Also, great distances sometimes isolate countries significantly from neighbors and other outside contact. To further complicate the situations, travel can be long and difficult from either the continental United States (CONUS) or Europe into these potential trouble spots.

Although travel across tremendous distances will slow any measurable response, especially surface travel, in these continental areas the shorter distances can often be just as formidable. The Andes Mountains in South America, for example, are a unique disruption to movement. These mountains extend the length of the west coast and feature abrupt dropoffs and summits above 20,000 feet. Known as the world's largest mountain barrier, they not only limit surface travel but also in places form an impassable wall stopping east-west helicopter flight.[2]

In other regions, territorial vastness limits travel, in some cases hampering air travel and such basics as the drawing of navigation charts. In Ecuador, an undeveloped interior has left more than 50 percent of the region uncharted on tactical pilotage charts (TPC). This sign of isolation is not restricted only to Ecuador. Many areas of Cameroon (Africa) and other third world countries are similarly uncharted. Although US forces may be strategically airlifted into any of these countries, should the host countries invite our participation, the restrictive geography and few airfields vastly limit the use of the Air Force's fundamental tactical airlift aircraft, the C-130. For example, one reason it took the US so long to deploy to Somalia in 1992 was the limited number of compatible airfields. Red Horse engineering teams were in country six months prior just to build temporary airstrips.[3] Common hindrance to travel includes a complete lack of roads and bridges in critical areas necessary to gain interior access, and formidable deserts and extensive plains that discourage simple travel plans and forthright intentions for ever developing the interior. Even Africa's seasonal floods interrupt modern transportation systems for weeks at a time.[4] With these frustrating challenges and barriers, movement is usually slow and unpredictable. Only the most developed areas have large, convenient, and more reliable lines of communication (LOC).

Climate. In addition to geographical barriers to travel, climate affects the use of air power. Although South America and Africa are equatorial continents, each experiences different climatic conditions caused by continental latitude, surrounding oceans, equatorial currents, and sunshine that all influence weather patterns. While temperatures are warm and stable along their equatorial bands, these conditions do not prevail over all other regions. Temperatures and conditions vary dramatically with changes in latitude and altitude.[5] Even Africa, the warmest continent, with surface highs of 58^0 C, experiences surface lows of -7^0 C in winter (not including mountainous extremes). South America is even cooler in the mountains and along southern extremities.[6]

The equatorial region receives heavy rainfall from quick-building, unpredictable storms, but extreme wet weather is not isolated to this area. In some areas, annual rainfall is over 400 inches under continuously overcast skies and up to 167 days of fog as well.[7] Even away from the equator, such as in one southern region of South America, the weather is stormy and turbulent for nearly 40 percent of the year and has more than 300 days of overcast.[8] So, challenging weather conditions for aviation extend even beyond equatorial areas. Although the storms and monsoons present challenging conditions for operating aircraft, they also emphasize the need for aircraft to overcome washed-out roads and otherwise unusable surface LOCs.

Deserts are the other extreme. The Sahara Desert in Africa is the largest dry area on the earth. In addition to its extremely hot summer temperatures, major dust-laden storms occur without warning, obscuring skies for hundreds of miles.[9] In these conditions it is utterly impossible to see anything in the air or on the ground. However, while the desert conditions in areas of Peru and Chile are similarly without rain, their surrounding conditions are actually quite different. The interior terrain traps high humidity, dense fog, and low overcast of stratus clouds that continually blanket these regions day and night.[10] The variety of desert weather introduces challenges and problems beyond those that are otherwise anticipated for aviation.

Societal Considerations

One way to help gauge a third world country's capacity for aviation is from certain aspects of its society. Three general aspects of third world society—economics, education, and population distribution—comprise some of the more basic influences.

Economics. Foreign debt and its attendant economic issues are among the most consuming problems for the less-developed areas of the third world. Estimates indicate this debt exceeds $1 245 trillion, which is almost one-half of the combined third world gross national product (GNP).[11] The extent of an individual country's debt can generate incomprehensible cutbacks to essential programs and continual hardship. In countries of the sub-Saharan region, basic programs have been suspended on highways, waterworks, railroads, and power systems to make debt payments. These already overused and antiquated systems then have declined and crippled regions into further economic isolation.[12] Radical actions to repay the debts cause even more problems.

In 1980 these sub-Saharan countries averaged annual personal incomes between $200 and $750. Even today the numbers have not appreciably changed.[13] Nigeria, with an annual personal income of $250, is still responsible for a debt exceeding 108 percent of its GNP. High inflation drives the average purchasing power down even further as most of the countries suffer average inflation rates of 56.8 percent.[14] In Nigeria, just dealing with the economic problems of chronic debt, low income, and inflation robs any growth potential.[15] Little money remains for even the most basic needs.

Without answers, the problems only get worse with continuing population growth. At current growth rates, third world populations are increasing rapidly, and in some areas worse problems are just ahead. Nigeria's population will double in 25 years, which will require a corresponding increase in their food supply and economic output.[16] The harsh reality is, many areas can neither afford the necessary technology to improve production nor apply the technology just to feed the people. The farm labor situation that exists in sub-Saharan Africa illustrates part of the problem. In this region, where people are now starving, farm labor is only 1 percent mechanized, 10 percent draft animals, and the remaining 89 percent is done by human labor.[17] The people can neither understand, maintain, nor operate complex equipment to improve crop yields. These countries are bound up in this "economic poverty and technological backwardness," and their conditions will not improve.[18]

Whatever the third world's need for aviation, aircraft must be cost-effective and affordable in relation to their other constraints. The predicament that must be avoided is operating aircraft with requirements in excess of the country's internal capacities to support. Consider a recent SOF joint/combined exercise at a classified Latin American location. AFSOF initially planned the one to two week exercise so large that operations would have used the host air force's entire quarterly allocation of aviation fuel. Even smaller exercises conducted with fewer aircraft can easily overwhelm the capacity of some hosts.[19]

Education. Without a large class of educated workers, the third world will never be able to operate or adopt the complex modern equipment that would help solve their sociological problems.[20] During colonial days, these areas avoided the high illiteracy and low education predicament by hiring from outside their borders. As a result, the newly independent countries never fully recognized or solved their real education and technical problems.[21] Now, because money is just not available, education suffers from extremely low funding.[22] At present levels, Ethiopian teachers earn just 20 cents a month from their students; in the Sudan, it means even fewer teachers and results in illiteracy for almost three-quarters of the adults. Education continues at inadequate levels and has very little chance of improvement, which means the countries will remain seriously short of trained people, and unable to operate, maintain, or apply new technical systems.[23] Appropriate machinery for these people must be reliable, yet simple to operate and repair.

Population Patterns and Lines of Communication. Many factors—trade routes, geography, and climate—influence where people live. In Africa, these factors resulted in major population centers locating along the coasts and avoiding the interior areas. The few groups drifting inland oriented near resources or along the growing LOCs.[24] In South America, limited natural ports, restrictive interiors, and harsh climates impeded movement, so the people clustered for reasons of convenience and occupied only one-third to one-half of their countries.[25] This clustering left settlements widely separated from each other and many regions sparsely populated or empty.[26] The LOCs—roads, railroads, bridges, and airports—similarly formed an uneven pattern across the countryside. The result is sparsely populated and empty regions having little or no connections—isolated from sources of development and outside trade.[27]

The extreme cost involved in developing basic overland transportation creates a major problem for these countries to ever get access to the isolated areas. In Africa it is cost prohibitive to build surface transportation across the vast undeveloped interior. In South America the costs are tremendous to build over physical obstacles such as the rugged Andes.[28] The third world economic situation will simply not permit the necessary sizable investments into surface transportation. The only way for many of these countries to develop their interiors is with low-cost air LOCs. Many plantation owners and large corporations recognized that air connections were the only realistic avenues available in their particular areas to allow them to administer their operations. In these underdeveloped areas, typical austere airfields are not difficult to access, with the right kinds of aircraft. The former commander in chief of European Command, Gen John R. Galvin, testified before the House Appropriations Subcommittee, "Latin America is built for small aircraft flying into coffee areas, into sugar cane and pineapple areas—small fields."[29] Although these airstrips are not carved out everywhere, inexpensive short takeoff and landing (STOL) aircraft can operate from most open spaces. Austere airstrips combined with STOL aircraft offer an affordable option for regular, timely contact with all regions while overcoming cost and geographical constraints.[30] In essence, STOL aircraft make small airfields stepping-stones to the hearts and the minds of otherwise isolated people.

Operational Considerations

Three factors bearing heavily on the conduct of air operations within the third world are foreign sensitivities to US presence, threats to aviation, and the availability of suitable airfields. Where sensitivities relate primarily to the US, threat and airfield factors have relevance to both the US and the host country.

Sensitivities. The US is not always well received in the third world. At times the mere presence of US forces irritates the locals. Despite the reason for their sensitivity, whether misperception or reality, it will affect the mission.

FID missions must be based on cooperation and support from the host country. To gain and keep foreign support, US actions must foster mutual trust and confidence and dispel misperceptions. In other words, host governments and populations must *believe* US intentions are well-aimed and appropriate.[31] Should they perceive otherwise, the general stability and cooperation necessary for success will unravel.[32]

Unfortunately, the US has lost trust and confidence in the past by muscling into nations and carrying out hidden agendas. Sensitive to unwelcome advances, the third world is often skeptical of US activity. As an example, weigh the Latin American response to US actions in Grenada and Panama. To some countries, the US action was seen as an unnecessary interference. For many Latin Americans, their fear is one of a renewed US interference that will only continue along this same line of *indiscretion*.[33]

To avoid US dominance, or the appearance of being dominated, foreign officials feel they must control US access and activities.[34] We have all read about these places in recent headlines. In the process, third world governments regularly delay or deny US requests for many activities. For example, during CABANAS 89, a joint/combined exercise, Honduran officials did not allow the use of CASA-212 aircraft in the exercise because of political sensitivities.[35] In Operation Provide Comfort, the Turkish government was unwilling to allow AFSOF aircrews to train to proficiency in Turkey. To maintain aircrew currency, then, AFSOC had to replace the aircrews as they became noncurrent, or to fly aircraft and aircrews into other countries for training. On the dramatic side, in 1992 the Peruvian government sought to define US limits by having their pilots knowingly strafe a clearly marked US C-130 while it was on an approved mission. This incident took place within airspace that Peru has considered its territory but the US recognizes as international.[36] At times, foreign officials will respond in different ways to show their upper hand over US activity.

People are also sensitive to US policies that dictate to them. For instance, President Carter attempted to export US human rights policies. Many governments in the third world were unwilling to accept the human rights policy, and US pressure disrupted what had been a predominantly warm relationship.[37] If US policies are well received otherwise, they may still rile internally hostile factions, making US bases targets for indiscriminate attack.[38] All of these are deciding factors. The outcome of foreign sensitivities frequently means *the US must base and operate in out-of-the-way locations, under heavy security, or with low signature aircraft* such as small utility planes that can blend with general aviation.

Aware of the particular *sensitivities* within a host country, US diplomats must act to minimize the *size* of US forces deploying for operations other than war.[39] These diplomatic limits on personnel and aircraft, while necessary for political reasons, can complicate missions. Some of our aircraft and manning levels do not lend themselves to tailoring. The only night surveillance aircraft available for recent operations in Panama (AC-130s) required two aircrews of 14 personnel each and over 30 maintenance technicians. This surveillance could have been done with a Pilatus PC-6 Turbo-Porter, four crew members, and two maintenance workers—a whole chapter will be devoted to these types of aircraft later.[40] In this type operation (operations other than war), US forces must be prepared to contend with diplomatic sizing limits.[41]

Threat. Within the scope of AFSOF's third world FID operations, US and host-country aircraft may engage a variety of low-level threats. This report assesses that the most challenging threats that aircrews may encounter during FID missions are those found within insurgent/guerrilla sanctuaries of neighbor countries. Insurgents are likely to choose sanctuaries in unforgiving terrain along border regions of neighbor states that allow them to recuperate and prepare new offensives against the government. If the country at threat does not act against these insurgents in sanctuary, it concedes them great advantages.[42] Necessary host-country missions, whether conducted solely for intelligence gathering or for more aggressive offensive operations, must survive threats the sanctuary government may bring against them. The air order of battle of the sanctuary countries suggests a real lack of balanced and integrated forces that can oppose measured strikes of a country protecting its internal security. This does not mean to imply such lesser-developed neighbor countries do not have modern, high technology weapons.[43] On the contrary, for example, the Sudan, a former USSR client, has depended upon foreign sources to outfit and maintain its air forces. In the past, the Sudanese have received equipment from the Soviets as well as from the US. As of 1991, however, shortages in parts and maintenance expertise have degraded their equipment, leaving 16 out of their 17 MiG-21 and MiG-23 aircraft inoperable and 50 percent of their unarmed helicopters unflyable, and a shortage of aviation fuel has halted pilot training and grounded aircraft.[44] When well maintained, this equipment is capable, but indications are that much of their equipment remains inoperable, and this state of decay also appears throughout their radar systems and vintage missiles. These problems of the Sudan prevail in other potential sanctuary countries as well.[45] The combination of degraded air capability and ground threats to counterinsurgent aviation form a primarily low-threat environment, with said defensive capabilities improving only around the more high-value, heavily populated areas. These defenses are less effective when employed outside their intended operating environment such as in sparsely populated or isolated areas, the only places where counterinsurgents would act against insurgents in sanctuary. Most countries so supporting insurgents are without the resources or the expertise to extend their protection beyond their own populated and valuable areas, especially following the demise of the Soviet Union. Therefore, the military capability of sanctuary governments to oppose counterinsurgent aviation remains questionable for daytime operations and virtually nonexistent at night.[46]

Another threat in this third world setting comes directly from the guerrilla/terrorist. This enemy is a common concern for FID missions, as well as for other host-country operations. Although this enemy is mobile, he is not well armed or supplied when compared to national forces. Guerrillas base out of camps hidden in isolated regions. Primarily roving bands, they carry weapons that are necessarily light to aid in their quick-strike-and-hide tactics. Typical weapons, according to Mr Jerome Klingaman, an expert in guerrilla tactics, include manually operated 12.7-millimeter (mm) and 14.5-mm guns and those small arms that are easily obtained and portable. Large, electrically operated weapons requiring well-trained crews are not feasible; however, guerrillas will use small caliber anti-aircraft artillery (AAA) and have in the past demonstrated the propensity to use infrared surface-to-air missiles (IR SAM).[47] Although not extremely well armed, the typical guerrilla nevertheless has capable weapons and can employ them effectively against slow-flying aircraft.[48]

Runways and Airfield Capacity. Most capital cities and larger population centers within the third world have airports that can support medium to heavy jet aircraft. But because of traffic congestion, operational security, sensitivities, and limited support facilities, only a few are appropriate for military operations.[49] Operating from just a few centrally located bases creates problems for the US. It restricts potential mission range, capability, and flexibility of aircraft and negates the opportunity for low-visibility, clandestine, or covert operations.[50] Further, aircraft operating centrally and under the view of observers present rich targets for enemy action, whether guerrilla, terrorist, or otherwise.[51]

Even if airstrips are not at risk from enemy activities, the local weather patterns described earlier can disrupt operations. Seasonal rainy weather in South America, for instance, regularly washes out landing strips, and some remain largely unusable until engineers can resurface during the dry season. Weather was a major influence on the use of aircraft in JCS exercise CABANAS 89 in South America. An exercise report stated: "The 'rainy' season weather was a major consideration in almost all operations involving air transport or support for both fixed-wing aircraft and helicopters."[52] An inadequate number of helicopters or STOL aircraft handicapped efforts to sustain troops or remove them from the field. Eventually, the exercise task force resorted to contracting for civilian transportation to meet these *operational* needs in the field.[53] In exercise KINDLE LIBERTY 86, the lack of airfields for large aircraft compelled US operations to overrely on helicopters to provide unit ground support. The exercise report stressed that these problems would have been alleviated by flying STOL aircraft from nearby short, austere airstrips.[54] These types of aircraft can also be used on dirt roads and other small areas of adequate clearance.

One must also remember there are few large runways in South America or Africa suitable even for C-130s, the US Air Force's smallest tactical transport. In South America C-130s can operate from *only* 5.4 percent of all runways (one out of every 20). The situation is not much better in Africa: *only* 15 percent (three out of every 20).[55] The simple fact is, as the runway requirements—length, width, and weight-bearing capacities—decrease, the number of actual runways within a given theater that are usable by that aircraft will increase. Yet, simply because an airfield is suitable for C-130s does not mean the airfield can accept more than one aircraft on the ground at a time. In fact, in many cases ramp space is often the limiting factor.[56] Appendix B provides further data for airfield availability.

Implications for Aviation

The preceding environmental, societal, and operational considerations imply several challenges for aviation. Aircraft must be equipped to allow flight in instrument weather conditions while operating over unsurveyed areas where navigation aids are unreliable or nonexistent. In some areas, such as in equatorial and coastal regions, weather radar is a necessity. During operations in high terrain and high temperatures, design performance must allow for mountainous overflight without sacrificing payload. Lastly, because of geographic distances between and within continents, aircraft must be able to initially relocate over long distances without time-consuming delays. This may require transport by longer-legged aircraft, or long-range flight operations with air refueling. To extend operations within the country may require improved fuel efficiency, the provision to carry additional fuel, and/or the capability to operate from certain strategic (intermediate) locations.

To minimize sensitivities, AFSOF must be able to respond with low visibility—small and unobtrusive—military packages tailored to minimize diplomatic interference and reduce regional sensitivities.[57] These operations need smaller and more reliable aviation systems that are simple to operate and maintain away from the visible large, fixed-base support facilities. Simple and more reliable aircraft mean smaller aircrews, fewer maintenance personnel, less repair equipment, and minimum logistical support. Characteristics emphasizing simplicity and reliability will remove the normal tether to central repair facilities and large aircrew and maintenance housing. Abandoning the need for facilities and large numbers of people allows units to disperse throughout several small locations, thus enhancing low profile operations.

In any theater, enemy threats can interfere with the effectiveness of aircraft to support host activities. The setting calls for small-profile aircraft equipped with night vision goggles (NVG), mounting and wiring to carry optional forward-looking infrared (FLIR), and the global positioning system (GPS) to aid night operations and accurately circumnavigate known threat rings. However, not all missions are conducive to these night operations, or secure from enemy threats. To minimize the exposure to threats, aircraft must fly faster than small helicopters, quietly, and be able to operate above small arms fire or safely at lower altitudes. To increase survivability both day and night against unexpected threats, aircraft must also be equipped to carry, as a minimum, *strap on* chaff and flare dispensers, infrared countermeasures (IRCM), and missile warning receiver (MWR) equipment. Furthermore, aircraft designs must effectively shield their IR emissions from ground detection.

The capability of aircraft to access and use the small, austere airstrips and open areas that are available is critical. The use of these sites increases aircraft ability to service the entire countryside, including otherwise isolated interior regions. It also increases the employment options and the opportunity for low visibility and for covert and clandestine operations.

The FID mission is a difficult situation for AFSOC. AFSOC must be able to assist the host country by performing their internal missions and also by training and advising from practical aviation platforms. These platforms must be appropriate for the host's particular needs, yet not surpass their internal capacity to operate and maintain them. The consequence of exceeding host-country capacity is to bypass a primary goal for achieving host-unit self-sufficiency. *Failing to establish self-sufficiency sets the host country up to depend on direct US assistance.*[58]

The reality of limited third world educational and economic resources means these countries must make the insightful, cost-effective choices that are justifiable to citizens living in poverty, disease, and famine. Aircraft that are within their means and meet their needs are those dependable and both easily and quickly deployed into outlying areas. They are also low-cost, low-maintenance aircraft with minimum special equipment, and able to perform in both security and civilian roles. Finally, these aircraft are simple enough for citizens with high school equivalency to operate and maintain.[59] The time is now right for thoughtfully reflecting on AFSOC's future force structure—both its composition and size—for contending with the demands of this evolving FID mission.

Notes

1. *Oxford Atlas of the World*, (New York, N.Y.: Oxford University Press, 1992), X, XIV.

2. Michael D. Olien, *Latin America: Contemporary Peoples and Their Cultural Traditions* (New York, N.Y.: Holt, Rinehart and Winston, Inc., 1973), 7; Kempton E. Webb, *Geography of Latin America: A Regional Analysis* (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1972), 33.

3. Maj H. Scott Murphy (Ret.), Niceville, Fla., interview with the author, 12 August 1993.

4. A.T. Grove, *Africa*, 3rd ed. (Oxford, U.K.: Oxford University Press, 1978), 16.

5. Denis Riley and Lewis Spolton, *World Weather and Climate* (Cambridge, U.K.: Syndics of the Cambridge University Press, 1974), 99; Simon Collier, Harold Blakemore, and Thomas E. Skidmore, eds., *The Cambridge Encyclopedia of Latin America and the Caribbean* (Cambridge, U.K.: Press Syndicate of the University of Cambridge, 1985), 19.

6. Paul E. Lydolph, *The Climate of the Earth* (Totowa, N.J.: Rowman & Allanheld, 1985), 330; Riley and Spolton, 104; Grove, 18-20.

7. Grove, 18; Lydolph, 302-3, 327-8, 330. This example is of Columbia. Webb, 37.

8. Collier, Blakemore, and Skidmore, 23.

9. Lydolph, 309; Roland Oliver and Michael Crowder, eds., *The Cambridge Encyclopedia of Africa* (Cambridge, U.K.: Press Syndicate of the University of Cambridge, 1981), 41. An example would be the sudden dust clouds, ***haboobs***, which no one correctly understood while flying en route to Desert One on the Iranian hostage rescue mission. The experience is described by Col James H. Kyle, US Air Force (Ret.), with John Robert Eidson, *The Guts to Try: The Untold Story of the Iran Hostage Rescue Mission by the On-Scene Desert Commander* (New York, N.Y.: Orion Books, 1990), 178, 246, 248, 254. Col Kyle is one of the US Air Force officers who helped plan and execute the Iranian hostage rescue attempt in 1980. He knows firsthand of the effort that went into planning this mission and witnessed the surprise ***haboob*** from his lead MC-130 inbound to the Desert One landing site.

10. Webb, 35; Lydolph, 318-9.

11. George Kurian, ed., *Atlas of the Third World*, 2nd ed. (New York, N.Y.: Facts On File, 1992), vi.

12. Ibid.

13. Ibid., v; *Annual income* is the per capita GNP in US dollars.

14. Ibid., vi; The quoted 56.8 percent inflation is for middle-income countries of the third world.

15. George Thomas Kurian, ed., *Encyclopedia of the Third World*, 4th ed., vol. 2 (New York, N.Y.: Facts On File, Inc., 1992), 1441.

16. Edward G. Stockwell and Karen A. Laidlaw, *Third World Development* (Chicago, Ill.: Nelson-Hall Inc., 1981), 17; Kurian, *Atlas of the Third World*, xi; Helen Chapin Metz, ed. *Nigeria: A Country Study*, 5th ed. (Washington, D.C.: US Government Printing Office, 1992), 96.

17. Pierre Etienne Dostert, J.D., *Africa 1992*, 27th ed. (Washington, D.C.: Stryker-Post Publications, 1992), 5.

18. Robert H. Jackson, *Quasi-States: Sovereignty, International Relations, and the Third World* (New York, N.Y.: Cambridge University Press, 1990), 189; Stockwell and Laidlaw, 16.

19. Murphy interview, 12 August 1993; Lt Col Steven S. Whitson and Mr Jerome W. Klingaman, Headquarters Air Force Special Operations Command, Security Assistance and FID directorate, Hurlburt Field, Fla., working discussion, 13 August 1993.

20. Steven R. David, "Why the Third World Still Matters," *International Security* 17, no. 3 (Winter 1992/93): 141.

21. Dostert, *Africa 1992*, 7.

22. Kurian, *Atlas of the Third World*, viii. Despite the tremendous demand for an educated work base today, the third world funds education at a rate 16 times lower than in the developed world. This is a contributing reason why almost one-half of the third world remains illiterate.

23. Dostert, *Africa 1992*, vii; Helen Chapin Metz, ed. *Sudan: A Country Study*, 4th ed. (Washington, D.C.: US Government Printing Office, 1992), 111-3.

24. Dostert, *Africa 1992*, 3; *Oxford Atlas of the World*, 23. This inland setting is other than scattered groups such as nomads and tribes who do not depend upon outside contact.

25. Pierre Etienne Dostert, J.D., *Latin America 1992*, 26th ed. (Washington, D.C.: Stryker-Post Publications, 1992), 6. In Ecuador less than one-half of the country is occupied by over 90 percent of the people. This is mentioned in Dennis M. Hanratty, ed., *Ecuador: A Country Study*, 3rd ed. (Washington, D.C.: US Government Printing Office, 1991), 54, 57-8, 66; George Thomas Kurian, ed., *Encyclopedia of the Third World*, 4th ed., vol. 1 (New York, N.Y.: Facts On File, Inc., 1992), 528.

26. Kurian, *Encyclopedia of the Third World*, vol. 1 528; *Oxford Atlas of the World*, 22-3.

27. Olien, 7.

28. Dostert, *Latin America 1992*, 6.

29. House, *Department of Defense Appropriation for 1988: Hearings before a Subcommittee of the Committee on Appropriations*, 100th Cong., 1st sess., 1988, 979.

30. Webb, 65.

31. The key questions are: What does it take to make leadership *believe* your force structure and manning are appropriate? Is the answer less aircraft, smaller aircraft, and/or fewer people?

32. Group Captain Keith Chapman, *Military Air Transport Operations* (Washington, D.C.: Brassey's International Defense Publishers, 1989), 182-3.

33. Dr Patrice Franko-Jones, assistant professor of economics and international studies at Colby College, "Conflict and Cooperation in US-Latin American Security Relations," presented to the National Defense University, November 1991.

34. Jeffrey Record, *U.S. Strategic Airlift: Requirements and Capabilities* (Washington, D.C.: Institute for Foreign Policy Analysis, Inc., January 1986), 3-4; Terry D. Bearce, special applications technology division, Los Alamos National Laboratory, *USSOUTHCOM-USSOCOM Joint Mission Analysis Final Report, vol. 2, Main Report (U), Appendix E, Red Team Final Report (U)* (MacDill AFB, Fla.: 1 August 1990): E-7. (Secret) Information extracted is unclassified. Bearce writes,

> All evidence points to an increasing sensitivity toward US forces on the ground in other nations. This is not only true for USSOUTHCOM's theater, but increasingly so throughout the world. We suggest that a concept of minimum force will become the norm.

35. Col Wicks, "Summary - CABANAS 89," Joint Universal Lessons Learned (JULLS) Long Report, submitted by SOCSOUTH, JULLS number 02052-61351 (03024), 25 August 1989.

36. "Peru knowingly downed U.S. plane in 1992," *The Washington Times* 12, no. 144, Monday, 24 May 1993, 2; Barbara Starr, "Peruvian 'Fitters' attack US C-130," *Jane's Defence Weekly* 17, no. 19 (9 May 1992): 796. Consider also the French and Spanish authorities denying F-111 overflight during Operation El Dorado Canyon, the counterterrorist strike and raid on Libya.

37. Dostert, *Latin America 1992*, 18.

38. Kurian, *Atlas of the Third World*, ix; David, 133, 137.

39. Col Steven E. Cady, *The Country Team: The Critical Interface Between the Department of State and the Department of Defense* (Maxwell AFB, Ala.: Air War College, Air University, May 1991), 32-33.

40. Murphy interview, 12 August 1993.

41. In military operations other than war, the military is simply a supporting element to all the other instruments of national power.

42. Philip Anthony Towle, *Pilots and Rebels: The Use of Aircraft in Unconventional Warfare 1918-1988* (London: Brassey's Defence Publishers, 1989), 211-12.

43. Joint Publication 3-07 (Draft Final), *Joint Doctrine for Military Operations Other than War*, April 1993, I-6; RAdm Phillip R. Olson, US Navy deputy director, strategy and policy Joint Staff/J-5, "Low Intensity Conflict: Myths and Trends," address to the Joint Staff/J-5 and A-AF CLIC Planning and Policy in LIC conference, Hampton, Va., 13 December 1988.

44. Metz, *Sudan*, 248-9. The Sudanese lack of aviation fuel may not be completely due to shortages in parts and maintenance expertise. It may also include the lack of a supplier. Nevertheless, this situation does hamper their capacity for aviation.

45. Ibid., 288. This data reflects the general character of the Sudan. Other third world countries are similarly armed.

46. Murphy, telephone interview with author, 6 May 1993. Murphy and I agree on the military threat posed by third world countries within this context of FID and UW missions.

47. Jerome W. Klingaman, "Light Aircraft Technology For Small Wars," in *Low-Intensity Conflict and Modern Technology*, ed. Lt Col David J. Dean, USAF (Maxwell AFB, Ala.: Air University Press, June 1986), 133. Klingaman does not specifically mention AAA. "The Alchemy of Turning Guns into Luxury Villas," *U.S. News & World Report* 103, no. 22 (30 November 1987): 36; John Chipman, "Third World Politics and Security in the 1990s: 'The World Forgetting, By the World Forgot'?" *The Washington Quarterly* 14, no. 1 (Winter 1991): 165; Rakiya Omaar, "Somalia: At War with Itself," *Current History* 91, no. 565 (May 1992): 230; Olson, address to LIC conference, 13 December 1988; James R. Locher III, assistant secretary of defense for special operations and low-intensity conflict, "The Special Operations Challenge of the 1990s," *Defense Issues* 5, no. 5, remarks prepared for delivery to the 1st Annual Symposium, SO-LIC Division, American Defense Preparedness Association, Alexandria, Va., 4 December 1989 (Washington, D.C.: American Forces Information Service): 2. Guerrillas and insurgents can obtain IR SAMS and other hard-to-find weapons from cash purchases, border thefts, and through relationships with narcotraffickers. In some areas of South America, guerrillas, terrorists, and narcotraffickers work together for convenience. Narcotraffickers supply money for guerrilla or terrorist weapons, and receive protection in return.

48. Robert Evans, "Missile Downed Bosnia Relief Plane, Report Says," *Reuters*, Wednesday, 16 September 1992; Jean de Galard, "French Jaguar shot down in Chad," *Jane's Defence Weekly* 1, no. 4 (4 February 1984): 142; Charles Mohr, "Contras Say They Fear a Long War," *The New York Times* 85, no. 46,807, Monday, 16 June 1986, A8; Pico Iyer, "Sudan: Stranded amid the Gunfire," *Time* 128, no. 9 (1 September 1986): 34; William Claiborne, "S. African Military Says Intervention in Angola Staved Off Rebel Defeat," *The Washington Post*, no. 343, Friday, 13 November 1987, A28; Metz, *Sudan*, 248-9.

49. AFM 2-11, *Air Force Operational Doctrine: Foreign Internal Defense Operations,* 3 November 1992, 6.

50. AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force,* vol. 2, March 1992, 94-5, 202.

51. AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force,* vol. 1, March 1992, 15.

52. Wicks, "Summary - CABANAS 89," 29 September 1989; Col Wicks, "Alternate Transportation," JULLS Long Report, submitted by SOCSOUTH, JULLS number 22348-48289 (03029), 25 August 1989.

53. Wicks, "Summary - CABANAS 89," 25 August 1989; Wicks, "Alternate Transportation," 25 August 1989.

54. "Short Takeoff/Landing (STOL) Aircraft," JULLS Long Report, submitted by USSOUTHCOM, JULLS number 31745-36675 (00467), 2 May 1986.

55. Don Burgett and Bill Buckwalter, Defense Mapping Agency Aerospace Center for Mapping, Charting, and Production, Section B, author request for special aeronautical information 048/93, 10 December 1992, 19 March 1993, and 1 July 1993. In this example, South America has 443 out of 8,224 runways available for heavy C-130s. In Africa, there are 642 runways available out of 4,274. The reader should note there are 2,038 runways in South America that are of an unknown weight-bearing capacity, and 243 in Africa. These runways are not included in any calculations. Light and medium-lift STOL aircraft operate well under these conditions of small airstrips and limited ramp space. In South America, runway availability for *fully-loaded* light STOL aircraft such as the Pilatus PC-6 Turbo-Porter is 91.1 percent. For *fully-loaded,* medium-lift aircraft like the Basler 67 Turbo, it is 44.2 percent. The Pilatus Porter can access 7,491 out of 8,224 runways. The Basler Turbo can access 3,633 out of 8,224 runways. These runway numbers include helicopter landing pads rated with load classification numbers (LCN).

56. Bearce, E-13. (Secret) Information extracted is unclassified. The USSOUTHCOM-USSOCOM JMA notes that of the few airfields able to handle fixed-wing aircraft, "even a smaller percentage have sufficient space to handle more than one aircraft at a time."

57. Paul F. Gorman et al., regional conflict working group, *Supporting U.S. Strategy for Third World Conflict* (Washington, D.C.: Pentagon, 30 June 1988), 26.

58. Exceeding the host-country's capacity is to revisit an earlier experience of the air commandos in Vietnam. In this instance, air commandos set out to train the South Vietnamese air force to fly combat missions. However, the commandos eventually took over the flying operations, because the aircraft and missions exceeded host air force capabilities. As Lt Col Dean put it, "the commandos relied more on doing it themselves than on training local forces." *This is what AFSOC must avoid—taking over the flying operations.* The way to avoid preempting host efforts is to advance aircraft that are within the means of each host country. See Lt Col David J. Dean, "The USAF in Low-Intensity Conflict: The Special Air Warfare Center," *Air University Review* 36, no. 2 (January-February 1985): 53-4; See also Towle, 159.

59. Technical career fields within third world countries compete seriously for the dwindling numbers of highly-educated workers. As a result, many of these workers are not available to serve aviation needs.

CHAPTER 3

AIR FORCE SPECIAL OPERATIONS AIRCRAFT

Air Force special operations forces must be ready not only to conduct special operations missions anywhere in the world but also to participate in any directed collateral activities. These are the challenges confronting a small force structure composed of only six types of aircraft—four versions of Lockheed C-130s and two classes of Sikorsky helicopters—that over time have taken on complex and costly enhancements.[1] The preceding chapters described the foreign internal defense mission and the general setting where operations must be conducted. This chapter describes the general features common to all Air Force special operations forces aircraft, and then more specifically their particular fixed- and rotary-wing characteristics. Finally, it relates the characteristics and capabilities of each aircraft as they may apply to achieving key operational objectives in any third world FID context. Appendix C provides additional background for this appraisal.

Central Aircraft Features

Air Force Special Operations Command's aviation force structure is unique, with one-of-a-kind adaptations that make its aircraft stand out from conventional platforms. For example, air refueling, precision radar and navigation, communications, and protection and self-defense capabilities are similar in all these aircraft. Past worldwide operations and exercises show the obvious effectiveness of these enhancements and imply that others are necessary for the future. Yet despite similarity in capabilities and even in types of equipment between aircraft, often the complex—at times almost overwhelming—problems lie in supplying, maintaining, and integrating the equipment that makes up each individual weapon system. Though the nature of special operations missions demands these complex modifications and enhancements, they do, in turn, make AFSOF aircraft costly to acquire and operate.

All AFSOC aircraft types benefit from range-extending air refueling systems. Of all the aircraft, only a few HC-130s still operate strictly from internal fuel tanks as they await their final air refueling modifications.[2] The capability to air refuel is now so common in special operations forces that operators and staff often take its benefits for granted. The capability is extremely valuable for special operations, because it increases range and mission endurance, eliminates ground delays, and allows overflight of intermediate servicing facilities. One additional AFSOC aircraft—the MC-130—carries the helicopter refueling modification as exists on HC-130s. Quite different from conventional refueling operations, this difficult helicopter refueling occurs most often at night during low-level flight under night vision goggle (NVG) procedures. Figure 2 shows an MH-60G Pave Hawk maneuvering for rare daytime refueling with an HC-130 Combat Shadow. With all the benefits to be gained by air refueling, the procedure does not always simplify composite AFSOF operations. It can increase the coordination and numbers of aircraft involved, possibly endangering low visibility, clandestine, or covert operations.

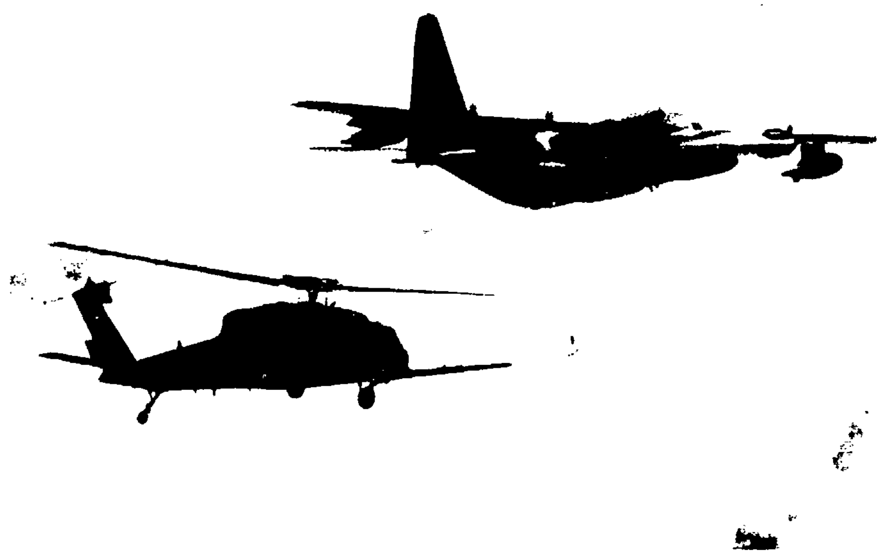


Figure 2. Helicopter Refueling
Photo Source: United States Air Force

For precise navigation and target discrimination during day, night, or adverse weather, AFSOC aircraft rely on sophisticated equipment (fig. 3), integrated with onboard avionics and navigation aids. Some systems are passive, such as the Navstar global positioning system (GPS), inertial navigation system (INS), self-contained navigation system (SCNS), or infrared sensors. Others are active emitters, such as ground mapping and weather radar or electronic sensors. Each aircraft carries a mix of these systems to accurately fly low-level operations, deliver troops, or lay down discriminating firepower. Precision sensors and navigation systems on AFSOC aircraft add tremendous operational capability and build customer confidence. As Lt Col Jim Connors, commander of an AC-130 gunship squadron proudly attests about the capability of his aircraft equipment and aircrews, "We can come in, identify the target, find out where the good guys are, and make sure they are protected."[3] This same AC-130 can put a 105-mm round into an area the size of a pickup bed only yards from friendly forces. Sophisticated, integrated systems allow other AFSOF aircraft to demonstrate similar capabilities in their missions.

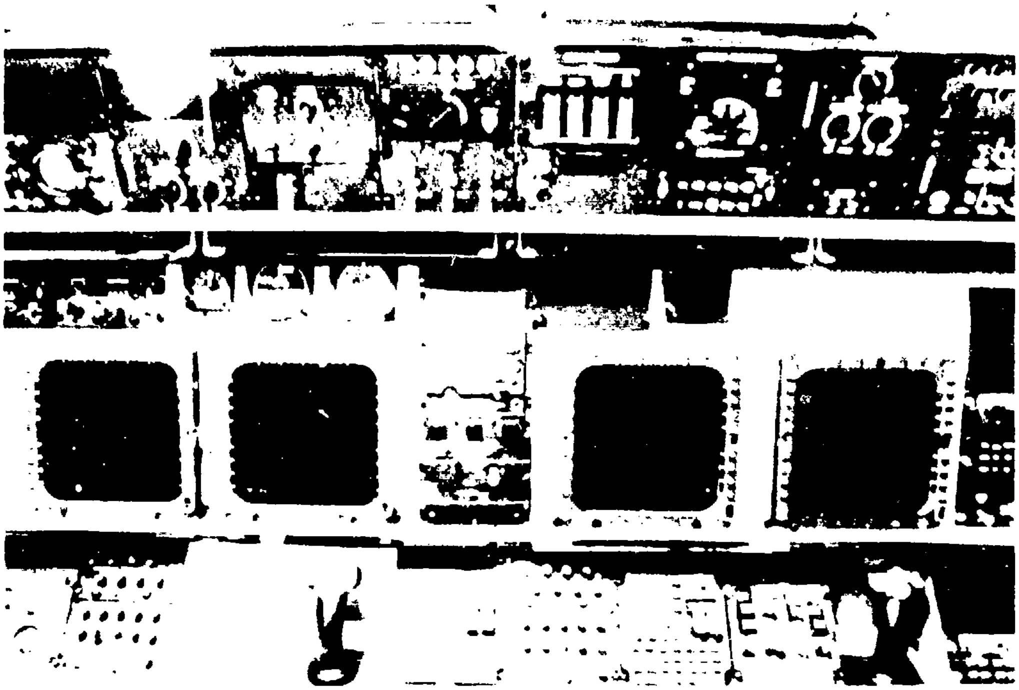


Figure 3. Complex Avionics on the MC-130H Combat Talon II
Photo Source: United States Air Force

All AFSOF aircraft rely on extensive communications systems, ensuring responsive worldwide command, control, and communications capability. They depend on multiple systems and the capability to integrate and operate with other SOF, conventional, and allied forces. This means each aircraft carries a complete array of radios including satellite communications (SATCOM), high frequency (HF), ultra-high frequency (UHF), and very-high frequency (VHF) radios. This type of equipment is becoming increasingly complex, and more frequently, operators depend on them to bring substantial time-critical information. For example, the Pave Low has carried digital data burst capability since 1989. To continue meeting the need for still more information, AFSOC intends to enhance other aircraft with improved communications equipment and real-time intelligence.

Still other equipment affords protection and self-defense capabilities for missions in hostile territory. In some cases, the latest in ceramic armor designs shield crew compartments from small arms fire. In others, engineering features allow fuel tanks to sustain small arms hits without exploding. Besides design protection, aircraft are also outfitted with equipment that reduces their vulnerability to threats. The newest IR detection systems (IDS), radar warning receivers (RWR), missile warning receivers (MWR), ECM, chaff and flare systems, and noise jammers detect, confuse, and deceive the enemy's weapons.[4] Yet perhaps the best defense for all combat AFSOF aircraft is their unique ability to operate at night.[5] Crews depend on darkness to limit enemy optical capabilities, and they practice with NVGs to enhance this capability. Thus, to conduct its varied missions in the cover of darkness throughout the world, AFSOF depends on these very specialized systems.

AFSOF aircraft are not simple to operate nor maintain (fig. 4). Unique missions call for state-of-the-art equipment, large crews, and extensive training programs to build and maintain a high degree of flying and maintenance proficiency. For example, the AC-130H has a crew of 14 people, and for every hour flown, specialists must perform 48.7 hours of maintenance.[6] For each

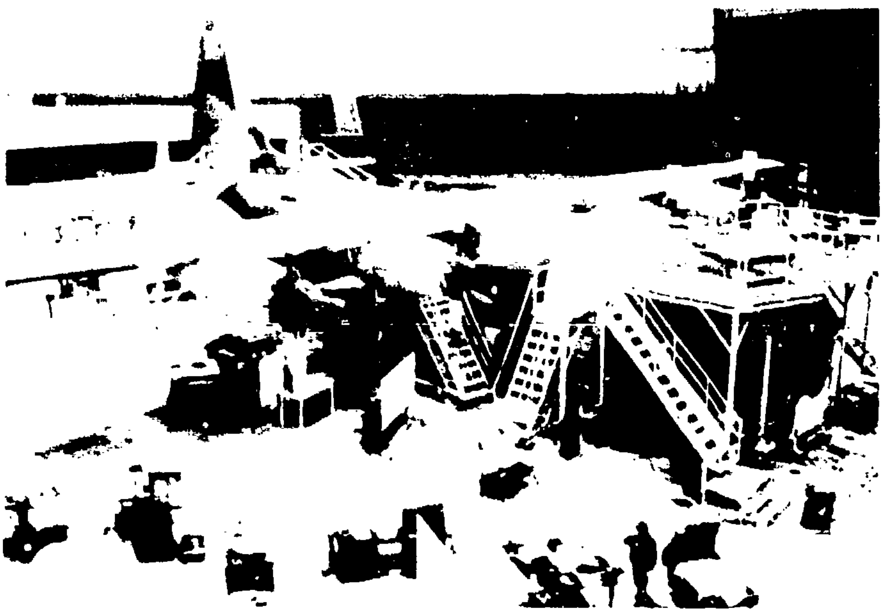


Figure 4. Regular Base-Level Maintenance on a C-130
Photo Source: United States Air Force

AC-130H, this degree of care requires over 67 maintenance personnel.[7] And when the airplanes leave on short one or two week deployments, normally 50 percent of permanently assigned maintenance personnel accompany them.[8] But even with these high levels of dedicated effort, mission capable (MC) rates are difficult to maintain—ranging from a low of 46.3 percent for the new MC-130H to a high of 79.7 percent for the AC-130H.[9] The fully mission capable (FMC) rates in appendix C are startlingly much lower. The limited numbers of SOF aircraft, demanding flying schedules, and complex systems magnify the maintenance and logistical dilemma. In some situations, not all of the aircraft have undergone the same modifications or enhancements, which causes even more maintenance and logistics complications.[10] "As they [AC-130s] were modified, they'd [specialists would] pull one box out and put another one in, so now there is a whole mishmash of systems," comments Maj Emmett Redding, an AC-130 evaluator. "It drives maintenance crazy—they hurt themselves working so hard."[11] SOF maintenance personnel must be ready for any type of work—from fixing vacuum tube technology equipment to repairing fiber optics and lasers.[12] In figure 5, the maintenance technician is repairing one of many complex *black boxes* found on every SOF aircraft. This complexity is one of the reasons AFSOC aircraft require regular attention from well-educated, technically-oriented maintenance personnel. According to Lt Col Spenser, an AC-130H assistant operations officer, these logistical complications force most of the gunship training to be flown right at home.[13]

Figure 5. Black Box Repairs
Photo Source: United States Air Force

AFSOF's complex aircraft are not only very expensive to own, they are expensive to operate. Acquisition prices are considerable—the most expensive is the AC-130U at $80 million, and the least expensive is the MH-60G originally costing $9.985 million. In addition to the initial airframe cost, there are also the hourly fuel, necessary maintenance, and the labor costs just to keep aircraft flying. These costs add up to $2,950 per hour for the AC-130H gunship,

$2,765 for the MH-53J Pave Low, and $491 for the MH-60G Pave Hawk.[14] Not surprisingly, the figures would be much higher if these aircraft were under civilian contract, since the military figures above do not reflect the air base support expenses that are also necessary to put aircraft into the air. This is important to remember when considering that these are the only aircraft AFSOC has to offer to financially strapped countries. Such operating expenses are far beyond the means of most third world countries.

Fixed-Wing Platforms

The Lockheed C-130 Hercules is a versatile four-engine turboprop aircraft that meets large payload and long-range aviation demands of the SOF community. After undergoing extensive internal and external modifications, C-130s contribute to SOF reconnaissance, surveillance, airlift, firepower, and intelligence gathering missions. Despite its rather large size—a wing span over 132 feet and a maximum operating weight of 155,000 pounds—the aircraft design and power plant yield some impressive performance capabilities. At maximum weights, it can operate from runways as short as 5,000 feet.[15] The C-130 can cruise at moderately high altitudes and airspeeds, ranging from speeds of 250 knots at low altitude, and close to 300 knots at higher altitude. Without additional internal fuel tanks or air refueling, the C-130 can reach locations well beyond a 2,000 nautical mile (NM) range.[16] With air refueling, it easily self-deploys worldwide and is limited only by crew endurance.

Lockheed MC-130 Combat Talon. Two generations of Combat Talon aircraft are flying AFSOF missions—the MC-130E Combat Talon I and the MC-130H Combat Talon II. Critical to missions are their terrain-following and terrain-avoidance (TF/TA) radar and precision navigation systems that together make day, night, or adverse weather low-level flight possible. These systems, linked with FLIR and NVG lighting, allow blacked-out landing and NVG terrain-following operations. During Operation Just Cause, three Combat Talons used their equipment to execute blacked-out landings at Rio Hato Airport while in the middle of firefights.[17]

The Combat Talon uses its penetration and arrival capabilities to perform many missions. Its main purpose is to provide forces mobility for joint and combined SOF through infiltration, exfiltration, and resupply methods. These methods include airland, multiple aerial delivery systems, and the Fulton surface-to-air recovery (STAR) system.[18] In the Rio Hato operation, two Talons landed to resupply helicopter gunships with fuel and armaments, while the third airlanded additional Rangers to secure the area.[19] The key capability for the Combat Talon is SOF mobility, but it can contribute in several other ways as well.

Although the Talon can contribute to PSYOP, its ability for surveillance and intelligence gathering is more limited. The Talon airdropped millions of PSYOP leaflets to Iraqi soldiers in southern Kuwait during Desert Storm.[20] Had the environment been less threatening at lower altitudes, the Combat Talon could have carried loudspeakers to broadcast similar messages. Later, the PSYOP effort intensified as Talons began delivering the world's largest conventional bomb, the 15,000 pound BLU-82.[21] However, the Talon is limited in its ability to contribute to surveillance and intelligence functions. The aircraft's low-level operating speed makes visual sightings nearly impossible, while forward looking infrared (FLIR) -aided observation is not much better because of poor clarity and a narrow field of view. Further, the Talon does not have a vertical or short takeoff and landing capability, and therefore cannot land at will to exploit human intelligence or other time-sensitive opportunities.

Lockheed AC-130 Spectre. AC-130A and H-models are currently the only two operational gunships. A newer generation U-model will begin arriving in 1993 as the older A-models retire. The gunship provides precision security and fire support capability for SOF and general purpose forces through integrated weapons, navigation equipment, visual and electronic sensors, and other features. It also aids reconnaissance and surveillance activities, although this potential is more limited.

The gunship has an impressive arsenal of side-firing weapons with several interlinked systems to accurately focus the firepower on an enemy. The H-model carries a 105-mm howitzer, 40-mm Bofars cannon, and two 20-mm Vulcan cannons. Weapons on this model and the earlier C-130 versions have continued to earn the gunship respect for the precise, effective firepower that brought the first dramatic successes against enemy trucks and troops in Vietnam. With such enhancements as its increased stand-off range, new 25-mm Gatling gun, and computer stabilized weapons, the new U-model improves on earlier capabilities. Unlike other gunships, the U-model's visual and electronic sensors can more accurately survey the battlefield, identify targets, and even receive electronic aiming inputs from participating ground forces. Quite often, onboard television and IR sensors enable the most discriminate, precision targeting. But for those times when fog, haze, or smoke obscures targets, the U-model's radar and electronic sensors by themselves can positively identify targets. With its all-weather fire-control radar, the U-model can clearly pick out targets under any conditions. The *Black Crow*, an electromagnetic direction finder, in the current H-model has also successfully tracked motorized vehicles.

The heart of the gunship is its fire-control computer, which makes its firepower extremely accurate. Here, sensor information combines with aircraft performance data to sight the weapons with discriminating accuracy. During Just Cause AC-130s fired explosive shells from 105-mm Howitzers into the

Panamanian Defensive Force (PDF) headquarters, the *Comandancia*, located in downtown Panama City. In only 10 minutes, gunships destroyed the roof and left the third floor on fire.[22] Firepower and visual sensors were so accurate, the surrounding area sustained minimum collateral damage. Special Forces and other troops displayed their confidence in Spectre systems by going into combat wearing tiny strips of glint (gated-laser illuminator) tape so that gunships could distinguish them from PDF forces.[23]

When not using its weapons, the aircraft has the capability to accurately aim its overt or covert illuminators at enemy forces, landing strips, or priority targets for air and ground forces. With laser technology, the gunship is also able to designate targets for other weapon systems. This unique blend of sensors, firepower, and other capabilities enables the Spectre to provide air base security, protect ground forces, and conduct escort operations.

Sensors also allow the gunship a limited reconnaissance capability. During Operation Urgent Fury in Grenada, gunships performed reconnaissance operations from an orbit over Point Salines Airfield. Sensor operators located runway obstructions early enough to allow following MC-130s to re-rig troops for an airdrop, rather than airland as planned.[24] Sensors were also valuable to search specific areas during Desert Storm, allowing AC-130H aircrews to fly armed reconnaissance missions into Iraq. Sensor operators searched specified areas to find and target Iraqi missiles.[25] However, with a limited field of view, the gunship cannot contribute greatly to surveillance operations, at least not until AFSOC operationally endorses the U-model systems and they are more fully evaluated.

Lockheed HC-130 Combat Shadow. In 1986 all active-duty HC-130s transferred to special operations after serving as air refueling and search and rescue assets in Southeast Asia. Since then, HC-130N and P-model tankers have taken on new equipment and the responsibility of extending the reach for SOF helicopters.[26] While the Combat Shadow is most valuable for the long-range air refueling it offers to helicopters, it can also provide limited support for airland or airdrop activity.[27]

The HC-130 is the least technologically advanced weapon system in AFSOC; consequently, the aircrews depend primarily upon NVGs for many night operations. The airplanes have been modified by adding enhanced navigation systems and NVG compatible lighting to aid night low-level flying or landings and takeoffs from unlit runways.[28] During a night Desert Storm rescue attempt from northern Turkey, an HC-130 accompanied two MH-53J Pave Lows in NVG low-level flight through Syria. The HC-130 refueled these helicopters at low altitudes for their rescue attempt into western Iraq.[29] With its special equipment, including the latest addition of a FLIR and an NVG heads-up display (HUD), both low-level and refueling rendezvous capabilities will definitely improve. Future programmed enhancements for Combat Shadow aircraft include updated defensive capabilities and communication systems.

Since most HC-130s carry large internal fuel tanks, the aircraft have limited cargo space to transport forces and equipment for airdrop or airland delivery missions. During Provide Comfort, HC-130s with internal fuel tanks provided a mix of refueling and airdrop support to disaster relief efforts, to include refueling Pave Low and Pave Hawk helicopters en route to Turkish avalanche victims. Simultaneously, they carried pararescuemen and special forces medics who were prepared for emergency airdrop should rescue helicopters be delayed.

Lockheed EC-130E Commando Solo. The EC-130E Commando Solo, whose mission was *black*[*] until 1986, provides PSYOP and civil affairs broadcasting primarily in the AM, FM, HF, TV and military communication bands.[30] The aircraft also can jam military communications frequencies, gather intelligence, and participate in disaster relief operations.[31] With their special pods and antennas, as well as extensive electronic communications capabilities, the Commando Solo is distinct from other special operations aircraft. Scheduled improvements will add worldwide connectivity through color TV, avionics for navigational accuracy, and aircraft survivability features for increasingly hostile operations. By December 1996, all six Commando Solos should be upgraded.[32]

Special operators working from control panels for the pod and antenna select a range of frequencies to conduct the aircraft mission. To transmit prepared information, the specialists can work with cassette or reel-to-reel tape, teletype, real-time relay of signals, noise modulators, and other means.[33] The operation uses antennas mounted on the tail, under each wingtip, deployed horizontally on a retractable wire from the tail, and deployed vertically on a 1,000 foot retractable wire from the belly.[34]

Commando Solo aircraft have operated during actions in Vietnam, Thailand, Grenada, Panama, and Southwest Asia.[35] As a part of Urgent Fury, EC-130s broadcasted essential information and warnings to citizens of Grenada, US students, and area aviation and ocean vessels. Nicknamed *Spice Island Radio*, the aircraft minimized confusion for the people and stayed on as the island's only radio for the three weeks following the US military action.[36] During Operation Just Cause, Commando Solo provided both humanitarian and military assistance by warning civilians and disrupting General Noriega's efforts to inform and employ his troops.[37]

* Covert and classified.

Rotary-Wing Platforms

AFSOF also operates two different types of Sikorsky helicopters. The MH-53J Pave Low III "Enhanced" is the world's most sophisticated helicopter, extensively modified for SOF operations. It has a maximum operating weight of 42,000 pounds, and a payload capacity between 2,000-5,000 pounds, depending upon specific range requirements. The twin-engine, medium-lift MH-60G Pave Hawk is an enhanced version of the Army's UH-60A Black Hawk, with an operating weight of 20,250 pounds and a much smaller payload capacity than the Pave Low. The Pave Hawk can be air deployed and operational in short order with minimum teardown and maintenance assistance. Each helicopter contributes in varying degrees to airlift, and also offers limited support for reconnaissance, intelligence collection, security and firepower, and surveillance missions.

Able to operate from cleared areas as small as 150 by 150 feet, these helicopters can land, take off, and hover almost anywhere, without regard to availability of runways. Although they can operate within austere environments, their speed and range restrict them. Missions are flown at airspeeds of 100-140 knots—half the speed of a C-130. Their unrefueled operating ranges are also shorter—in some scenarios the maximum range is only 500-600 nautical miles (NM).[38] Like the C-130s, SOF helicopters can self-deploy; however, for distances greater than 1,000-1,500 NM, it is often more efficient to transport them aboard either the C-141 Starlifter (MH-60G only) or C-5 Galaxy aircraft (fig. 6). Yet, the strategic airlift to bring helicopters into theater requires large capacity runways. In addition, after reassembly of shipped helicopters, aircrews must conduct extensive flight checks to make the helicopters operational.[39] Whether the helicopters self-deploy or transport aboard ship or larger aircraft, the situation will require strategic airlift to bring additional aircrew, maintenance specialists, and equipment.

Helicopters are not able to perform well in all environments. Often their performance limitations can affect operations, making them inappropriate for some situations. Helicopters are extremely capable; however, high temperature and payload situations degrade their ability to hover except at lower altitudes. To overcome some of these performance difficulties and operate in high terrain may require either a decrease in payload or roundabout routing to destination.

Sikorsky MH-53J Pave Low IIIE. The MH-53J Pave Low is an all-weather, long-range helicopter modified for infiltration, exfiltration, and resupply of SOF in hostile or denied territory.[40] Although the Pave Low's range and speed are less than fixed-wing aircraft, air refueling enables it to conduct long-range penetration missions. The ability to hover or vertically take off and land allows the Pave Low to fly into small, unprepared areas. Because of this, the Pave Low can deploy troops by airdrop, airland, rappel, rope ladder, and fast rope;

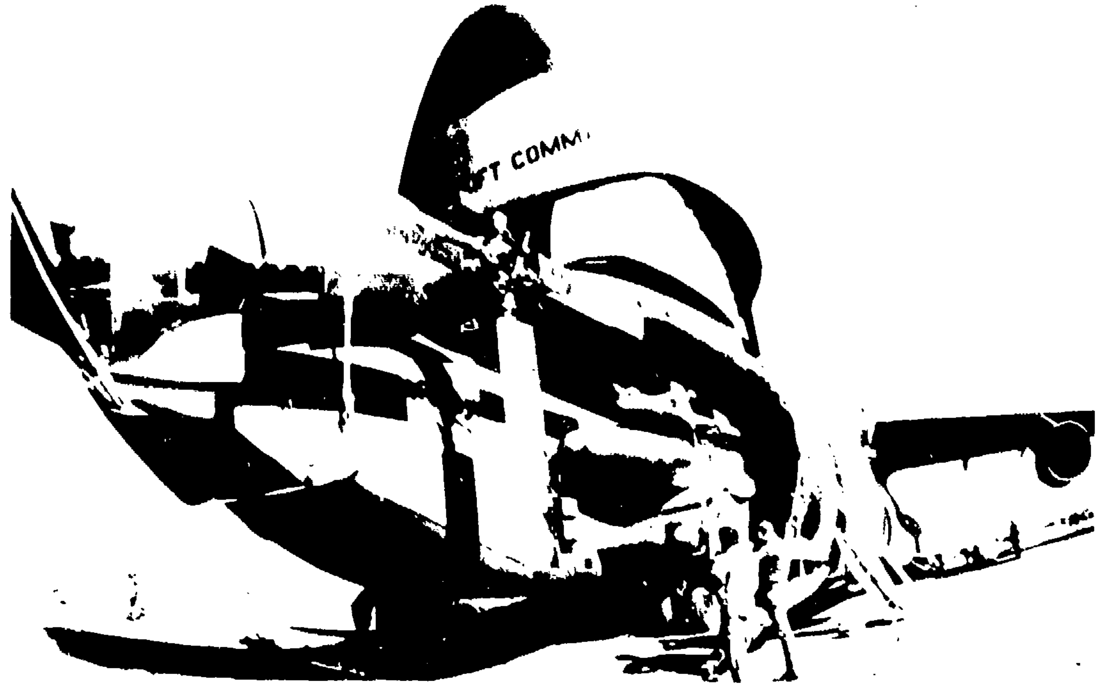


Figure 6. Disassembled MH-53 Loading onto C-5 for Transport
Photo Source: United States Air Force

and, they can extract forces in as many different ways (fig. 7). With this many options, the Pave Low is often preferred for employing SOF when the payload is not too large, and runways or drop zones are not available for fixed-wing delivery.

The Pave Low relies on its sophisticated TF/TA radar and precision navigation systems to allow system-directed flight to as low as 50 feet above the ground. Other systems, including FLIR, NVG-compatible HUD and lighting, and a moving-map display improve tactical opportunities. For hostile environments, the Pave Low is also modified with dual control factors, redundant systems, and upgraded defensive avionics. The 7.62-mm miniguns or .50-caliber machine guns also support a limited escort mission and add to self-defense.

Most recently, several Pave Lows, using enhanced aircraft systems, acted as pathfinders to position Army AH-64 helicopter teams in firing positions to destroy Iraqi early warning, acquisition, and search radars. Coincidentally, this operation, code-named Eager Anvil, was the very first mission of Desert Storm. This mission required precision NVG flying at low level through a featureless, dark desert with AH-64 Apaches in trail. As the Pave Lows led the return flight, Iraqi Bedouins engaged and fired two SA-7 missiles. The helicopters defeated these threats by means of the Pave Low's night maneuver capability and threat warning and defensive countermeasure systems.[41]

Figure 7. MH-53J Recovering SOF via Rope Ladder
Photo Source: United States Air Force

Sikorsky MH-60G Pave Hawk. The MH-60G Pave Hawk is a multipurpose, medium-range helicopter equipped for infiltration, exfiltration, and resupply of SOF in marginal weather conditions in hostile or denied territory.[42] Other capabilities include armed escort roles for SOF helicopters and combat search and rescue as a collateral mission.[43] This modern, improved, medium-lift helicopter incorporates the latest in communications, navigation, and defensive countermeasures equipment characteristic of all other AFSOF aircraft. Besides these upgrades, the Pave Hawk carries other less-standard features such as radar beacon tracking, rescue hoist, and .50-caliber and 7.62-mm machine guns.

The Pave Hawk is a small helicopter with a 200-450 NM unrefueled mission range. Because of its smaller size, the numbers of troops the Pave Hawk can accommodate easily vary from eight to 12, depending upon other equipment carried. Large mission payloads then will restrict the total available on board fuel, but HC-130 or special MC-130 tankers can extend helicopter range through in-flight refueling at regular intervals.

Unlike the Pave Lows, Pave Hawks are not equipped with TF/TA for low-level penetration operations. Instead, helicopter crews rely on precision GPS, inertial navigation, and Doppler radar systems, along with NVG-compatible lighting features for night and marginal weather low-level flying. Even in poor weather search and rescue missions or escort missions, Pave Hawks can accurately locate and follow ground forces on radar. With this equipment and an increased crew effort, the Pave Hawk can navigate as accurately as the Pave Low.

With methods and capabilities similar to the Pave Low, the Pave Hawk can operate into isolated areas. Even in the most difficult to reach areas, where hover is the only way to insert or extract forces, a rescue hoist allows the helicopters to perform these functions. The hoist was extremely valuable for MH-60G crews flying in the mountains of Turkey and northern Iraq supporting Operation Provide Comfort and other disaster relief efforts. Non-AFSOF helicopters could not support such operations over rough terrain and high altitudes; however, the Pave Hawk and Pave Low had sufficient power reserves to hover and use the rescue hoists to aid the search and rescue and disaster relief efforts.

As an indication of the Pave Hawk capabilities, two MH-60s flew an undetected low-level route to insert Army Special Forces into an isolated area south of Baghdad in the night hours before the Allied ground invasion. When the A-Team later came under fire from Iraqi Bedouins and troops, two MH-60s returned in darkness to extract them.[44] During Operation Just Cause, AFSOF dedicated MH-60Gs to the rescue efforts. The call for rescue came when 12 US Army soldiers had mistakenly been left behind in blocking action against PDF during the search for Noriega. As one of the first missions of Just Cause, two MH-60Gs were notified, and made the rescue with NVGs from low-level flight amid enemy fire.[45] In these rescue situations, the Pave Hawk carries .50-caliber and 7.62-mm side-firing machine guns. In addition to these self-protection weapons, it can also mount an external stores system with assorted rockets, cannons, and miniguns.[46]

Conclusion

AFSOC's aircraft incorporate unique features and capabilities to meet its principal mission challenges. These modifications and technological enhancements allow AFSOF to take on many worldwide challenges. However, their specialization makes them complex, costly, and logistically demanding. Despite the speed and range flexibility of fixed-wing aircraft, their operations are inextricably linked to large airstrips. Quite differently, the slower speed, shorter range, and smaller size of rotary-wing aircraft restrict their applications, yet at a tremendous gain in flexibility to operate from areas inaccessible by C-130s. These few considerations are an important reference as practical decisions need to be made concerning AFSOF ability to conduct FID operations in the third world.

Notes

1. The six types of aircraft (MC-130, AC-130, HC-130, EC-130, MH-53, and MH-60) are available in more than one model. For example, AFSOC has two MC-130 models, the E and H. Even within the E-model, aircraft are modified differently. The MC-130E includes several versions: Clamp and Yank (Fulton and non-Fulton capable), basic (stateside and Pacific), European, and aircraft undergoing SOF improvements (SOF-I).

2. Hon James R. Locher III, assistant secretary of defense for special operations and low intensity conflict, and Gen Carl W. Stiner, commander in chief, US Special Operations Command, *United States Special Operations Forces: Posture Statement 1993* (1993), A-4, A-7. Six HC-130 aircraft are air refueling modified, with the remaining 22 soon to follow.

3. Quoted in Frank Oliveri, associate editor, "No Time for Rambos," *Air Force Magazine* 76, no. 6 (June 1993): 33.

4. Locher and Stiner, *Posture Statement* (June 1992), A-4; Locher and Stiner, *Posture Statement 1993*, 38, A-4, A-6.

5. Lt Col Jim Conners, commander, 16th Special Operations Squadron, as quoted in Oliveri, 33. Lt Col Conners said the main defense of combat AFSOF aircraft is flying in the nighttime.

6. Maj Wayne Gallant, chief of programming and modifications for maintenance engineering, Headquarters Air Force Special Operations Command, telephone interview with author, 6 January 1993 and 15 March 1993. Data reflects aircraft in the 1st Special Operations Wing from March 1992 to February 1993.

7. G.T. Richardson, Headquarters Air Force Special Operations Command, Manpower Section, maintenance analyst for aircraft operations and maintenance costs, telephone interview with author concerning 1993 Programming Factors, 19 November 1992. The exact number of maintenance personnel figured for each AC-130H averages to 67.5. As a reference, for each MH-60G, the number is 18.55. The latter happens to be the lowest of all AFSOF aircraft. While these numbers may seem high, they do not include the personnel necessary for other base support functions; AFR 173-13, *Cost Analysis: US Air Force Cost and Planning Factors*, 31 October 1989, 140.

8. Maj H. Scott Murphy (Ret.), Niceville, Fla., interview with the author, 12 August 1993.

9. Col Robert F. Guy, deputy chief of staff for logistics, Headquarters Air Force Special Operations Command, "HQ AFSOC Maintenance Data Summary Oct 91 - Sep 92," undated, 6, 9, 15, 29, 43, 54, 60; Lt Col Carl Kostival, assistant deputy chief of maintenance, Pennsylvania Air National Guard, Headquarters 193rd Special Operations Group, telephone interview with author, 14 January 1993. The MC-130H is the newest weapon system and is still under production.

10. Jeffrey P. Rhodes, "Special Operations Live," *Air Force Magazine* 73, no. 6 (June 1990): 72.

11. Ibid.

12. Ibid.

13. Lt Col Spenser, "Command and Control of the AC-130 Asset," Joint Universal Lessons Learned (JULLS) Long Report, submitted by 16 SOS/ADO, JULLS number 15634-50400 (00019), 17 January 1991.

14. Gallant interview. Operating costs for the AC-130U are not available. The numbers reflect AC-130H data instead.

15. Air Force Special Operations Command Regulation (AFSOCR) 55-130 requires AFSOF C-130 aircrews to use runways that are a minimum of 5,000 by 80 feet; however, the regulation does permit Combat Talon aircrews to operate at reduced gross weights on airfields as small as 3,000 by 60 feet. This study bases runway availability for C-130 operations on runways that are a minimum of 5,000 by 80 feet, and also considers C-130s to be operating at maximum weights. The numbers of runways 3,000 by 60 feet appropriately stressed for heavy weight C-130 operations (a discrimination important only for MC-130s) are *not* significantly higher than those 5,000 by 80 feet.

16. Of all gunships, only the AC-130U, the newest model, is equipped for convenient pressurization and continuous flight operations above 10,000 feet. Older model gunships primarily operate at lower cruise altitudes and within a reduced range.

17. Maj Gen Thomas E. Eggers, "Today's Air Commandos: Air Force Special Operations Command," *Military Review* 71, no. 6 (June 1991): 17-18; Maj David L. Davenport (Ret.), former MC-130E assistant director of operations, 8th Special Operations Squadron, Hurlburt Field, Fla.; telephone interview with author, 9 January 1993.

18. The MC-130E STAR system will recover personnel or packages from small clearings without landing. The aircraft intercepts a liftline hoisted by helium balloon, then hydraulic winches retrieve the package into the aircraft. Eight Talon I aircraft are equipped with this system.

19. Eggers, 17-18; Davenport interview.

20. Office of the Historian, Headquarters Air Force Special Operations Command, "Air Force Special Operations Command in Desert Shield and Desert Storm," draft, 15-16.

21. Ibid., 34-35.

22. Editors of Time-Life Books, *The New Face of War: Commando Operations* (Alexandria, Va.: Time-Life Books, 1991), 135; Julie Bird, "Special ops wing led attack on Panama, flew Noriega to U.S.," *Air Force Times* no. 24, 22 January 1990, 12.

23. Tony Capaccio, "U.S. Commando Units Were Stars in Panama," *Defense Week* 11, no. 7 (Monday, 5 February 1990): 16.

24. Maj Mark Adkin, *Urgent Fury: The Battle for Grenada* (Lexington, Mass.: Lexington Books, 1989), 177; Editors of Time-Life Books, 88.

25. Office of the Historian, 31.

26. Office of Public Affairs, "HC-130N/P Combat Shadow" (Hurlburt Field, Fla.: Headquarters Air Force Special Operations Command, November 1991).

27. Locher and Stiner, *Posture Statement 1993*, A-4; Air Force Special Operations Command, tactical operations, *SORTS DOC Statement for 9 SOS* (U), 1 December 1992, (Secret). Information extracted from Air Force Form 723, block IIA, mission identification, is unclassified.

28. Office of Public Affairs, "HC-130N/P Combat Shadow."

29. Office of the Historian, 27.

30. "EC-130E Volant Solo" (Middletown, Pa.: 193rd Special Operations Group, Headquarters Pennsylvania Air National Guard, 1 May 1992); Until recently, the EC-130Es were known either as Volant Solo or Rivet Rider. They are most recently renamed Commando Solo; William B. Scott, "EC-130E with Color TV Capability Developed for U.S. 'Psyops' Missions," *Aviation Week & Space Technology*, 13 July 1992, 71.

31. Locher and Stiner, *Posture Statement 1993*, A-7; "EC-130E Volant Solo."

32. Locher and Stiner, *Posture Statement 1993*, A-7; "EC-130E Volant Solo."

33. "EC-130E Volant Solo."

34. Scott, 71.

35. Ibid.

36. "23rd Air Force: Special Operations in the Air," *Special Warfare* 2, no. 2 (Spring 1989): 21, 22; Maj Michael W. Brough, EC-130E Liaison officer, Pennsylvania Air National Guard, Headquarters 193rd Special Operations Group, telephone interview with author, 11 January 1993.

37. Scott, 71; Brough interview.

38. Capt Ted McCleskey, *Special Operations Reference Manual*, (Hurlburt Field, Fla.: USAF Special Operations School, January 1991), 7-3, 7-4.

39. Depending on the particular helicopter and mode of transportation, helicopters must undergo various levels of disassembly. The MH-53J Pave Hawk requires the most extensive teardown, rebuild, and flight check efforts. The same operation for MH-60G Pave Hawk is on the order of only a few hours.

40. Locher and Stiner, *Posture Statement 1993*, A-6; Air Force Special Operations Command, tactical operations, *SORTS DOC Statement for 21 SOS* (U), 15 December 1991, (Secret). Information extracted from Air Force Form 723, block IIA, mission identification, is unclassified.

41. Office of the Historian, 24-5.

42. Air Force Special Operations Command, tactical operations, *SORTS DOC Statement for 55 SOS* (U), 31 December 1991, (Secret). Information extracted from Air Force Form 723, block IIA, mission identification, is unclassified.

43. Office of Public Affairs, "MH-60G Pave Hawk" (Hurlburt Field, Fla.: Headquarters Air Force Special Operations Command, November 1991).

44. George C. Wilson, "8 Green Berets vs. 150," *Air Force Times* 53, no. 29, 22 February 1993, 20, 24. To the author's knowledge, *Air Force Times* was first to print unclassified information about this Desert Storm operation. Although the MH-60s described here were A-models flown by the 3rd/160th SOAR, the mission and capability are most indicative of MH-60Gs.

45. Maj William J. Dunn, Jr, MH-60 Tactics officer, Headquarters Air Force Special Operations Command, telephone interview with author, 12 January 1993 and 29 June 1993.

46. Office of Public Affairs, "MH-60G Pave Hawk."

CHAPTER 4

FOREIGN INTERNAL DEFENSE CAPABILITY WITHIN THE THIRD WORLD

SOF aviation is designed and trained primarily for regional contingencies and global war.

USSOUTHCOM-USSOCOM JMA*

Everyone who has worked the Third World learns that what we procure for our own forces is often the wrong item for the forces in the country we are trying to help.

Terry D. Bearce
Red Team Comments
USSOUTHCOM-USSOCOM JMA*

To be effective in the implementation of FID and security assistance, the US military must consider . . . simple, reliable, and affordable equipment fitting the needs and capabilities of Third World nations. . . .

Joint Pub 3-07 (Test)
October 1990

As the foreign internal defense mission re-emerged in the late 1980s, it did so without generating the introduction of any new aircraft into Air Force Special Operations Command's inventory. Today, there are many questions concerning whether this present force structure, never tested in foreign internal defense, is now adequate to address the mission. To address specific FID needs, AFSOC must be able to help train and assist host countries in fulfilling their own demanding plans. Unfortunately, AFSOC's aircraft have limited potential to support FID operations because of their system complexity, cost, logistics requirements, and inaccessibility to runways.

The time is right for thoughtfully considering the applicability of AFSOC's force structure to contend with FID. This chapter concludes the discussion of

* (Secret) Information extracted is unclassified.

issues about Air Force Special operations forces' ability to sustain FID operations within the third world. It draws upon conclusions formed within the previous three chapters concerning aviation FID responsibilities, third world setting, and characteristics and capabilities of current AFSOC aircraft.

Perspective on Force Structure

Presently, AFSOC is not force structured to conduct aviation FID. The current aircraft were chosen, modified, and enhanced during the early seventies when our nation was focusing on other concerns that overshadowed FID—a mission then in [illegible] decline. Until most recently, missions other than FID carried higher [illegible] interests within the security environment of cold war threats and [illegible] scenarios. The recent USSOUTHCOM-USSOCOM Joint Mission Analysis (JMA) attests where those security interests have led SOF capability. They have shaped AFSOF aviation—tailored and trained the force to fight global wars and regional contingencies.[1]

AFSOF's structure and capabilities evolved to deal with direct action and unconventional warfare missions, to the near exclusion of aviation FID and related activities.[2] After complex modifications and enhancements, AFSOC aviation is equipped and trained for global deployments, communications, precision operations under all extremes, and survivability in complex threat environments. With these systems and capabilities, Maj Richard Newton comments in "A US Air Force Role in Counterinsurgency Support," "when the Air Force says it does well in LIC [low-intensity conflict], it means that it excels in executing a one-time raid (like the Libyan action), in conducting limited joint operations (like the one in Grenada), or in supporting the theater commanders' unconventional warfare (UW) requirements."[3] Actions like these show AFSOF very capable for the unorthodox and unconventional, but the same force structure has never addressed FID.[4] The simple lack of aircraft appropriate for FID is one reason for AFSOC's inactivity in aviation FID training and assistance programs. Even as late as the summer of 1991, AFSOF conducted no substantial FID activity.[5] Today neither AFSOC's corporate aviation experience nor the US Air Force's, in the broader sense, extends beyond their own complex aircraft. The overall perspective, then, is that FID was not considered during the acquisition of current aircraft, and the FID mission is one for which current aircrews have never trained, flown, or prepared. In this regard, AFSOC has neither the proficiency nor credibility from which to train host countries, nor the capability to operate its own aircraft in support of many FID programs.

Fixed-Wing Issues

Few areas in the third world are well suited for C-130 operations. At issue are their runways. They are either too small or stressed to handle lighter aircraft. The few suitable airfields are usually centered within well-developed and populated areas, for example, portions of Ecuador and a few other countries.[6] Consider in Ecuador, only one out of every seven airfields (19 of 136, or 14 percent) is suitable for heavy C-130 operations.[7] Of these, most runways are located in the populated regions.[8] Because C-130s are size-limited to the largest, centrally located regions, C-130 operations are unable to use remote airfields or conduct low-visibility, covert, or clandestine support. Restricted from remote locations, and thereby rather visible and predictable in operation, the C-130s depend on their speed, range, loiter, and payload characteristics to contribute toward host-country needs.

Employment of C-130s in third world countries demands extensive maintenance and logistical support. As a large four-engine turboprop aircraft, the C-130 requires large quantities of fuel. Each aircraft can hold thousands of gallons. Multiplied by many aircraft operating from the same remote site, operations will quickly overwhelm the delivery capacity of most third world locations.[9] During operations from a major airfield in Cameroon (Africa), the author found only one refueling location from which to service his aircraft, at the center of commercial airliner activity. The host unit had no trucks for transporting fuel, and this caused congestion and delays at the refueling pits. This was the capability and level of development at a major airfield facility. In the remote areas, there are no refueling pits, nor can fuel trucks deliver on demand over the great distances of undeveloped roads and inadequate bridges. Without a reliable, continuous fuel supply from host-country sources, circumstances may force AFSOF to depend on US strategic airlift for shuttling fuel into the larger airfields, or more likely, seeking air refueling from KC-10 and KC-135 aircraft before and after each mission. Each of these options is complicated, and unrealistic for conducting FID operations or training and assisting host countries toward self-sufficiency. In fact, they lead to just the opposite. Fuel is only one of many needs that signal the logistical magnitude and complexity of AFSOC's large fixed-wing assets for FID operations. Beyond this, the operational commitments, training, and exercises mean AFSOC's sophisticated aircraft, dedicated logistics assets, and funds are limited, especially for the FID mission. When combined operations and support packages grow too large, as current circumstances indicate they must, the increased activities may inflame sensitivities by overstepping the bounds of host-unit expectations.

Rotary-Wing Issues

As with fixed-wing aircraft, there are critical issues to consider with AFSOC's helicopters. Unlike C-130s, one of their unique abilities is operating into locations irrespective of runways. This operational flexibility is crucial, since AFSOF and the host countries can now reach remote areas and conduct needed operations. Another advantage is the ability for helicopters to carry some payload. They can move lighter loads over short distances or sling oversize items underneath. However, their smaller payload capability cannot compare to the C-130 in either size or weight. Another drawback inherent to rotary-wing aircraft is its many moving parts. Helicopters require extensive maintenance and logistics support, to a greater extent than other aircraft. When compared to other AFSOF aircraft by payload capacities, *helicopter assets are the most maintenance intensive and expensive*. In fact, according to Scott Murphy, maintenance for helicopters is more than 100 times greater than for comparable fixed-wing aircraft, and helicopters are generally five times more expensive to purchase.[10] Appendix C offers limited data for comparison. Although helicopters are the most expensive aviation option, we cannot rule out their usefulness or versatility, but cost certainly does limit their value for all host-country missions.

Air forces need to apply aviation assets that are proper for their operations rather than staying with the awkward business of making work-arounds to otherwise avoidable problems. Despite their mission enhancing modifications and capabilities, helicopters do not compare to fixed-wing capabilities in terms of speed, payload, loiter, ceiling, or range. There are work-around ways to improve most of these weaknesses by supplementing with internal fuel, air refueling, or even ground refueling at intermediate sites, but these tradeoffs also bring logistical complications.[11] Gen John R. Galvin tells of SOUTHCOM's frustrations setting up ground refueling for helicopters in a Honduran operation.

> I wanted to do a helicopter operation out along the border as an exercise with the US rangers. In order to do that, I had to move fuel by fixed-wing aircraft from Palmerola to the North Coast of Honduras, move it from there with a CH-47 Chinook helicopter so that the Huey helicopter could operate. That is an awkward way to do business.[12]

The fact is, remote operations often mandate simplicities in aircraft servicing and repairs. AFSOC helicopters are complex and require extensive maintenance and logistics to support their day-to-day operations.

If these awkward operations such as routing aviation fuel in third world locations do not draw attention, the heavy C-5 or C-141 aircraft will. This case is especially true when these strategic aircraft must transport helicopters into and out of the country's largest airfields. Such heavy activity advertises size, scope, and location of US forces and complicates low visibility operations as well as gives insurgents/terrorists a ready target. One alternative to strategic airlift support is grueling helicopter ferry missions involving multiple air refueling, causing personnel and machinery fatigue. Another is much slower shipborne transport. For distant operations such as to areas of South America and all of Africa, transporting helicopters is the only realistic method to overcome the time and distance involved. At direct levels of FID support, AFSOC must also account for helicopters deploying and redeploying to repair depots for repairs that exceed field maintenance capabilities.[13] Helicopter operations within host countries naturally demand extensive logistical support. The high levels of effort necessary to sustain AFSOC's operations with complex aircraft seem to interfere with the primary intent to build and prove aircraft capable of improving host-country self-sufficiency.

Central Issues

AFSOC must be structured and trained to assist within traditional areas, should host countries ever require direct forms of US support. Within these four areas, AFSOC aircraft have only limited potential to address the reconnaissance and surveillance, airlift, attack, and PSYOP mission needs. Beyond the mere mismatch evident between aircraft characteristics and capabilities and the requirement to answer FID needs, the logistical circumstances minimize their FID value.

Despite their enhancements and capabilities, AFSOC's aircraft can make only limited contributions to reconnaissance and surveillance activity. The AC-130 is certainly a unique and valuable reconnaissance aircraft with its range and loiter capabilities and accurate visual and electronic sensing systems. The newest gunship allows exceedingly accurate observations, even in all-weather considerations. From a capability standpoint, this is outstanding, but from cost and logistics, it is excessive. Rotary-wing aircraft, though limited in range and loiter, can fly low and slow to observe ground activity. They can also land or hover as necessary to investigate and gather intelligence. With these features, they are often platforms of choice to insert, extract, or resupply reconnaissance and surveillance ground forces. Scarce AC-130 aircraft, often required in numbers beyond their current strength, are available only to the highest priority SOF missions; therefore, they may be unavailable for FID mission needs. By themselves, helicopters cannot gather intelligence from distant locations, loiter, or relocate quickly as needs shift throughout the country. In reality, AFSOF's capabilities do not translate into something usable for answering FID reconnaissance and surveillance needs.

AFSOF has a similarly limited capability for the attack mission. Although the MH-53J and MH-60G helicopters are lightly armed for self-defense, they cannot project accurate and sustained firepower, attack over long distances, or loiter to conduct armed reconnaissance missions. Though the MH-60G platform has been tested with forward-firing rocket and machine gun armaments, these systems have not been purchased by the Air Force, nor are there plans to do so. AFSOC will neither operate this equipment nor train aircrews in its use.[14] Again, the most capable weapon platform is the AC-130, able to loiter and deliver surgical firepower under most weather and low-threat circumstances. The AC-130 is noted for credible, accurate CAS as it successfully provided during Operation Just Cause. It can also interdict several types of targets, despite a somewhat limited variety of available ammunition.[15] With the AC-130 realistically unavailable for FID missions, AFSOC loses the capability for prompt, long-range, accurate, and sustained firepower. Helicopters simply are unable to make up the difference.

What AFSOC and host countries need are aircraft with size and performance capabilities somewhere between a helicopter and C-130, with multimission capability and minimum logistical and maintenance needs. AFSOC has tremendous capacity for providing airlift under intended conditions. Mobility is a common theme within all SOF missions, responsible for much of the selecting and modifying of its aircraft. Similarly, host countries have this basic need for airlift to support their security and mobilization functions, and *it is upon this airlift mission for which both AFSOC and the host countries depend the most.*[16] The host's security and mobilization activities depend on aircraft that can assist in the rapid movement of forces and equipment into many different areas. AFSOC's helicopters have capacity to help the small, short-haul airlift needs, while C-130s are appropriate for the larger capacity, long-haul missions. AFSOC could address a variety of the host's airlift needs (apart from aircraft cost and complexity) if it were not for the few runways suitable to C-130 operations. Losing the tactical airlift support of these C-130s leaves helicopters with an additional burden for long-lift, quick-movement missions for which they are clearly inappropriate. Even if both fixed- and rotary-wing assets were to work well in the host-country environment, the sheer sophistication and expense of operating AFSOC's aircraft for *routine* airdrop, airland, and resupply missions would be hard to justify as appropriate uses of air power. Despite their inappropriateness for the other three traditional missions, all aircraft can add immeasurably to PSYOP.

The PSYOP mission permits helicopters and C-130s to maximize their strengths and avoid earlier complications arising from few suitable runways. Whether the information medium is radio and TV, loudspeakers, leaflets, or demonstrations of weapon capabilities, AFSOF has the potential to contribute. Although the PSYOP mission is somewhat restricted by suitability of runways, the EC-130 can broadcast to distant sites over radio and TV waves, and MC-130 and HC-130s can airdrop messages to many areas by giving up low visibility cover and operating from larger runways. To accomplish the PSYOP mission with AFSOC's aircraft, the larger fixed-wing aircraft must concentrate on targets requiring their range and loiter and helicopters must penetrate into austere areas.

For AFSOF to conduct these missions requires tremendous coordination and logistic support involving fuel, personnel, equipment, and parts.[17] Though planning for repair parts and personnel is always critical for any operation, other necessities like aviation fuel often are overlooked until the last. Most host countries do not have the robust capacity to meet AFSOF's facilities requirements in the locations desired. AFSOF requires complete support for all aircraft, and this equates to large living and maintenance facilities. These requirements alone relegate AFSOF to the largest capacity and the highest visibility airfields. The level of effort and visibility this all implies does not go unnoticed by insurgents.[18] Central flying, maintenance, and logistical operations on highly visible airfields only encourage insurgents/terrorists to attack whatever becomes most vulnerable.[19]

Host-Country Issues

Aviation FID is so important today because host countries must learn to choose, manage, and apply aircraft in order to address their primary security and growth needs. AFSOF must guide and assist them toward their aims through proper force structuring and training. Many needy Latin American countries are flying antique aircraft operated during FID efforts in the early sixties and seventies, such as the C-47, DC-3, C-7, and C-123.[20] Typically, these aircraft are very capable of supporting host-country needs and can still operate into austere airfields. However, they have well exceeded their design life and are worn out beyond any reasonable means to restore functionality. In some countries of South America, for example, a recent AFSOC FID study indicates USSOUTHCOM staff have characterized the replacement of some of these older planes with jet aircraft as wholly inappropriate for counterinsurgency, nation-building, and other internal operations. The study says these new aircraft "are generally expensive, difficult to maintain, unable to apply surgical firepower, have very limited night capability, and do not possess the STOL [short takeoff and landing] capability needed to access remote areas."[21] With insupportable, inappropriate aircraft for their basic needs, some countries are unable to meet their IDAD goals. Although eager to retire the older aircraft, in several cases, host countries cannot always find or afford appropriate replacements for their particular situations.

Some of these older aircraft are slowly being updated, but newer ones often prove too sophisticated for third world education levels and financial burdens. Gen Paul F. Gorman made this point about C-130s when testifying to the Senate Armed Services Committee in 1987. He said, "The current US Air Force counterpart [to the C-47], the C-130, is much too complicated and demanding for most third world countries, and when we present aid-clients C-130s, as we did to Chad a few years ago, we hang an economic millstone around their neck."[22] Lesser-developed nations cannot always field, operate, or adequately maintain this new equipment, designed for an economic and educational work base more typical of advanced nations.[23] I can attest to this from my experience in Africa during the late 1980s where Cameroonian air forces spent over two weeks trying to get one C-130 engine started. Of three C-130s, none could fly during the entire exercise. Like the C-130s and others, helicopters are unsuitable because they are maintenance intensive, expensive to operate, and logistically demanding. In short order, their complexity and expense will overburden the host country. Complex and expensive aircraft such as helicopters and C-130s cannot be the primary emphasis for any host-country operations. Maj David A. Reinholz considered these problems in his article, "A Way to Improve Our 'Marginal' Counterinsurgency Airlift Capability." He explained, "What is needed is an aircraft between the performance of the C-130 and helicopters to meet the requirements of US counterinsurgency operations and security assistance [FID]."[24]

AFSOC and host countries need *compatible aircraft* so each can conduct their own particular operations in the third world. General Galvin's comments to the House Appropriations Subcommittee surfaced some valid reasons why his aircraft do not work in South America.

> If I had an aircraft like the old Caribou [C-7], except that I don't want a piston-driven aircraft for this, I could save a lot of money and do a lot of things I can't do now by getting in and out of small airfields in support perhaps of helicopter operations that are deep in country. Now, I have to go through all kinds of gyrations in order to get helicopters to where they ought to be.[25]

AFSOF and the host country must avoid these same *gyrations* by finding and applying aircraft suitable for the IDAD plan and their particular setting.

Resolving These Issues

AFSOC's aircraft cannot fulfill traditional FID missions, and therefore are of limited value for helping the host country achieve its IDAD plan. Because of this aviation gap, AFSOF aircrews have little value to add to joint/combined FID flying exercises in the third world.

Aircraft to fill this gap in performance and mission capability must somehow combine the speed, range, payload, loiter, and STOL access for the four traditional missions—attack, airlift, reconnaissance, and PSYOP. To be similarly useful for host countries, these aircraft must also be simple, reliable, low cost, rugged, and operable from austere airfields. At the present time, there are *no aircraft in the DOD inventory* able to address these criteria.[26]

To properly prepare for the FID mission, AFSOF must operate aircraft that offer desired functionality within the host-country setting. By doing this, AFSOC will earn the credibility and gain the experiences necessary for truly advising, training, and assisting host countries. An additional benefit is that AFSOF will also learn to more efficiently and effectively integrate with the forces they train, assist, and seek to understand.

Consequences of Avoiding Change

There are additional complications on the horizon should AFSOC be saddled with FID operations under its present force structure. These complications extend beyond issues centering on the clear lack of proper FID aircraft, corresponding maintenance and logistical problems, and unsuitable airfields. The following are typical of problems ahead if AFSOC attempts to sustain FID operations:

- All types of AFSOC aircraft may be necessary to support host-country needs, including scarce AC-130s. The shortage of suitable runways means MH-53J and MH-60Gs will be overused fulfilling short-haul and long-haul airlift.

- Aircrews will be proving complex and expensive AFSOC aircraft that are both inappropriate and unavailable to the host country.

- The lessons AFSOC aircrews offer in tactics, techniques, and procedures will be of limited value to host-country aircrews who must fly nation-building and internal security missions in wholly different types of aircraft.

- Aircrews dedicated to FID may lose critical proficiency in other mission areas, either because of host-country restrictions (sensitivities) or for in-country operational reasons.

- Aircraft applied to FID needs will always be *on call*, subject to *crisis* missions across the world scene. Answering the world scene will demonstrate a wavering FID commitment and lose third world confidences.

Conclusions

AFSOC is structured for, and has been quite successful at, high priority JCS missions, but it currently has *limited utility for FID*. AFSOC's aircraft are not sufficiently simple, rugged, reliable and low maintenance, suitable for austere sites, or low cost. To force AFSOC into long-term third world operations will mean considerable expenses in logistic and maintenance efforts. In reality, the complex and technical characteristics of *AFSOC's aircraft make poor teaching platforms* for basic host-country needs. Besides this, AFSOC's aircraft are *unavailable to support traditional FID missions*, because they are allocated for other national priorities. Absence of the AC-130 means little reconnaissance and attack capability, and loss of fixed-wing airlift leads to an overreliance on helicopters for the heavy-lift, long-distance operations. The character and capability of these aircraft are in sharp contrast to what countries need for their IDAD programs. Changes in doctrine, maintenance, or training will not correct this deficiency in capability. Unfortunately, as host countries look to supplement their capabilities with newer aircraft, the ones provided through security assistance often exceed their means to operate and maintain.

When the pieces of all these various arguments come together, they conclude that what *AFSOC really needs* for its FID operations is *a family of aircraft* that can meet the operational needs of the third world. Fixing FID does not have to be an expensive proposition. The FID mission requires AFSOC aircraft that can self-deploy to eligible countries or enter by other air transport such as in smaller aircraft like the C-130 or C-17. Arriving by these aircraft, rather than in C-5 or C-141s, FID aircraft can rapidly insert directly into small host-country airfields. For simplicity in maintenance and logistical support, FID also requires aircraft with compatible/interchangeable equipment for avionics, refueling, and common provisions for multirole missions through strap-on pods or roll-on pallets. Yet, the emphasis must be to keep these aircraft simple to operate, maintain, and support logistically. They must be rugged, designed for minimum support, equipped for ease of repair and high mission capable rates, and small and powerful enough to operate from remote sites. As important as all other conditions, the aircraft must be affordable for host countries to purchase, operate, and maintain. The next chapter presents alternative-*like* aircraft that display some of these characteristics and capabilities ideal for FID operations.

Notes

1. *USSOUTHCOM-USSOCOM Joint Mission Analysis Final Report (U), vol. 1, executive summary (U)* (MacDill AFB, Fla.: 1 August 1990): 3-8. (Secret) Information extracted is unclassified.

2. Col August G. Jannarone and Mr Ray E. Stratton, "Building a Practical United States Air Force Capability for Foreign Internal Defense (FID)," *The Disam Journal* 13, no. 4 (Summer 1991): 85. Jannarone and Stratton note, as other studies conclude, the inappropriateness of US military aircraft for application in military operations other than war, to include FID. See also William M. Hadly et al., *Airlift and Logistics Systems for Low-Intensity Conflict (LIC)*, SRI

International Final Technical Report 7013-89-FR-186 (May 1989). New AFSOC missions and requirements to develop special capabilities have always evolved through a process of procurement, modification, enhancement, and equipment improvements.

3. Maj Richard D. Newton, "A US Air Force Role in Counterinsurgency Support," *Airpower Journal* 3, no. 3 (Fall 1989): 69.

4. AFSOF have achieved successes in unconventional warfare, direct action, counterterrorism, and special reconnaissance missions.

5. Lt Col Enrique A. Oti II, "The Air Force and Low-Intensity Conflict," Air War College paper, May 1992, 49. Lt Col Oti is a command pilot who has served as squadron commander of an HC-130 special operations squadron and deployed to Operations Just Cause and Desert Storm. He joined special operations when the Air Rescue and Recovery Service and SOF first merged. Lt Col Oti remarks, "AFSOC lacks the capability to implement a FID program." While part of his concern is with the lack of air power expertise for carrying out a FID program, the other aspect is absence of aircraft to apply within the FID missions; Jannarone and Stratton, 85.

6. These large population areas are subject to extremely high visibility.

7. Bill Buckwalter, Defense Mapping Agency Aerospace Center for Mapping, Charting, and Production—Section B, author request for special aeronautical information 162-93, 13 May 1993; Percentages exclude those runways with undetermined weight-bearing capacity, and are based on maximum gross weight aircraft, and runways 5,000 by 80 feet with an LCN $\geq$ 33. This same C-130 can operate from only 20 out of 74 runways (27 percent) in Nigeria and 15 out of 68 runways (22.1 percent) in the Sudan.

8. Occasionally airfields appear along the fringes of populated regions, but they often lack space to accommodate multiple aircraft.

9. An AFSOC C-130 can carry nearly 10,000 gallons of aviation fuel for some missions. Consider also, the Air Force operates two sizes of fuel trucks, the A\S32 R-9 that carries only 5,000 gallons; the A\S32 R-11 carries 6,000 gallons. Both trucks are designed for operations primarily over paved surfaces. The logistics of fuel, especially in these amounts, is not a simple matter. General Galvin testified to a House Appropriations Subcommittee of his frustrations with moving fuel in third world areas:

> In Bolivia, I don't have a way to haul fuel. There are exercises in which I just don't do the kinds of exercise I would like to do for training with other countries because I can't get into the areas.

See House, *Department of Defense Appropriation for 1988: Hearings before a Subcommittee of the Committee on Appropriations*, 100th Cong., 1st sess., 1988, 981.

10. Maj H. Scott Murphy (Ret.), Niceville, Fla., interview with the author, 12 August 1993.

11. In 1988, General Galvin told the House Appropriations Subcommittee of situations in SOUTHCOM where the combination of inappropriate aircraft and fuel complications hampered accomplishing even short-term exercises.

> While helicopters also are used for intratheater airlift, their reduced range and large support requirements limit operations. Helicopters often need Forward Area Refueling Points (FARPs), which can take 12 to 24 hours to set up given the need to transport large quantities of fuel.

See House, *Defense Appropriation for 1988*, 950.

12. Ibid., 981.

13. Special airlift of helicopters was necessary several times during Operation Provide Comfort in Turkey despite our having a well-equipped and experienced maintenance organization.

14. Maj William J. Dunn, Jr, MH-60 Tactics officer, Headquarters Air Force Special Operations Command, telephone interview with author, 12 January 1993 and 29 June 1993.

15. Munitions that could keep insurgents under additional risk are time-delay munitions, scatterable mines, and hard-target penetrators.

16. Maj H. Scott Murphy and Lt Col William Pailes, *AFSOC: Foreign Internal Defense* (Hurlburt Field, Fla.: Headquarters Air Force Special Operations Command, July 1991), 11-12.

17. The logistical dilemma will become increasingly complex for SOF in the future. As General Stiner comments,

> An area that merits concern is our requirement for in-theater support. In the past, we have depended upon the services' logistic support structures to meet the bulk of SOF *sustainment* [emphasis added] requirements. However, as service structures are drawn down, we can expect that forward-deployed logistic infrastructures will also be reduced. This will require SOF to deploy its own tailored support and sustainment organization *with* [emphasis added] its forward-employed forces.

See Gen Carl W. Stiner, "The Strategic Employment of Special Operations Forces," *Military Review* 71, no. 6 (June 1991): 13.

18. Strategic C-141 and C-5 airlifters that transport AFSOF helicopters and the other logistical supplies signal the priority, scope, and location of AFSOF operations.

19. Jeffrey P. Rhodes, "Any Time Any Place," *Air Force Magazine* 71, no. 7 (July 1988): 73. Rhodes suggests that AFSOF's advanced aircraft make *inviting targets*. Consider, one insurgent's success against an AFSOC aircraft such as the AC-130 could eliminate a highly trained 14 person crew and an aircraft costing over $80 million. The aircraft, in all likelihood, never could be replaced.

20. Maj David A. Reinholz, "A Way to Improve Our 'Marginal' Counterinsurgency Airlift Capability," *Armed Forces Journal International*, July 1987, 41.

21. Murphy and Pailes, 11.

22. Gen Paul F. Gorman, US Army (Retired), "National Strategy and Low Intensity Conflict," statement for the Senate Armed Services Committee, Washington, D.C., 28 January 1987.

23. While a few helicopters are assuredly necessary for certain situations, overrelying on them for all needs is an inappropriate move for host countries.

24. Reinholz, 41.

25. House, *Defense Appropriation for 1988*, 979.

26. The Bell/Boeing CV-22 Osprey aircraft is under development, but is prohibitively complex, maintenance intensive, and expensive for host countries.

Chapter 5

ALTERNATIVE AIRCRAFT FOR AIR FORCE SPECIAL OPERATIONS

In low-intensity conflict, we need things that are simple and reliable.

Charles S. Whitehouse
ASD/SO-LIC

We must exploit our nation's technological advantage in assisting our friends in the Third World. We must, however, avoid the mistake of trying to create an army (or navy or air force) in our own image. We have to recognize that Third World requirements as well as the ability to absorb, maintain and support high-technology equipment differ markedly from our own. The needs are comprehensive—from sensors to aircraft to individual equipment. The answers, however, must be relevant.

James R. Locher III
ASD/SO-LIC

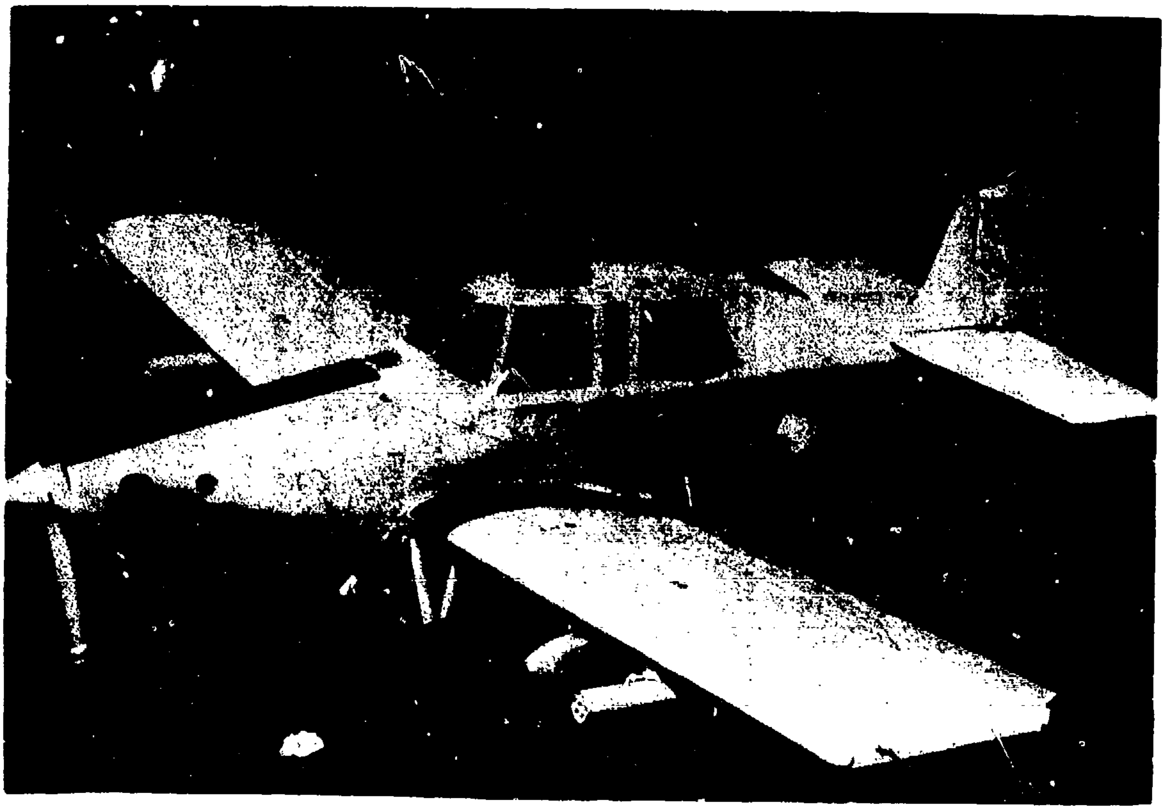
Particular foreign internal defense mission challenges within the third world setting exceed the capabilities of Air Force Special Operations Command's fixed- and rotary-wing aircraft to provide sustained, credible assistance. This is not to say that any other United States military organizations are more capable or better equipped for the FID mission, because no other service operates the appropriate types and sizes of aircraft suitable for FID operations. With the proper aircraft, Air Force special operations forces can help prepare third world nations to efficiently address their challenging internal security and nation-building needs. To conduct operations in the third world and meet FID needs, AFSOF must look to alternative aircraft. These alternatives must have short takeoff and landing performance for operations into and from small unprepared airstrips, turboprop engines for increased power and economic operation, and a fuselage adaptable to many different roles. The aircraft must also incorporate low-cost, rugged features that lend simplicity to overall operations, maintenance, and support efforts. While United States Special Operations Command may be able to look beyond low-cost alternatives for AFSOC, host countries must seek aircraft that cost no more than $3 - 5 million. With a family of alternative-like aircraft, able to mix and adjust for the particular needs of any host country, AFSOC will be properly structured to conduct FID. Alternatives will allow AFSOF to teach and assist host countries while simultaneously proving the value of *alternatives* for bettering third world social and economic welfare.

Alternative Aircraft

This section provides a brief look beyond AFSOC's current aircraft to several alternatives with lift and multirole applications appropriate for FID and host-country missions.[1] The author does *not* present these aircraft to suggest the best platforms for AFSOC's FID mission—these aircraft simply display characteristics and capabilities *appropriate* for host-country and FID operations. These alternatives include examples of aircraft either never produced, converted from a vintage transport, manufactured outside the US, or only entering prototype production. These aircraft are the Ayres Vigilante V-1-A, Pilatus PC-6 Turbo-Porter, Skytrader SCOUT-STOL, Basler Turbo 67, and Snow Aviation 210 TA STOL-C/AT. Appendix D provides supplementary data on each aircraft. I must emphasize at this point that the following runway suitability calculations for each aircraft includes the total count of runways *and helicopter pads* that have been listed by the Defense Mapping Agency with a load classification number. Although this method may not be most appropriate for the large-sized alternative aircraft, it is for the light STOL airplanes. Additionally, this method provides a common basis for discussion. Again, the author has no desire to rank order these alternative aircraft or to imply that they are the only available choices.

Ayres Vigilante V-1-A. The Ayres Vigilante is an unsophisticated, single engine, low-wing aircraft with fixed gear and no hydraulics. The small aircraft design, wide speed range, and long loiter capabilities specifically lend the aircraft to surveillance and attack missions. A Pratt and Whitney PT6A-65AG turboprop engine provides the power, and with a quiet five-blade propeller, the aircraft can achieve a top speed over 200 knots or loiter as slow as 50 knots. Additionally, the aircraft's two-seat design accommodates a workstation for sensor operator in full reach of communications and reconnaissance gear. Designed to survive in low-threat environments, the aircraft operates with reduced IR signature and has optional armor, sealing fuel tanks, and provisions for radar and IR warning equipment, ECM, and chaff and flares. Specially enhanced versions carry FLIR surveillance systems, and they improve mission capability with external fuel and gun pods and munitions bays for rockets and bombs, land or water mines, torpedoes, and air-to-air and antitank missiles.[2] In 1989 Ayres Corporation proved the aircraft value for surveillance by tracking illegal immigrants crossing into the southern US. The aircraft can also incorporate multispectral low light TV and laser-gate low light TV cameras for reconnaissance missions. In addition, other systems will record and transmit real-time video and audio intelligence to receiving stations over 100 NM away.[3]

The Vigilante (fig. 8) offers these capabilities from a simple, reliable airframe with provisions for low-cost maintenance, minimum special tools and equipment, and easy access in-the-field maintainability.[4] Built to address applications beyond surveillance and attack, this aircraft is the choice of many



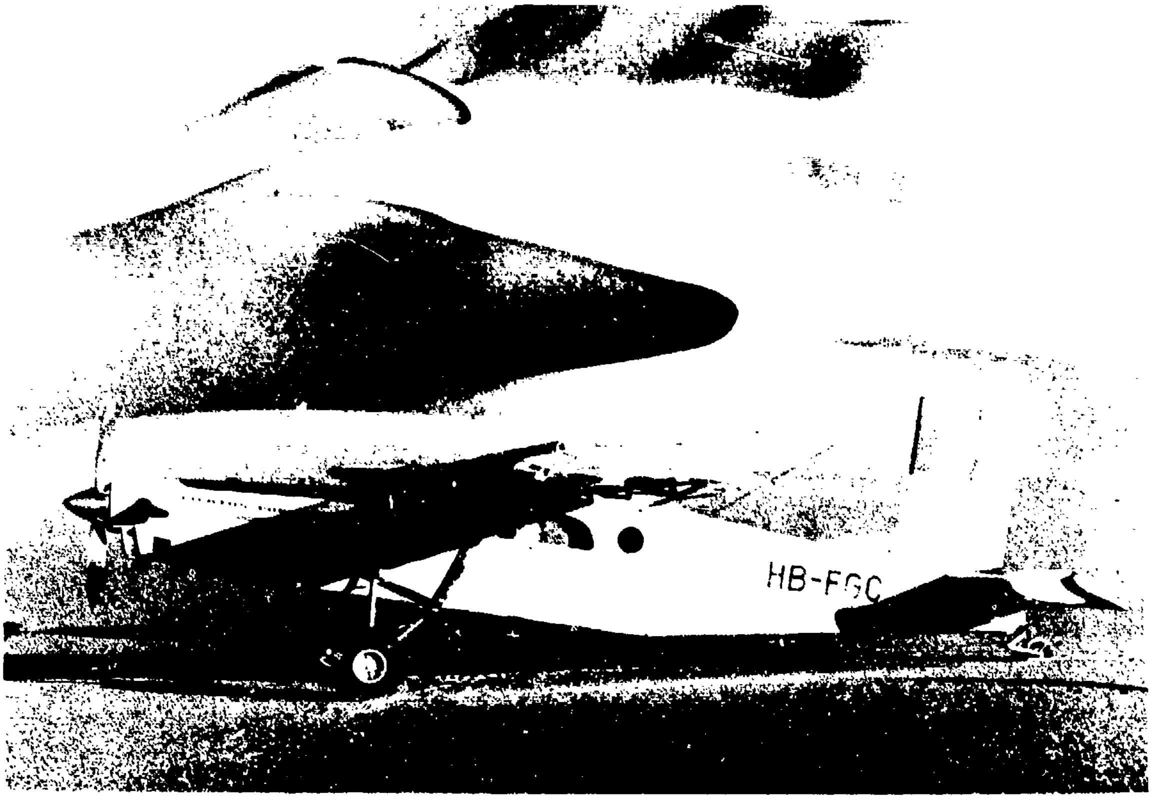
FID MISSION APPLICATIONS	Surveillance and Attack	**Takeoff**	1,250 ft[11]
		Landing	500 ft (reverse thrust)[12]
Purchase Price	$750,000[5]		
Cost/Flight Hour	$175[6]	**Suitable Airfields** ... (percentages include helicopter pads)	Ecuador 93% Sudan 84% Nigeria 68%[13] South America 86% Africa 77%[14]
Maximum Gross Weight	10,500 lbs		
Empty Weight	5,600 lbs[7]		
Maintenance Man Hours/Flight Hour	.1667[8]	**Stall**	50 kts
Operationally Ready Rate ..	99%[9]		
Time Between Overhaul	4,500 hrs (engine)[10]	**Endurance**	7 hrs[15]

Figure 8. Ayres Vigilante V-1-A and Leading Particulars
Photo Source: Ayres Corporation

countries for agricultural uses. Ayres anticipates that the Vigilante (not yet in production) will market well within Africa and South America.[16] Already popular, Ayres aircraft operates in over 60 countries with repair facilities and dealers conveniently situated to customers in South America and Africa.[17]

Pilatus PC-6 Turbo-Porter. The Pilatus Porter is a high-wing, multirole STOL aircraft powered by a single PT6A-27 free turbine turboprop engine behind a reversible three-blade propeller.[18] Built to work in any environment, this *Jeep of the Air* can tackle snow, ice, water, or desert. Its simple and versatile design holds fixed gear on oleo shocks, optional pontoons, skis, or even wide tires. Other important options include dust and sand filters to extend engine life in desert conditions.[19] The Turbo-Porter (fig. 9) is designed for a crew of one or two, with simple systems that require only 4.5 hours to check out a pilot. Simplicity ensues from its scheme for low maintenance, no hydraulics, fixed gear, and electric flaps and convenient, easily accessible repair points, such that even a few low-skill workers can maintain the aircraft in the most remote locations.[20]

The aircraft is flexible enough to carry either seven to ten passengers, one to four litters with attendants, or externally mounted munitions and equipment from hardpoint fixtures. It can also airdrop up to 660 pounds through a floor-mounted hatch, or several jumpers through a side door.[21] The PC-6 Pilatus Porter has achieved worldwide recognition. Almost 500 have been sold in 54 countries, and over 120 countries operate the Pilatus Britten-Norman line of aircraft.[22] In South America, alone, there are 25 PC-6 Turbos, with one-third equipped to operate on floats.[23] South Africa flies these same aircraft modified with IR and FLIR instruments to aid SWAT teams, and Iraq depended on them for CAS during its war with Iran.[24] Other uses include mobility, freight, parachute training, photography, ambulance service, search and rescue, aerial survey, supply drops, fire fighting, target and glider towing, and agricultural roles.



FID MISSION APPLICATIONS	Surveillance, Attack, Airlift, and PSYOP	**Takeoff**	646 ft[31]
		Landing	417 ft (reverse thrust)[32]
Purchase Price	$670,000[25]		
Cost/Flight Hour	$139[26]	**Suitable Airfields** . . . **(percentages include helicopter pads)**	Ecuador 98% Sudan 84% Nigeria 78%[33] South America 91% Africa 93%[34]
Maximum Gross Weight . . .	6,173 lbs (wheels) 5,732 lbs (skis)[27]		
Payload	2,200 lbs[28]		
		Stall	52 kts[35]
Maintenance Man Hours/Flight Hour	1.02[29]	**Endurance**	4 hr 20 min (internal fuel) 7 hr 35 min (internal and external)[36]
Operationally Ready Rate . .	98%[30]		

Figure 9. Pilatus PC-6 Turbo-Porter and Leading Particulars
Photo Source: Pilatus Corporation

Skytrader SCOUT-STOL. The Skytrader SCOUT-STOL is a twin-engine, high-wing, multimission-capable aircraft. It has impressive twin V-8 turbo-supercharged, hushed engines (Thunder Engines Model TE 495-TC700) with NASA five-bladed *Quiet Props*.[37] Built to be maintained by a motor pool mechanic, the engines require no special tools or test equipment, and other major structures of the aircraft interchange to ease remote, in-the-field repairs. Similarly adaptable to remote area operations, the Thunder engines use fuels available at the moment, whatever that might be. The aircraft can run on aviation gasoline (AVGAS), JP-4, AVGAS/alcohol mixing, and automotive octane fuels.[38]

The aircraft's potential for multiple missions arises not only from its rugged, simple design, but also from side cargo doors, versatile aft ramp, and the latest technology in airframe, aerodynamics, and equipment. Figure 10 shows some of the simplicity in SCOUT design features. Latest technology features include color radar, halon fire suppression, and STOL enhancing Fowler flaps and leading edge slats. Military options incorporate strap-on armor plating for all critical areas, various lift-enhancing devices, and IR suppression of enemy threats. The aircraft is further capable of carrying other systems for anti-air-to-air attack. The airframe holds up to 12 litters plus attendants, 24 troops, or mixes and matches PSYOP or intelligence modules, which can be installed in an hour, with provisions to receive and broadcast in TV, AM, FM, and short-wave bands. Though the SCOUT is a genuine example of an aircraft appropriate for FID, Skytrader Corporation liquidated in September 1989 following efforts to avoid an unwanted takeover bid.[39] Civilian applications would have included the commuter-line configuration to seat 19 passengers. The company advertised roles for transport, cargo, medical evacuations, remote sensing, surveillance, search and rescue, agricultural assistance, air ambulance, airdrop, and amphibious float operations. The company offered an aircraft built not only for missions of underdeveloped countries, but also for the general level of their economic and work-skill capacities. Skytrader maintained service centers in the US, South America, Africa, Europe, Asia, Australia, the Pacific Basin, and the Middle East.[40]

FID MISSION APPLICATIONS	Surveillance, Attack, Airlift, and PSYOP	**Takeoff**	450 ft[46]
		Landing	400 ft[47]
Purchase Price	$1.6 million[41]		
Cost/Flight Hour	Not Available[42]	**Suitable Airfields (percentages include helicopter pads)**	Ecuador 98%
			Sudan 82%
Maximum Gross Weight	14,000 lbs[43]		Nigeria 62%[48]
Payload	6,700 lbs[44]		South America 82%
			Africa 64%[49]
Maintenance Man Hours/Flight Hour	Not Available		57 MPH[50]
Operationally Ready Rate	Not Available	**Stall**	1,131 SM (at cruise)
		Range	1,742 SM (55% power)[51]
Mean Time Between Overhaul	Beyond 2,000 hrs[45]		

Figure 10. Skytrader SCOUT-STOL and Leading Particulars
Photo Source: Unknown origin

Basler Turbo 67. Basler has an amazing concept for reviving an aircraft that has operated faithfully in rugged environments throughout the world for many years. The original version of the airplane still flies in many third world air forces and in civilian applications. The military version was the Douglas C-47 Skytrain, used extensively during the Berlin Airlift, and the civilian equivalent, the famous DC-3. Once extremely successful in earlier FID operations and in accessing remote areas, over the years this C-47 became increasingly impossible to maintain for its age and lack of spare parts. For the developing world—also for the underdeveloped—Basler zero-timed the airframe, redesigned the wing, stretched the bulkhead forward 60 inches, overhauled and added new systems, and re-engined with twin Pratt and Whitney PT6A-67R engines and Hartzell five-bladed propellers (fig. 11).[52] Today Basler advertises, "the *BT-67* provides a 76% increase in productivity at 50% of the original DC-3 operating cost."[53] It does so now as an all-weather-capable aircraft featuring independent systems such as self-start for remote operations.

Basler converted the DC-3, keeping unsophisticated capabilities of the old aircraft, and added new technology to ease maintenance, improve airlift, and boost payload.[54] New hydraulic and electrical systems, with widely-available aviation parts behind easy-access service panels, add reliability while simplifying the magnitude of supply and maintenance efforts. The design similarly allows for over-the-wing repairs, eliminating the need for numerous special tools and equipment. A convenience for some uses, these features are necessary for reliable operations from remote areas. Cargo capacity improves with the stretched airframe and more powerful engines. The aircraft loads through a side door and takes cargo intended for rollers, guide rails, or bulk shipment. The military version holds 40 troops or 32 litters, and the civilian equivalent carries 19 passengers comfortably.[55]

New aircraft design includes the option for survivability equipment and makes other features standard. Armor shrouds the cockpit and seating areas, and a vent-over-the-wing design shields hot engine exhaust from ground sensors—an engineering aspect that has effectively eliminated IR signature. Further, the new engine and propeller combination permits low noise operations.[56]

Using FLIR mounted in the nose or wing, the aircraft can aid day or night reconnaissance and surveillance missions. Also, the provisions for quick-load mission modules could aid intelligence-gathering or PSYOP operations. Valuable beyond airlift, the aircraft is currently operating as an accurate side-firing gunship in El Salvador. Maj Castillo Salvador, an El Salvadoran pilot, spoke firsthand of Basler's success with their gunship. He said the conversions dramatically increase power, decrease maintenance complications, and improve utility. Also, the guns can be removed, and the aircraft used for airlift missions.[57] Other proven capabilities for the conversion platform are maintenance support activities; medical evacuations; photography; antisubmarine warfare and maritime patrol; drug interdiction; remote area delivery and support; parachute operations; command, control, and communications (C^3); tug-target tow; and fire fighting.[58] Basler can service its conversion aircraft sales wherever they operate with engine overhaul and heavy maintenance shops worldwide.[59] Basler has sold at least 20 of these conversions in South America.

FID MISSION APPLICATIONS	Surveillance, Attack, Airlift, and PSYOP	**Takeoff**	1,296 ft[67]
		Landing	1,240 ft[68]
Purchase Price	$3.1 - $3.6 million[60]		
Cost/Flight Hour	$92[61]	**Suitable Airfields** (percentages include helicopter pads)	Ecuador 39% Sudan 69% Nigeria 50%[69] South America 44% Africa 42%[70]
Maximum Gross Weight	28,750 lbs[62]		
Payload	13,000 lbs[63]		
Maintenance Man Hours/Flight Hour	.5[64]	**Range (45 min reserve)**	950 NM (standard fuel) 2,140 NM (long range fuel)[71]
Operationally Ready Rate	98%[65]		
Mean Time Between Overhaul	3,500 hrs initial (engine)[66]	**Endurance (45 min reserve)**	13.4 hrs[72]

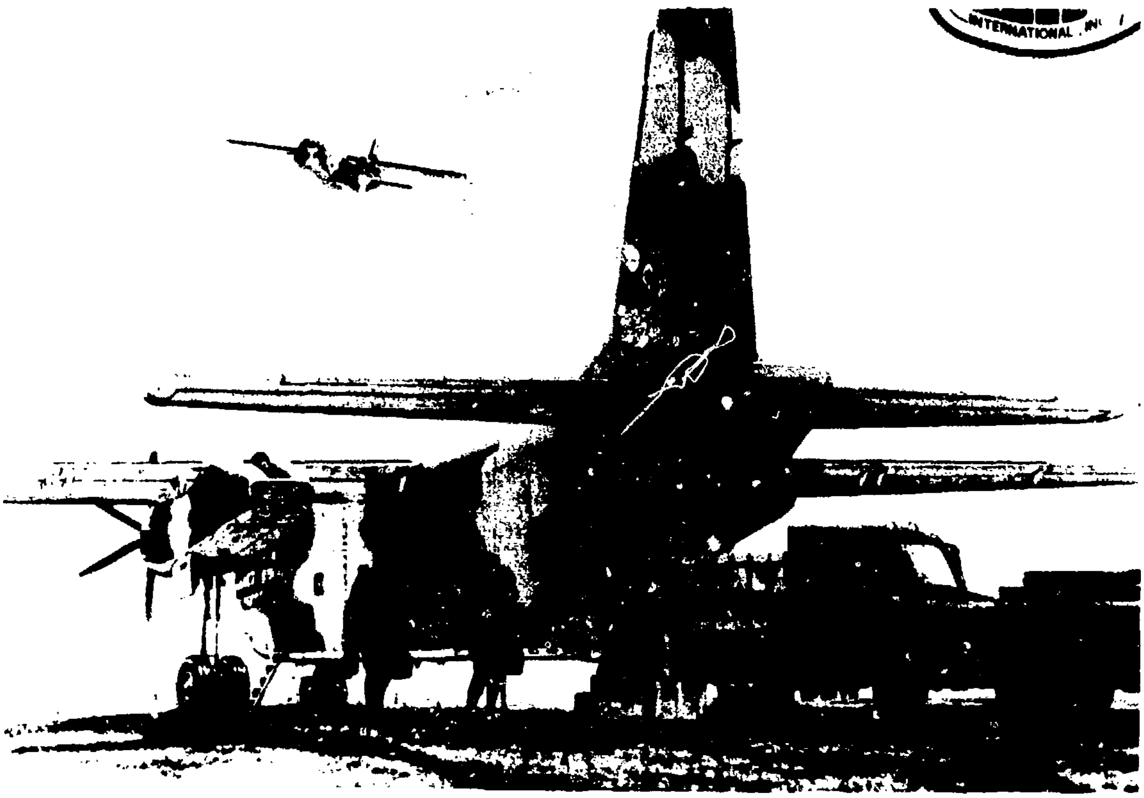
Figure 11. Basler Turbo 67 and Leading Particulars
Photo Source: Basler Flight Service, Inc.

Snow Aviation 210 TA STOL-C/AT Cargo Assault Transport. The Snow Aviation 210 TA is the largest of the alternative-*like* aircraft this study examines. Other larger capacity aircraft may also display performance or design characteristics favorable for FID applications, but this aircraft is interesting because it caters to civil and military needs in STOL and conventional takeoff and landing (CTOL) configurations for applications in developing countries.[73] The company is only beginning prototype construction, but already has interested clients in Australia, the Pacific Rim and island areas, and China. According to Snow Aviation, clients choose the aircraft for, among other things, its capacity and performance potential even in mountains and high temperature and low pressure altitude situations.[74]

The 210 TA is a medium-size, high-wing, multirole transport operated by a two-person crew, and powered by two Allison GMA 2100/SA turboprop engines and the Dowty Aerospace six composite blade, variable pitch propeller. The engine torque box design includes provisions for future growth in aircraft power. Other features allow for all-weather operations, and include hydraulically-driven, multislotted, wide span flaps; retractable gear with antiskid, and the capability to roll over rough terrain and rocks up to nine inches in diameter.[75]

This aircraft, as shown in an artist's impression in figure 12, is designed for transport utility. It has left and right paratroop doors and a convenient ramp, and it can carry 61 to 64 combat loaded troops at 300 pounds each or 40 litters with up to seven attendants. In another display of versatility, the aircraft can carry two army high mobility multipurpose wheeled vehicles (HMMWV) or one HHMWV plus a towed 105-mm howitzer, 21 rounds of ammunition, and a crew of seven.[76] It is also readily convertible from military to civilian roles. Civilian versions can accept the entire range of commercial containers and pallets, including military 463L pallets. The aircraft will configure within one hour for roll-on packages and in 15 minutes from palletized to wheeled vehicles.[77]

Other design features and options add functionality. The cockpit is NVG compatible, and like other critical areas is protected by lightweight kevlar containment vessels. To enhance survivability, special engine features reduce hot exhaust to minimize the IR signature and direct-look exposure to IR missiles.[78] The aircraft can carry an optional 2,700 gallon fuel tank, and configure with refueling boom or probe and drogue arrangement to support air refueling operations. The airborne refueling option will service both fixed- and rotary-wing compatible aircraft through the ramp (two people can install the equipment in one hour).[79] In another way, the aircraft can accomplish other missions with one or more removable modules equipped for PSYOP or the attack mission with optional side-firing cannons like AC-47 and AC-130 aircraft.



FID MISSION APPLICATIONS	Attack, Airlift, and PSYOP	**Takeoff**	CTOL - 1,780 ft STOL - 1,040 ft[83]
Purchase Price	$9 - 10 million[80]	**Landing**	CTOL - 1,400 ft STOL - 1,300 ft[84]
Complete Cost/Flight Hour	$425[81]		
Maximum Gross Weight	CTOL 65,300 lbs STOL 58,252 lbs[82]	**Suitable Airfields (CTOL/STOL) (percentages include helicopter pads)**	Ecuador 20% Sudan 34% Nigeria 32%[85] South America 14% Africa 24%/25%[86]
Payload	CTOL 24,000 lbs STOL -8,000 lbs		
Maintenance Man Hours/Flight Hour	Not Available		
Operationally Ready Rate	Not Available	**Range (45 min reserve)**	CTOL - 1,628 NM STOL - 1,634 NM[87]
Mean Time Between Overhaul	Not Available		

Figure 12. Snow Aviation 210 TA STOL-C/AT and Leading Particulars
Photo Source: Snow Aviation International, Inc.

Snow Aviation emphasizes its choice of systems will allow for future enhancements and long-term maintainability. One method to aid ease of maintenance, for example, includes an onboard device that records system malfunctions and airborne conditions onto *floppy* disk. With nothing more complex than a personal computer, workers can continually track engine performance and make more thorough analyses. Besides other features that simplify maintenance, the company will also market quick engine change kits that facilitate remote-area engine replacement in under two hours using onboard equipment.[88]

Applying the Alternatives

With exception of the Snow Aviation 210 TA, these aircraft are affordable answers to the typical security and nation-building needs of lesser-developed countries. Although the Snow Aviation 210 TA aircraft offers capability appropriate for third world needs and AFSOC's FID intentions, it exceeds host-country financial ability. With their multirole capabilities and characteristics, however, all these aircraft can adjust to *needs of the moment*—whether AFSOC or host countries require them for reconnaissance and surveillance, attack (gunship), airlift, and PSYOP, or even enabling roles such as airborne tanker. Because these aircraft are generally simple, rugged, reliable, inexpensive, and can operate into remote areas more consistently than C-130s, they are appropriate for AFSOC's FID mission and host-country IDAD needs.

All five aircraft possess certain characteristics and performance capabilities of value to underdeveloped countries. They are readily modifiable with proven equipment, whether the need is to adapt for navigation, threat avoidance, operating terrain and climate, or mission enhancement—all at reasonable cost.[89] Many countries have already chosen these types of aircraft, which is a good indication that the aircraft can answer needs within the third world setting. Unfortunately, the US foreign military sales (FMS) program does not support all of these aircraft.[90]

Without these or similar types of aircraft, AFSOC cannot meaningfully participate in the aviation FID teaching and integration processes. Having never operated or explored tactics, techniques, or procedures in aircraft fitting to those owned or appropriate for host countries, AFSOC will carry little credibility. Instead, to be effective and valued at FID, AFSOC must operate aircraft at least similar to those of the air forces it proposes to train. This means equipping AFSOC aircrews with FID aircraft that have characteristics and capabilities clearly separate and distinct from its current inventory.

With separate aircraft and FID-educated aircrews, AFSOC can conduct credible FID training within host countries. These AFSOC crews could even operate from their own special operations squadrons, pooling FID-related experiences with their extensive SOF backgrounds. This pulling together of experiences into one central unit will multiply the teaching power of a FID outfit. I believe Gen Paul F. Gorman argued for such arrangements when he disclaimed *ad hoc* trainers and teams as ineffective. He looked to the favorable effect of providing "cohesive groups from the same unit, prepared together for their mission."[91] This organization process can develop credible, respected instructors who can become experts in the IDAD environment and experienced in flying host-country type aircraft and missions. With this experience and alternative aircraft, AFSOC can tailor assistance efforts to minimize sensitivities with smaller operations, decrease logistical requirements, and spread mission aircraft throughout smaller operating locations.

Not surprisingly, while these alternative-*like* aircraft are appropriate for host-country use and AFSOC FID efforts, their use will aid AFSOC in other ways. They free scarce AFSOC assets that may otherwise have been chained to FID missions. For AFSOC operations in restrictive third world settings beyond the FID mission, these alternative-*like* aircraft can improve AFSOF ability to conduct other missions such as unconventional warfare (UW). Additionally, the aircraft can serve as additive training platforms for Army, Navy, and Air Force SOF who because of AFSOC's commitments and the resulting lack of aircraft are unable to provide requested training support.[92] Also apart from FID, the aircraft could take advantage of opportunities to support SOF military training teams (MTT) that currently depend on host units for in-country transportation. Not only would using alternative-*like* aircraft in this situation aid AFSOF in establishing rapport with host air force personnel, but also would take US forces out of some host-country aircraft that today are not safely maintained nor operated.

Notes

1. The companies for these alternative aircraft not currently manufacturing within the US are negotiating for that privilege. Manufacturers realize the US government rarely procures systems produced wholly outside the country.

2. Ayres Corporation, *The Ayres Vigilante (V-1-A)* (Albany, Ga., undated).

3. Mark Lambert et al., eds., *Jane's All The World's Aircraft 1990-91*, 81st ed. (Alexandria, Va.: Jane's Information Group, Inc., 1990), 346.

4. Ayres Corporation, *Ayres Vigilante* (Albany, Ga., undated).

5. Pete Lewis, sales manager, Ayres Corporation, telephone interview with author, 8 March 1993.

6. Ibid. This price includes $163 an hour for avionics and fuel, $38 labor rate, engine overhaul at 2,500 hours, two hot section inspections, and propeller overhaul at 3,000 hours.

7. Ayres Corporation, *Ayres Vigilante*.

8. Ibid.

9. Lewis interview. Based on results of a two year US Army test in 1987-88.

10. Ayres Corporation, *The Ayres Vigilante (V-1-A)*.

11. Ayres Corporation, *Ayres Vigilante*.

12. Ayres Corporation, *The Ayres Vigilante (V-1-A)*. Landing conducted at a weight of 8,500 pounds (2,000 pounds under the maximum gross weight).

13. Bill Buckwalter, Defense Mapping Agency Aerospace Center for Mapping, Charting, and Production—Section B, author request for special aeronautical information 162-93, 13 May 1993. Percentages for Ecuador, Sudan, and Nigeria exclude runways of undetermined weight-bearing capacity. All data is screened against the following criteria: LCN $\geq$ 4, and runway length $\geq$ 1,500 feet.

14. Buckwalter, request for information 16 March 1993 and 1 July 1993. Percentages for Africa and South America exclude runways of undetermined weight-bearing capacity. According to Mr Buckwalter, these unrated airfields are usually not maintained, and are dirt strips of the poorest quality that appear only in photos, not in country aviation data. South America has 10,262 runways (to include helicopter pads), but only 8,224 are classified with weight-bearing data. Africa has 4,517 runways (to include helicopter pads), with only 4,274 classified. In South America, 7,086 runways are suitable for this aircraft, and the number is 3,320 for Africa.

15. Ayres Corporation, *Ayres Vigilante*.

16. Lambert, 347.

17. Lewis interview.

18. Pilatus Aircraft Limited, *PC-6/B2-H4 Aircraft Specification* (1 December 1991); Larry Bardon, director, Pilatus Civil Aircraft Marketing, slide briefing with author, Air Force Special Operations Command, Hurlburt Field, Fla., 10 September 1992.

19. Bardon slide briefing.

20. Ibid.

21. Ibid.

22. Ibid. Over 400 PC-7 Turbo Trainers sold to customers in 20 countries, including 17 air forces, and eight air forces selected more than 166 PC-9 advanced turboprops.

23. Ibid.

24. Ibid.

25. Ibid. This is for the basic version.

26. Ibid. Based upon an annual 500 flying hours.

27. Ibid.

28. Ibid.

29. Ibid.

30. Maj H. Scott Murphy and Lt Col William Pailes, *AFSOC: Foreign Internal Defense* (Hurlburt Field, Fla.: Headquarters Air Force Special Operations Command, July 1991), 40. The AFSOC FID study quotes this figure from the Air Force AU-23A Test (Credible Chase), a testing of the PC-6.

31. Pilatus Aircraft Limited, *PC-6/B2-H4 Aircraft Specification*. Distance reflects ground roll at maximum gross weight.

32. Ibid. Distance reflects landing ground roll at 5,864 pounds, slightly less than maximum gross weight.

33. Buckwalter, request for information 162-93, 13 May 1993. Percentages for Ecuador, Sudan, and Nigeria exclude runways and helicopter pads of undetermined weight-bearing capacity. All data is screened against the following criteria: LCN $\geq$ 2, and runway length $\geq$ 700 feet.

34. Buckwalter, request for information 16 March 1993 and 1 July 1993. Percentages for Africa and South America exclude runways and helicopter pads of undetermined weight-bearing capacity. South America has 7,491 acceptable runways, and Africa has 3,972.

35. Bardon slide briefing. Stall is calculated at maximum weight.

36. Pilatus Aircraft Limited, *Pilatus PC-6/B2-H4 Turbo Porter* (undated).

37. Skytrader Corporation, *'S.C.O.U.T.' STOL Aircraft Data Manual* (Richards-Gebaur AB, Mo., undated).

38. Ibid.

39. Lambert, 516.

40. Skytrader Corporation.

41. Ibid.

42. Ibid. With Thunder engines, the cost is less than one-third of turbine engine counterparts, and life cycle costs of fuel and maintenance should be about 20 percent.

43. Ibid.

44. Ibid.

45. Ibid.

46. John W. R. Taylor et al., eds., *Jane's All The World's Aircraft 1989-90*, 80th ed. (Alexandria, Va.: Jane's Information Group, Inc., 1989), 518. Takeoff distance reflects ground run.

47. Ibid., 516. Landing distance reflects ground run.

48. Buckwalter, request for information 162-93, 13 May 1993. Percentages for Ecuador, Sudan, and Nigeria exclude runways and helicopter pads of undetermined weight-bearing capacity. All data is screened against the following criteria: LCN $\geq$ 5 and runway length $\geq$ 700 feet.

49. Buckwalter, request for information 16 March 1993 and 1 July 1993. Percentages for Africa and South America exclude runways and helicopter pads of undetermined weight-bearing capacity. South America has 6,738 acceptable runways, and Africa has 2,718.

50. Skytrader Corporation. Stall speed is with flaps and slats extended.

51. Ibid. Each example includes an additional 80 US gallon auxiliary tank for a total of 240 gallons.

52. Neil Hyerstay, director of training, Basler Corporation, telephone interview with author, 8 March 1993; Basler Flight Service, Inc., *Basler Turbo-67*, pamphlet, (West Bend, Wis.: C_3 Documentation Division, undated); Basler Flight Service, Inc., *Basler Turbo-67* (West Bend, Wis.: C_3 Documentation Division, undated).

53. Basler Flight Service, Inc., *Basler Turbo-67*.

54. H. Scott Murphy, Maj (Ret.). Telephone interview with author, 16 July 1993. Murphy most recently served on AFSOC's staff, helping stand up the new FID organization. Besides civilian flying, which includes the Basler 67 Turbo, Murphy has over 2,000 hours in the three H-1 Huey model helicopters and 800 hours in the Sikorsky HH-3 and MH-60G helicopters.

55. Basler Flight Service, Inc., *Basler Turbo-67*, pamphlet; Basler Flight Service, Inc., *Basler Turbo-67*.

56. Hyerstay interview; Basler Flight Service, Inc., *Basler Turbo-67*.

57. Maj Castillo Salvador, pilot, El Salvadoran Air Force, interview with author, 12 July 1993. Maj Salvador has flown extensively in the A-37 and O-2, and is very familiar with the Basler Turbo. He currently attends Air Command and Staff College, Class of 1994.

58. Basler Flight Service, Inc., *Basler Turbo-67*.

59. Ibid. There are five shops in South America and two in Africa; Warren L. Basler, letter. Conversion Sales are ongoing in El Salvador, Columbia, Bolivia, South Africa, Guatemala, and in the US.

60. Don Downie, "Warren Basler's Turbo 67," *General Aviation News & Flyer* 1st issue, October 1991, A-24; Hyerstay interview. Exact price depends upon choice of avionics.

61. Hyerstay interview. Cost includes fuel and maintenance.

62. Basler Flight Service, Inc., *Basler Turbo-67*.

63. Ibid.

64. Hyerstay interview.

65. Ibid. Data is based upon a six month period of operations in the Sudan for the International Red Cross in 1992.

66. Basler Flight Service, Inc., *Basler Turbo-67*. The PT-6 has been an engine of commuter airlines for over 20 years. It powers over 10,800 aircraft (66 types) in 146 countries worldwide. Basic inflight shutdown rate is one every 40,000 hours. The basic unplanned removal rate is one every 26,000 hours.

67. Basler Flight Service, Inc., *Basler Turbo-67*, pamphlet. Takeoff distance is distance to break ground.

68. Warren L. Basler, president, Basler Flight Service, Inc., to author, letter, subject: request for information on conversion sales, 4 August 1992; Data is based on a 20 June 1991 flight test. The takeoff distance during that test was 1,360 feet.

69. Buckwalter, request for information 162-93, 13 May 1993. Percentages for Ecuador (53/136), Sudan, and Nigeria exclude runways and helicopter pads of undetermined weight-bearing capacity. All data is screened against the following criteria: LCN $\geq$ 12, runway width $\geq$ 30 feet, and runway length $\geq$ 1,500 feet.

70. Buckwalter, request for information 16 March 1993 and 1 July 1993. Percentages for Africa and South America exclude runways and helicopter pads of undetermined weight-bearing capacity. South America has 3,633 acceptable runways, and Africa has 1,812.

71. Basler Flight Service, Inc., *Basler Turbo-67*. Standard fuel is 772 gallons. Long-range fuel is 1,542 gallons.

72. Basler Turbo Conversions, Inc., *Basler Turbo-67 Guardian* (West Bend, Wis.: C_3 Documentation Division, undated). Endurance is flown at 110 knots.

73. Edward J. White, director of marketing, Snow Aviation, telephone interview with author, 8 March 1993 and 30 June 1993. According to the article "Snow Aviation is Developing Short Takeoff, Landing Aircraft," the "firm [Snow Aviation] is aiming for foreign and US military markets as well as international cargo sales." See "Snow Aviation is Developing Short Takeoff, Landing Aircraft," *Aviation Week & Space Technology* 130, no. 8 (20 February 1989): 115.

74. White interview.

75. Snow Aviation International, Inc., *The SA-210TA STOL-C/AT Cargo/Assault Transport* (March 1992).

76. Ibid.

77. Ibid.

78. Ibid.

79. Ibid.

80. White interview. Actual price depends upon options selected.

81. William M. Hadly et al., *Airlift and Logistics Systems for Low-Intensity Conflict (LIC)*, SRI International Final Technical Report 7013-89-FR-186 (May 1989), VIII-48; Ibid. Snow Aviation offers pricing for two different scenarios—industrialized or developing countries. The complete cost per flight hour is $1,334.17 for industrialized countries and $1,817.00 for developing countries. The figures reflect all aspects of aircraft ownership, including aircraft payment on balance remaining, and estimated crew wages, insurance, fuel, and landing fees.

82. Snow Aviation International, Inc. CTOL is based on a semi-prepared area that is firm, dry, and smooth—California bearing ratio (CBR) 7 or better. STOL is based on an unprepared area that is soft (mud/sand) or rough—CBR 4.

83. Ibid. Takeoff distances reflect ground roll.

84. Ibid. Landing distances reflect ground roll.

85. Buckwalter, request for information 162-93, 13 May 1993. Percentages for Ecuador (both CTOL/STOL are 27/136), Sudan, and Nigeria exclude runways and helicopter pads of undetermined weight-bearing capacity. All data is screened against the following criteria: CTOL - LCN $\geq$ 23, runway width $\geq$ 35, and runway length $\geq$ 2,000 feet; and STOL - LCN $\geq$ 21, runway width $\geq$ 35, and runway length $\geq$ 1,500 feet.

86. Buckwalter, request for information 16 March 1993 and 1 July 1993. Percentages for Africa and South America exclude runways and helicopter pads of undetermined weight-bearing capacity. South America has CTOL/STOL 1,143/1,167 acceptable runways, and Africa has CTOL/STOL 1,036/1,061.

87. Snow Aviation International, Inc. Range is based on flight at 10,000 feet and 230 knots true airspeed (KTAS) with maximum fuel. For CTOL, range includes 15,910 pounds payload. For STOL, range includes 8,862 pounds payload. Range with no reserve is 1,800 NM for CTOL and 1,826 NM for STOL.

88. Ibid.

89. Murphy and Pailes, 11. The AFSOC FID study emphasizes that aircraft applicable for FID should have certain *provisions* (mounting and wiring) for defensive equipment. Some examples of equipment are already available as currently used options on these alternative-*like* aircraft. They include: radar warning (RAW), chaff and flare systems, and IRCM (as used on MH-60G and all Army helicopters). The study estimates the combined cost of this equipment at

approximately $100,000. With additional capability to strap-on equipment as needed, the survival systems become even more affordable.

90. Basler Corporation was successful at selling some of its conversions to El Salvador under FMS.

91. Paul F. Gorman et al., regional conflict working group, *Supporting U.S. Strategy for Third World Conflict* (Washington, D.C.: Pentagon, 30 June 1988), 30.

92. Message, 051840Z Jun 92, commander in chief, United States Special Operation Command to commander, United States Army Special Operations Command, subject: Rotary Wing (RW) Support for NAVSOC, 5 June 1992; Staff Summary Sheet, Col John F. Bridges, deputy chief of staff for plans and programs, Headquarters Air Force Special Operations Command (HQ AFSOC), to Maj Gen Bruce L. Fister, commander in chief, HQ AFSOC, subject: Rotary Wing (RW) Support for NAVSOC, 22 June 1992. These sources document a Navy Special Operations Command (NAVSOC) request for additive aviation training platforms to avoid interruptions in training support that have been caused by

> operational tasking of AFSOF assets, in-house training requirements, exercise commitments, higher priority training of other unit personnel, less than anticipated availability of AFSOC rotary wing assets, and the high cost in time and operational efficiency of deploying assets to the West Coast.

Chapter 6

CONCLUSION AND RECOMMENDATION

The United States is in danger of allowing its strategy to be determined by its weapons rather than its weapons being determined by its strategy.

Rear Admiral Henry E. Eccles, USN (Ret.)
Christian Science Monitor,
1 October 1981

This study began by noting a national shift in strategy from a cold war focus to new concerns stemming from regional insurgencies, terrorism, subversion, and narcotics trafficking. For this shift and these problems, foreign internal defense is re-emerging as one avenue through which the United States can help struggling democracies throughout the world by lending stability and increasing host-government self-sufficiencies. Though these instabilities are a worldwide concern, this study looked primarily at examples within South America and Africa to assess the most prevalent FID aviation needs, perceive the third world setting, and characterize Air Force Special Operations Command's force structure capabilities. The familiar issues embroiling these two regions served to illustrate the typical flashpoints elsewhere. This study concludes the urgent need to enhance AFSOC's limited aviation FID capabilities, and describes favorable capabilities and characteristics of aircraft that will improve mission effectiveness.

Conclusion

Foreign internal defense is the US role in helping a friendly or allied country find the means to free and protect its people from internal disorder and unrest. The mission focuses nation-building capability on the host-country's strategy for developing and mobilizing its society within a secure, nurturing environment. To achieve this strategy, one part of the host country's requirements is for aviation that can adapt to its many internal civil and security needs. AFSOC's charge is to be capable of moving the country toward self-sufficiency in this regard with proper aviation training, advice, and assistance programs. These programs show the US preference to contribute indirectly, in ways that minimize US involvement and boost host-country self-sufficiency. Indirect avenues such as advice and force exercise activities will so test and evaluate the progress. Indirect assistance will not, however, lead to US forces replacing host-country efforts. Should conditions demand more direct types of US assistance, host-country and US forces need only step up combined operations to the levels they tested and evaluated in earlier training.

In the sixties and seventies, the air commandos performed this mission successfully with over 550 aircraft flying throughout many third world countries at the peak of the war in Vietnam. Today, FID is again becoming a priority concern. The setting for this mission takes place within underdeveloped third world areas, each region with its own blend of environmental challenges and lagging economic, education, and infrastructure characteristics. Within this setting, aviation must adjust to the particular civil and military needs. Flexible, multirole aircraft that operators can easily modify for the particular mission and threat conditions will solve otherwise overwhelming internal problems. However, the preponderance of unsuitable airfields in these areas complicates the host-country's mobility and security programs designed to keep hostile elements at risk while ministering to the remote populace.

AFSOC steps up to this aviation FID mission with a specialized inventory of C-130s and helicopters. Many expect with this inventory and extensive special operations experiences, SOF can guide, shape, and help host countries employ their aviation. But because AFSOC's complex systems and enhancements are designed to answer demanding unconventional and special operations missions, their aviation capability necessarily comes with trade-offs requiring intensive maintenance and logistical support. These systems and their tremendous support requirements mean AFSOC's third world missions will inextricably be tied to the few extensively developed areas with sizable facilities and runways. The C-130 flight operations must tether to large airfields and away from where they are most needed—in and around small, remote sites. For the overwhelming complexities in equipment and logistics, sizes of operational and support aircraft, and scarcity of AC-130s and other high-value assets, AFSOC's fixed-wing aircraft offer little value to FID efforts. Working without fixed-wing capabilities would leave AFSOC's slower, shorter range, and smaller payload helicopters to shoulder the preponderance of all FID requirements. This is an unrealistic and unachievable task solely for helicopters. With their own critical logistics peculiarities, the helicopters could never assume the increased flying left by fixed-wing aircraft. The situation would demand dramatic increases in maintenance time and effort. Even so, helicopters would be wholly inappropriate for the long distance and heavy-lift needs. They could neither assume most of AFSOC's aviation FID mission requirements nor become AFSOC's sole platform for imparting flying advice and training. *In essence, AFSOF cannot adequately perform FID operations under its current force structure.* For these reasons, I believe a credible FID program is possible *only* if AFSOC operates and proves aircraft in its force structure that are suitable for conducting operations within the host country. Suitable aircraft must operate from remote airfields and be simple, rugged, reliable, multirole, and inexpensive to operate and maintain. The most preferable aircraft must also offer mutual value to AFSOF and host-country needs. *To succeed in FID, AFSOC must look to these alternatives.*

Recommendation

The time has passed for debating organization and development of a FID capability. We must get to the business of creating forces that can conduct these missions within the third world setting—where they must be sustained. There is only one way to introduce mission capability and training credibility into AFSOC's evolving FID program such that the recipients will value our advice and assistance. *USSOCOM must aggressively fund the purchase, contract, or lease of a family of aircraft* that can perform sustained reconnaissance and surveillance, attack, airlift, and PSYOP missions for the FID setting. Following this, AFSOC must equip the aircraft with expert, mission-sensitive aviators, and support them in preparing aircraft specific tactics, techniques, and procedures for FID. Until USSOCOM acts, AFSOC lacks the means to maintain proficiency and credibility in aircraft representative of those found in developing nations. AFSOC awaits the aircraft that are ultimately necessary to fulfill its FID mission responsibilities.

Appendix A

Worldwide Flashpoints

Region	Flashpoint	Concern
Former Soviet Union	Moldavia	Ethnic differences
	Hungary and Moldavia	Hungarian minority in Transylvania
	Estonia, Latvia, and Lithuania	Russian minorities
Europe	Yugoslavia	Civil war
	Croatia and Serbia	Each claim Bosnia and Hercegovina
	Kosovo	90 percent ethnic Albanian
	Bulgaria and Serbia	Each claim Macedonia
	Vojvodina	Hungary protective of ethnic minority
	Albania	Internal pressures for reform
	Yugoslavia	Border tensions regarding Macedonia and the resident Albanian minority
	Bulgaria	Slow to democracy and market economy
	Romania	Slow to democracy and market economy
	Aegean Sea	Territorial tensions between Turkey and Greece. Unrest over Cyprus partition. Turkey in midst of domestic insurgency and Kurdish unrest
	Spain and France	Basque separatist group ETA
	United Kingdom	Irish Republican Army and Loyalist groups
	France, Spain, and Italy	Migration from Maghreb North African nations
	Poland	Migration from former Soviet Union
	Czech and Slovakia	Migration from former Soviet Union

North Africa Maghreb	Algeria	Border dispute with Libya
	Chad	Border dispute with Libya
	Niger	Border dispute with Libya
	Tunisia	Border dispute with Libya
	Morocco	National referendum on self-determination in former Western Sahara
	Mauritania	Uncertain relation with Iraq. Senegalese dispute. A fluid Mali insurgence
	Togo	Instability following coup d'etat
	Cameroon	Nigeria seeks resources
	Sudan	Civil war
	Ethiopia	Civil war
	Kenya	Ethiopian and Somalian poachers
Middle East	Lebanon	Syrian backed peace tied to Arab-Israeli peace talks
	Iraq	Hussein remains in power. Kurdistan unresolved
	Iran	Kurdish question unresolved
	Turkey	Kurdish question unresolved
	Oman	Guards Saudi Arabian rear. Yemeni are Hussein allies
	Israel	Palestinian terrorists and Intifada; conflict renewal if the peace process fails
	Iran and Straits of Hormuz	Iran pursuing submarine force; building other military forces. Regional aspirations
	Afghanistan	Civil war
	Pakistan	Migrating Afghan citizens

	India and Pakistan	Kashmir elicits fighting, terrorism, and insurgency
	India	Committed to peacekeeping amongst Sikh separatists in Punjab
	Sri Lanka	Ethnic violence and terrorism among Tamil and Singhalese groups
	Bangladesh	Natural disasters. Fear military strike from India
	Bangladesh	Secessionist rebels and tensions with Burma
	India and China	Border tensions
	Tibet	Now decreasing threat of Indian intervention
	Bhutan	India would resist Chinese intervention
Asia/Pacific	Burma	Ongoing secessionist insurgency
	Burma	Golden Triangle drug barron fights
	India, Bangladesh, and China	China sending Burma weapons to gain access to Indian Ocean and Adaman Sea
	Korean peninsula	North Korean nuclear weapon capability
	Kurile Islands	Russian and Japanese tension
	Japan	Growing maritime self-defense force; considering peacekeeping operations
	Cambodia	UN has not disarmed warring factions; regional instability
	Malaysia	Thai border is home to Communist terrorists
	Vietnam	Ethnic distaste for Montagnards in Central Highlands
	Spratly Islands	Disputed by China, Vietnam, Taiwan, Malaysia, and the Philippines
	Paracel Islands	Controlled by China; claimed by Vietnam
	Irian Jaya	Indonesian secessionist movement
	East Timor	Ethnic unrest; Indonesian secessionist movement

Appendix B

Runway Suitability

The following measurements are extracted from the Defense Mapping Agency Aerospace Center (DMAAC) computer data base on aeronautical information. This agency is the primary source for worldwide runway data and therefore is regularly referenced by reliable and respected publications such as the Central Intelligence Agency's *World Factbook*.

This runway data is available for all areas of the world; however, for the purposes of this study the appendix shows data only for Ecuador, South America, Nigeria, the Sudan, and Africa. Corresponding to each aircraft are load classification numbers (LCN) and specific runway widths and lengths. LCN is one of several methods to classify aircraft and runways. The International Civil Aviation Organization (ICAO) adopted this system in 1956 to represent the weight-bearing capacity of aircraft pavements.[1] Today, engineers assign each aircraft an LCN according to "the stress it creates in a standard rigid pavement [runway or taxiway]."[2] DMAAC tracks aircraft LCN to establish a base for runway accessibility. Fundamental engineering factors for LCN are "load on the undercarriage gear, the configuration of the wheels and the tire pressure."[3] Runways are also rated with an LCN depending upon their ability to support certain aircraft. The central reference number for both aircraft and runways is LCN. Table 1 offers examples of aircraft LCNs and indicates the C-130 and alternative aircraft in ***bold type***. Table 2 indicates the numbers and percentages of runways in areas of South America and Africa that are suitable for C-130 and alternative-*like* aircraft. The alternative aircraft can operate into remote area runways and load-classified landing surfaces. The assessment incorporates LCN and runway width and length figures for each aircraft. The author determined the minimum necessary runway width and length dimensions based upon maximum gross weight takeoff and landing data, and calculated LCN from the best available engineering measurements (aircraft manufacturers were unable to provide LCN data). To extract actual LCN figures, the author used engineering graphs in *Design and Evaluation of Aircraft Pavements 1971*.

TABLE 1

Selec'ed Aircraft in Hard Surface LCN Order

LCN (Hard Surface)		Aircraft
82		KC-10A
72		C-141A/B
59		P-3C
46		C-9A
37		C-5A
36		DC-9-10
33	....	*Heavy weight C-130 (155,000pounds)*
32		A-10A
29		C-123K
25	....	*Medium weight C-130 (135,000 pounds)*
23	....	*Snow 210 TA CTOL*
22	....	*Light weight C-130 (120,000 pounds)*
21	....	*Snow 210 TA STOL*
12	....	*Basler Turbo 67*
11		C-23A
		T-33A
10		C-21A
8		T-38A
		A-37A
7		OV-10A-1
		C-7A
6		T-28 D50/0
		C-12A
5	....	*Skytrader Scout - STOL*
		UV-18
4	....	*Ayres Vigilante V-1-A*
		U-1A
		T-37A/B/C
3		O-2A
2	....	*Pilatus PC-6 Turbo-Porter*
		T-41A

Source: Modified from Defense Mapping Agency Aerospace Center (DMAAC) ' ıpping, Charting, and Production, Section B, DMAAC SOP AD 8320.2, 1 June 1986.

TABLE 2

Runway Suitability Assessment

Representative Aircraft	Ecuador (136)	South America[4] (8224)	Nigeria (74)	Sudan (68)	Africa[5] (4274)
	Suitable Runways (numbers and percentages)				
Pilatus PC-6 Porter LCN ≥ 2 No minimum width Length ≥ 700 ft	134 **98.5**	7491 **91.1**	58 **78.4**	57 **83.8**	3972 **92.9**
Ayres Vigilante V-1-A LCN ≥ 4 No minimum width Length ≥ 1,500 ft	127 **93.4**	7086 **86.2**	50 **67.6**	57 **83.8**	3320 **77.7**
Skytrader SCOUT LCN ≥ 5 No minimum width Length ≥ 700 ft	134 **98.5**	6738 **81.9**	46 **62.2**	56 **82.4**	2718 **63.6**
Basler Turbo 67 LCN ≥ 12 Width ≥ 30 ft Length ≥ 1,500 ft	53 **39.0**	3633 **44.2**	37 **50.0**	47 **69.1**	1812 **42.4**
Snow 210 TA STOL LCN ≥ 21 Width ≥ 35 ft Length ≥ 1,500 ft	27 **19.8**	1143 **13.9**	24 **32.4**	23 **33.8**	1036 **24.2**
Snow 210 TA CTOL LCN ≥ 23 Width ≥ 35 ft Length ≥ 2,000 ft	27 **19.8**	1167 **14.2**	24 **32.4**	23 **33.8**	1061 **24.8**
C-130 (medium weight) LCN ≥ 25 Width ≥ 60 ft Length ≥ 5,000 ft	20 **14.7**	443 **5.4**	22 **29.7**	15 **22.1**	688 **16.1**
C-130 (heavy weight) LCN ≥ 33 Width ≥ 60 ft Length ≥ 5,000 ft	19 **14.0**	430 **5.2**	20 **27.0**	15 **22.1**	625 **14.6**

Source: Don Burgett and Bill Buckwalter, Defense Mapping Agency Aerospace Center for Mapping, Charting, and Production, Section B, author request for special aeronautical information, 16 March, 13 May, and 1 July 1993.

Notes

1. U.K. Department of the Environment, *Design and Evaluation of Aircraft Pavements 1971* (London: undated), CISfB 142 UDC 6291391, 3.

2. Memorandum, James L. Greene, Systems Engineer for Headquarters Air Force Civil Engineering Support Agency, to DEMP Engineers, subject: Air Force Evaluation System versus LCN, undated. Contains selected minutes of 1981 NATO Headquarters Pavements conference: "The Advantages of the ACN/PCN Classification System."

3. Department of the Environment, 3.

4. Bill Buckwalter, Defense Mapping Agency Aerospace Center for Mapping, Charting, and Production—Section B, author request for special aeronautical information 16 March 1993 and 1 July 1993. Percentages for South America exclude runways and helicopter pads of undetermined weight-bearing capacity. According to Mr Buckwalter, these unrated airfields are usually not maintained, and are dirt strips of the poorest quality that appear only in photos, not in country aviation data. South America has 10,262 runways (including helicopter pads), but only 8,224 are classified with weight-bearing data. Calculations for South America include

> Bolivia, Brazil, Chile, Colombia, Ecuador, French Guiana, Guyana, Suriname, Paraguay, Peru, Uruguay, and Venezuela.

5. Ibid. Percentages for Africa exclude runways and helicopter pads of undetermined weight-bearing capacity. According to Mr Buckwalter, these unrated airfields are usually not maintained, and are dirt strips of the poorest quality that appear only in photos, not in country aviation data. Africa has 4,517 runways (including helicopter pads), but only 4,274 are classified with weight-bearing data. Calculations for Africa include

> Algeria, Angola, Botswana, Benin, Burundi, Chad, Congo, Zaire, Cameroon, Central African Republic, Djibouti, Egypt, Equatorial Guinea, Ethiopia, the Gambia, Gabon, Ghana, Guinea, Ivory Coast, Kenya, Liberia, Lesotho, Libya, Malawi, Mali, Morocco, Mauritania, Mozambique, Niger, Nigeria, Guinea-Bissau, Rwanda, South Africa, Senegal, Sierra Leone, Somalia, Sudan, Togo, Tunisia, United Republic of Tanzania, Uganda, Burkina Faso, Namibia, Western Sahara, Swaziland, Zambia, and Zimbabwe.

Appendix C

AFSOC Aircraft Specifics

TABLE 3

Combat Talon Specifics

Aircraft Specifics	MC-130E Combat Talon I	MC-130H Combat Talon II
Speed	300 mph	
Range	Beyond 2,000 miles (unlimited with in-flight refueling)	
Ceiling	33,000 ft	
Maximum Operating Weight	155,000 lbs	
Runway Requirement	Minimum 3,000 X 60 ft	
Crew (mission dependent)	9	7
Cargo Ground Troops Paratroops Litters Pallet Positions	 53 26 15 4	 75 52 Not Available 5
Minimum Altitudes TF TF over water	 250 to 1,000 ft above ground level (AGL) 100 ft	
Maintenance Personnel per Aircraft	51[1]	46.5[2]
Maintenance Man Hours per Flight Hour	37.5[3]	Not Available
Fully Mission Capable (FMC) Rate Mission Capable (MC) Rate	35.0%[4] 75.1%[5]	15.0%[6] 46.3%[7]
Replacement Cost Cost per Flying Hour	$62 million[8] $1,731[9]	$78.5 million[10] $1,440[11]

TABLE 4

Spectre Gunship Specifics

Aircraft Specifics	AC-130A Spectre	AC-130H Spectre	AC-130U Spectre
Speed	250 kts	280 kts	280 kts
Range	1,700 NM (with pylon) 1,600 NM (internal)	Beyond 2,000 miles (unlimited with in-flight refueling)	
Maximum Mission time (unrefueled)	4 hrs	5 hrs[12]	Estimated 5 hrs
Ceiling	25,000 ft (unpressurized)		30,000 ft (pressurized)
Maximum Operating Weight	124, 200 lbs	155,000 lbs	
Runway Requirement	5,000 X 80 ft		
Crew (mission dependent)	14	14	13[13]
Maintenance Personnel per Aircraft	Not Available	67.5[14]	67.5[15]
Maintenance Man Hours per Flight Hour	Not Available	48.7[16]	Unknown
FMC Rate MC Rate	Not Available Not Available	40.4%[17] 79.7%[18]	Unknown Unknown
Replacement Cost Cost per Flying Hour	Not Available Estimated $2,500	$68 million[19] $2,950[20]	$80 million[21] Unknown

TABLE 5

Combat Shadow Specifics

Aircraft Specifics	HC-130N/P Combat Shadow
Speed	250 kts
Range	Beyond 4,000 miles (with internal fuel tanks); Unlimited with in-flight refueling
Ceiling	33,000 ft
Maximum Operating Weight	155,000 lbs
Runway Requirement	5,000 X 80 ft
Crew	8
Cargo Passengers	 12 (with internal fuel tanks)
Minimum Altitudes NVG low level	 300 ft AGL contour
Maintenance Personnel per Aircraft	27[22]
Maintenance Man Hours per Flight Hour	21.4[23]
FMC Rate MC Rate	29.6%[24] 77.1%[25]
Replacement Cost Cost per Flying Hour HC-130N HC-130P	$42.4 million[26] $1,653[27] $1,433[28]

TABLE 6

Commando Solo Specifics

Aircraft Specifics	EC-130E Commando Solo
Speed	240 to 260 kts
Range	Beyond 2,000 miles (unlimited with in-flight refueling)
Ceiling	33,000 ft
Maximum Operating Weight	155,000 lbs
Runway Requirement	5,000 X 80 ft
Operating Altitudes	18,000 to 24,000 ft
Endurance	8 to 10 hrs (unrefueled)
Crew	11
Maintenance Personnel per Aircraft	40[29]
Maintenance Man Hours per Flight Hour	Not Available
FMC Rate MC Rate	41.9%[30] 63.1%[31]
Replacement Cost Cost per Flying Hour	$43 million[32] $2,635[33]

TABLE 7

Pave Low Specifics

Aircraft Specifics	MH-53J Pave Low
Normal Cruise Speed	120 to 130 kts[34]
Range	600 NM (with minimum cargo); Unlimited with in-flight refueling; Combat Radius 200 to 500 NM[35]
Ceiling	16,000 ft
Maximum Operating Weight	42,000 lbs
Landing Requirements	150 X 150 ft[36]
Crew	6
Cargo Passengers Paratroops Litters	 35 to 55[37] 37[38] 16
Minimum Altitudes TF Pave Low System and NVG	 100 ft AGL 50 ft AGL
Transportable on C-5	2
Maintenance Personnel per Aircraft	39[39]
Maintenance Man Hours per Flight Hour	39.8[40]
FMC Rate MC Rate	39.4%[41] 63.7%[42]
Replacement Cost Cost per Flying Hour	$18 million[43] $2,765[44]

TABLE 8

Pave Hawk Specifics

Aircraft Specifics	MH-60G Pave Hawk
Normal Cruise Speed	110 to 130 kts[45]
Range	300 to 450 NM (minimum cargo and internal fuel); Unlimited with in-flight refueling
Ceiling	Not Available
Maximum Operating Weight Routine Operations Ferry Flight	 22,500 lbs 24,500 lbs
Landing Requirements	100 X 100 ft
Crew	4
Cargo Passengers Litters	 8 to 10 troops (12 combat equipped troops without seats) 3
Minimum Altitudes TF (day or night with NVG)	 50 ft
Transportable C-5 C-141	 5[46] Classified
Maintenance Personnel per Aircraft	18.55[47]
Maintenance Man Hours per Flight Hour	17.2[48]
FMC Rate MC Rate	31.9%[49] 69.4%[50]
Replacement Cost Cost per Flying Hour	$9.985 million[51] $491[52]

Notes

1. G.T. Richardson, Headquarters Air Force Special Operations Command, Manpower Section, maintenance analyst for aircraft operations and maintenance costs, telephone interview with author concerning 1993 Programming Factors, 19 November 1992.

2. Ibid.

3. Maj Wayne Gallant, chief of programming and modifications for maintenance engineering, Headquarters Air Force Special Operations Command, telephone interview with author, 6 January 1993 and 15 March 1993. Data reflects aircraft in the 1st Special Operations Wing from March 1992 to February 1993.

4. Col Robert F. Guy, deputy chief of staff for logistics, Headquarters Air Force Special Operations Command, "HQ AFSOC Maintenance Data Summary Oct 91 - Sep 92," undated, 29.

5. Ibid.

6. Ibid., 60.

7. Ibid.

8. Gallant interview.

9. Ibid.

10. Ibid.

11. Ibid.

12. Operations Plans Divisions, 1st Special Operations Wing, "1st Special Operations Wing Mission Employment Guide for AC-130H Gunship Spectre/Ghost Riders," November 1990, 5.

13. Mark Lambert et al., eds., *Jane's All The World's Aircraft 1990-91*, 81st ed. (Alexandria, Va.: Jane's Information Group, Inc., 1990), 491.

14. AFR 173-13, *Cost Analysis: US Air Force Cost and Planning Factors*, 31 October 1989, 140.

15. Ibid.

16. Gallant interview. Data reflects aircraft in the 1st Special Operations Wing from March 1992 to February 1993.

17. Guy, 6.

18. Ibid.

19. Gallant interview.

20. Ibid.

21. Ibid.

22. Richardson interview.

23. Gallant interview. Data reflects aircraft in the 1st Special Operations Wing from March 1992 to February 1993.

24. Guy, 15.

25. Ibid.

26. Gallant interview.

27. Ibid.

28. Ibid.

29. AFR 173-13, 143.

[illegible] Carl Kostival, assistant deputy chief of maintenance, Pennsylvania Air National [illegible] Headquarters 193rd Special Operations Group, telephone interview with author, [illegible] 1993; These are calendar years (CY) 1991 and 1992 combined.

[illegible] These are CY 1991 and 1992 combined.

[illegible] Management Analysis, "History of 193rd Special Operations Group" (Middletown, Pa.: [illegible] Special Operations Group, Headquarters Pennsylvania Air National Guard, undated), 5.

[illegible] interview.

[illegible] Plans Divisions, 1st Special Operations Wing, "1st Special Operations Wing [illegible] Employment Guide for MH-53J Pave Low," November 1990, 6.

[illegible] Ted McCloskey, *Special Operations Reference Manual*, (Hurlburt Field, Fla.: USAF [illegible] Operations School, January 1991), 7-3.

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[illegible] interview.

[illegible] interview. Data reflects aircraft in the 1st Special Operations Wing from [illegible] 1992 to February 1993.

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[illegible] Plans Divisions, 1st Special Operations Wing, "1st Special Operations Wing [illegible] Employment Guide for MH-60G 'Pave Hawk,'" November 1990, 4.

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[illegible] interview.

[illegible] interview. Data reflects aircraft in the 1st Special Operations Wing from [illegible] 1992 to February 1993.

[illegible]

[illegible]

[illegible] interview.

[illegible]

Appendix D

Additional Data for Alternative Aircraft

These tables 9 through 13 present additional data for each of the alternative aircraft in chapter 5. The data continues to reflect the speed, size, range, payload capacity, and endurance characteristics valuable for aircraft suitable to foreign internal defense and host-country operations.

TABLE 9

Ayres Vigilante V-1-A

Dimensions	
External	Length 33 ft, Wing Span 44 ft 5 in, Height 9 ft 6 in[1]
Long Range Cruise Speed	150 kts[2]
Max Cruise Speed	200 kts[3]
Ferry Range (no reserve)	900 NM (internal fuel); 1,750 NM (internal and external fuel)[4]
Service Ceiling	25,000 ft

TABLE 10

Pilatus PC-6 Turbo-Porter

Dimensions	
External	Length 35 ft 9 in, Wing Span 52 ft 7 in, Height 10 ft 6 in
Internal	Length 9 ft 5 in, Width 45.7 in, Height 46.5 in[5]
Time between overhaul	
Airframe	Partial at 3,500 hrs or 7 yrs. Total at 7,000 hrs or 14 yrs.
Engine	Inspection 1,250 hrs (hot section). Overhaul at 3,500 hrs.
Propeller	Every 3,000 hrs or 5 yrs.[6]
Maximum Cruise Speed	119 kts[7]
Range (1/2 hr reserve)	435 NM (internal fuel); 820 NM (internal plus wing tanks)[8]
Service Ceiling	20,500 ft[9]

TABLE 11

Skytrader SCOUT-STOL

Dimensions	
External	Length 46 ft, Wing Span 58 ft, Height 19 ft
Internal	Length 18.5 ft, Width 67 in, Height 72 in[10]
Cruise Speed	170 mph (75% cruise power)[11]
Service Ceiling	28,000 ft[12]

TABLE 12

Basler Turbo 67

Dimensions	
External	Length 67 ft 9.5 in, Wing Span 95 ft 8 in, Height 23 ft 6 in
Internal	Length 42 ft 2 in, Width 7 ft, Height 6 ft 8 in[13]
Standard Cruise Speed	199 kts[14]
Service Ceiling	25,000 ft[15]

TABLE 13

Snow Aviation 210 TA STOL-C/AT

Dimensions	
External	Length 89 ft 9 in, Wing Span 112 ft, Height 33 ft 5.5 in
Internal	Length 42 ft 7 in, Width 100 in, Height 101.6 in[16]
Cruise Speed	222 KTAS[17]
Service Ceiling	32,000 ft[18]

Notes

1. Ayres Corporation, *Ayres Vigilante* (Albany, Ga., undated).

2. Ayres Corporation, *The Ayres Vigilante (V-1-A)* (Albany, Ga., undated).

3. Ibid.

4. Ayres Corporation, *Ayres Vigilante*.

5. Pilatus Aircraft Limited, *PC-6/B2-H4 Aircraft Specification* (1 December 1991).

6. Pilatus Aircraft Limited, *Pilatus PC-6/B2-H4 Turbo Porter* (undated). Engine overhaul is extensible by 500 hours.

7. Pilatus Aircraft Limited, *PC-6/B2-H4 Aircraft Specification*.

8. Larry Bardon, director, Pilatus Civil Aircraft Marketing, slide briefing with author, Air Force Special Operations Command, Hurlburt Field, Fla., 10 September 1992. Two underwing tanks at 64 US gallons each.

9. Pilatus Aircraft Limited, *PC-6/B2-H4 Aircraft Specification*. Calculated at ı ıum weight.

10. Skyırader Corporation, *'S.C.O.U.T.' STOL Aircraft Data Manual* (Richards ꞁbaur AB, Mo., undated). Internal length represents the cargo bay.

11. Ibid. Cruise is at 10,000 feet.

12. Ibid.

13. Basler Flight Service, Inc., *BT-67*, photo with data, (undated). Internal width measured at the floor.

14. Basler Flight Service, Inc., *Basler Turbo-67* (West Bend, Wis.: C Documentation Di . undated).

15. Harry Hopkins, "Born-Again Basler," *Flight International* 139, no. 4264 (24 - 30 April 1991): 42.

16. Snow Aviation International, Inc., *The SA-210TA STOL-C/AT Cargo/Assault Transport* (March 1992).

17. Ibid.

18. Ibid.

Glossary

AAA	anti-aircraft artillery
AM	amplitude modification
ACSC	Air Command and Staff College
AFM	Air Force Manual
AFR	Air Force Regulation
AFSOC	Air Force Special Operations Command
AFSOCR	Air Force Special Operations Command Regulation
AFSOF	Air Force special operations forces
AGL	above ground level
ASD/SO-LIC	assistant secretary of defense for special operations and low-intensity conflict
AVGAS	aviation gasoline
CAS	close air support
CBR	California bearing ratio
C^3	command, control, and communications
COMAFSOC	commander, Air Force Special Operations Command
CONUS	continental United States
CTOL	conventional takeoff and landing
CY	calendar year
DMAAC	Defense Mapping Agency Aerospace Center
DOD	Department of Defense
FID	foreign internal defense
FLIR	forward-looking infrared
FM	frequency modification
FMC	fully mission capable
FMS	foreign military sales
FT	feet

GNP	gross national product
GPS	global positioning system
HF	high frequency
HQ AFSOC	Headquarters Air Force Special Operations Command
HRS	hours
HUD	heads-up display
HUMINT	human intelligence
ICAO	International Civil Aviation Organization
IDAD	internal defense and development
IDS	infrared detection system
IMINT	imagery intelligence
IN	inches
INS	inertial navigation system
IR	infrared
IRCM	infrared countermeasures
IR SAM	infrared surface-to-air missile
JCS	Joint Chiefs of Staff
JMA	Joint Mission Analysis
JTTP	joint tactics, techniques, and procedures
JULLS	joint universal lessons learned
KTS	knots
KTAS	knots true airspeed
LBS	pounds
LCN	load classification number
LIC	low-intensity conflict
LOC	line of communication
MC	mission capable
MM	millimeter
MPH	miles per hour
MTT	military training team
MWR	missile warning receiver

NAVSOC	Navy Special Operations Command
NCA	national command authorities
NM	nautical miles
NVG	night vision goggles
PDF	Panamanian Defensive Forces
PSYOP	psychological operations
RAF	Royal Air Force
RW	rotary wing
RWR	radar warning receiver
SAM	surface-to-air missile
SATCOM	satellite communications
SCNS	self-contained navigation system
SIGINT	signals intelligence
SM	statute miles
SOF	special operations forces
SOF-I	special operations forces improvements
SOUTHCOM	Southern Command
STAR	surface-to-air recovery
STOL	short takeoff and landing
TF/TA	terrain following/terrain avoidance
TPC	tactical pilotage chart
TV	television
UHF	ultra-high frequency
USCINCSOC	commander in chief, United States Special Operations Command
USSOCOM	United States Special Operations Command
UW	unconventional warfare
VHF	very-high frequency
YRS	years

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