



**ECONOMIC IMPACT
OF ARIZONA'S
PRINCIPAL MILITARY OPERATIONS**

Military Affairs Commission

PREPARED BY



The Maguire Company

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In addition, we would like to thank the State of Arizona that sponsored this study and the supporting analysis. Special thanks are also due to The Arizona Military Affairs Commission and the Arizona Commerce Authority for their support and assistance.

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Introduction

This study was commissioned by the State of Arizona to update the 2002 and 2008 studies of the Economic Impact of Arizona's Principal Military Operations. Prior to the 2002 Study, no such analysis had been completed on such a comprehensive and methodologically consistent basis.

As the 2002 and 2008 studies demonstrated, one of the largest and yet frequently overlooked employers in Arizona is the United States Department of Defense. The presence of military personnel and their supporting activities pre-date statehood but is sometimes ignored in economic development discussions. For years, the "Five C's" were used to describe the basic industries of Arizona – Copper, Cotton, Citrus, Cattle, and Climate. These industries were identified as the core of Arizona's economy. Nowhere in this list was there any recognition of the thousands of Arizona jobs tied directly and indirectly to the many military operations within the State.

The presence and economic contribution of the military operations in Arizona may have been historically under-recognized due to the general isolation of the operations from typical commerce, the physical separation for security reasons of many of the facilities, or the methods typically used to collect and report economic and employment statistics. Whatever the reasons for the historical oversight, the military operations within Arizona represent a substantial and valuable industry in the State that should be recognized and listed among the State's most important sources of economic activity.

Since the release of the 2002 Study, the economic and fiscal benefits of the Arizona key military operations have been frequently cited in discussions of the state's economic development and vitality. The mortgage debt-triggered recession of the last decade and the consequent fiscal impacts for state and local governments highlight the benefits of a non-cyclical economic driver like these military operations.

Among the reasons for this study and the prior efforts, cited by the sponsors, are the continuing frequency of proposed state legislation involving issues relating to the location and activities of various military operations in the State, the continuing development of land adjacent to and near military facilities, and the continuing possibility of base closures by the Department of Defense. For these and other reasons, this effort to update the prior studies results was undertaken.



Background

While the 2005 round of the Base Realignment and Closing Commission (BRAC) largely spared Arizona's facilities and operations, it is expected that another round of BRAC reviews will occur in the years ahead.

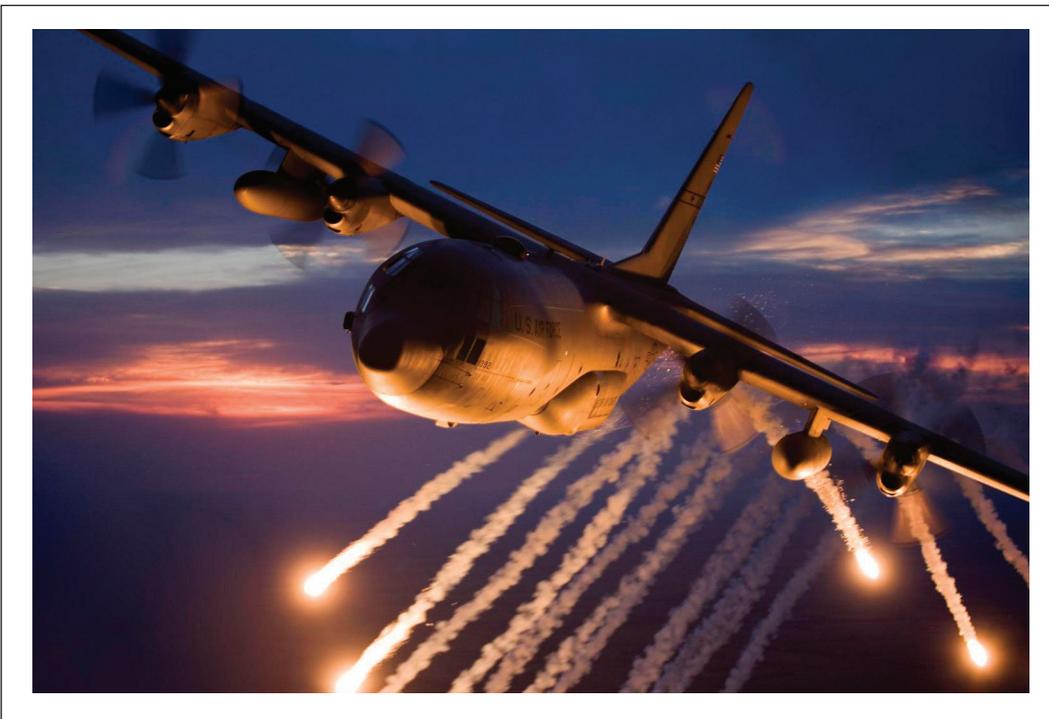
The consequences of the previous BRAC-ordered closures have been the subject of substantial controversy and debate. Some have argued the benefits of the efficiencies that have resulted from the Commission-prompted closings, while others have raised concerns regarding the loss of essential military capabilities, especially unique, irreplaceable locations or facilities.

At the same time that federal actions may result in the reduction or closing of military facilities within Arizona, local decisions and activities also endanger the future of some military operations. In most cases, Arizona's principal military operations historically developed at facilities either in remote locations or at the periphery of development. This physical separation permitted the operations to exist largely unaffected by the surrounding

population growth and development. However, in the last few decades Arizona's sustained growth and development have, in some cases, brought development closer to the formal boundaries of some bases and into the adjacent, off-base areas that are crucial to the safe and prudent execution of military activities from those facilities.

A number of state laws have been enacted to protect areas directly adjacent to military operations and to enable the continued use of critical, but off-base areas, through permitting only those land uses that are compatible with the ongoing military activities.

In addition, the closure and redevelopment of Williams Air Force Base in eastern Maricopa County has prompted discussions concerning the economic development challenges and opportunities that might be associated with the closing of other military facilities within the State.



Study Methodology

To fully measure the impact of the principal military operations within Arizona, the Study Team had to establish a study methodology. Since the purpose of this effort was in large part to update the prior studies, the methodology of that effort was a starting point for the Study Team's determination. Prior to 2002, no study had examined the combined economic effect of all of Arizona's principal military operations on the State's economy, so a new methodology had to be developed for that effort. It was critically important that the approach used would ensure a comprehensive, yet conservative, estimate of the operations' impact, based on information compiled using uniform and consistent techniques. In addition, the Study Team sought to develop a reproducible methodology assuring that subsequent studies could build upon the information and knowledge gained. Based on that prior foundation, the Study Team determined to replicate the prior studies methodology with only minor adjustments as described below.

Based on the experience gained through the 2002 and 2008 Studies efforts and, most importantly, the availability of a number of key personnel at the various military installations that had participated in the earlier studies, the financial data collected for a number of the installations is significantly improved from the prior study. Consequently, not all of the changes in the reported impacts are entirely attributable to changes in the scope of operation; some changes, in some cases significant amounts, are the result of better data collection and reporting. The Study Team is grateful to all of the key personnel at the various military installations who spent hundreds of hours collecting, validating, and crosschecking financial data.

In examining Arizona's principal military operations as an industry, it was essential that the information gathered and analyzed for each military operation be compiled using uniform and consistent techniques. In this way, both the inputs for the economic analysis as well as the outputs would be reasonably comparable among the various military operations. It must be recognized that there are substantial differences in the missions and activities of the various military operations within Arizona, even though there are numerous unifying similarities. Great care was taken to recognize and balance the differences among the military operations while maintaining the desired consistency. It is important to note that prior studies, as well as future studies, undertaken with respect to a single facility or operation may employ equally valid, but different, methodologies for estimating the economic impact of those facilities or operations. However, for the purposes of this effort, uniformity and consistency were paramount.

Another continuing concern of the Study Team was ensuring that the economic inputs used in the analysis, while comprehensive, were non-duplicative. Many opportunities existed for double counting or the inclusion of redundant data. The inclusion of such information would overstate the actual economic impact of the principal military operations and as such would violate one of the study's guiding principles, that is, the production of a conservative, yet realistic, estimate.

Use of IMPLAN

The Study Team, as in the prior studies, felt it was important to rely upon an independent input-output model, not subject to any influence from within the State, to estimate indirect and induced impacts. It was determined that the use of the IMPLAN Pro economic impact model software was most appropriate. IMPLAN stands for Impact Analysis for Planning. IMPLAN Pro software was created and is distributed by the Minnesota IMPLAN Group (MIG) as a comprehensive econometric tool for analyzing economic impacts within specific regions. The IMPLAN econometric model uses actual input and output information for each county within the United States to develop a tailor-made model for each individual study.



Study regions typically include single counties, multi-county regions, one or more states, or the entire national economy. Study regions can also be based on zip codes, using a mixture of county and zip code level information.

As a general rule, the larger the study area examined, the greater the impacts, because of the increased amount of economic activity occurring within the larger region. Occasionally, larger geographic areas can have reduced impacts as a result of unique characteristics within the geographic region, such as average productivity of workers or the location/absence of certain important industries.

Definitions

The IMPLAN econometric model operates by estimating the indirect and induced impacts generated by the direct economic activity. This approach reflects the “multiplier effect” of economic activity as it spreads through the economy. **Direct** economic impacts are those attributable to the initial economic activity; for example, an operation with ten full-time employees creates ten *direct* jobs. **Indirect** economic impacts are those economic activities undertaken by vendors and suppliers within the supply chain of the direct activity as a result of the initial economic activity. For example, suppliers of goods, materials, and services used in the direct activities produce secondary or indirect economic impacts. **Induced** economic impacts result from the spending of wages paid to employees in local industries involved in direct and indirect activities. These wages, which are analogous to household spending, support additional local activities, such as the purchase of goods and services within the region. In turn, that portion of spending that accrues to local businesses and employees is once again re-circulated within the local economy, producing additional economic activity.

The econometric model measures the amount of economic activity in each round of spending until all of the spending within the local region has been exhausted. In each iteration, a certain portion of spending is attributed to economic activities (purchases) outside of a local (study) region. Once money is spent outside the local region, it is not included in subsequent iterations. Thus, each iteration recycles an ever-declining amount of economic activity. The extent to which economic activity recycles within the local region is defined for each specific region (in this study, counties and the state) based upon the input and output relationships among industries and their suppliers in the region. This information is derived from Bureau of Economic Analysis data.

Determination of Operations and Activities to be Included

Another of the challenges the Study Team faced was determining which military facilities and operations to include within the study. The Study Team examined a wide range of activities for possible inclusion within the study. Ultimately, the Study Team developed a uniform series of standards to determine whether a particular activity, facility, or operation should be included. In short, a two-test standard was developed and utilized.

The first test concerned the mobility or susceptibility to potential closure or relocation of an activity, facility, or operation. If the continuation of an operation depends **solely** on a *federal government decision*, it was included in the analysis. For example, an operation that could be reasonably relocated to some other geographic location by a decision of the Department of Defense would be included.

The second test measured the degree to which the activity, facility, or operation was subject to *community influence* concerning its activities or operations. In other words, does the operation inherently impact its neighbors? Some of the frequently encountered examples of community influences or external pressures on various military activities, facilities and operations include geographic encroachment, zoning and regulatory constraints, or neighborhood noise and safety concerns.

Utilizing this two-test standard, the Study Team identified the principal military operations to be included in the study. These operations include the principal military facilities within the state: Fort Huachuca and the Army Intelligence Center, Davis-Monthan Air Force Base, Luke Air Force Base, Army Yuma Proving Ground, Marine Corps Air Station - Yuma, and Naval Observatory - Flagstaff. In addition, the activities of the Arizona Army National Guard and the Arizona Air National Guard were included. These are the same operations included in the prior studies, except the Naval Observatory was added.



Determination of Operations and Activities to be Excluded

As mentioned earlier, equally important and difficult was the determination of which activities to exclude. Using the two-test standard described above, the Study Team, as in 2002 and again in 2008, eliminated from consideration military contractors, such as, the Boeing helicopter facilities in Maricopa County, the Raytheon facilities in Pima County and a wide variety of other military-related contractors within the state of Arizona that were not directly linked to the location of one of the principal military operations in the state. The businesses excluded from this study are important contributors to Arizona's economy; however, their location in Arizona is largely attributable to other factors including labor force characteristics, lower costs of doing business in Arizona, quality of life considerations, and the other attractive characteristics of Arizona and its economy.

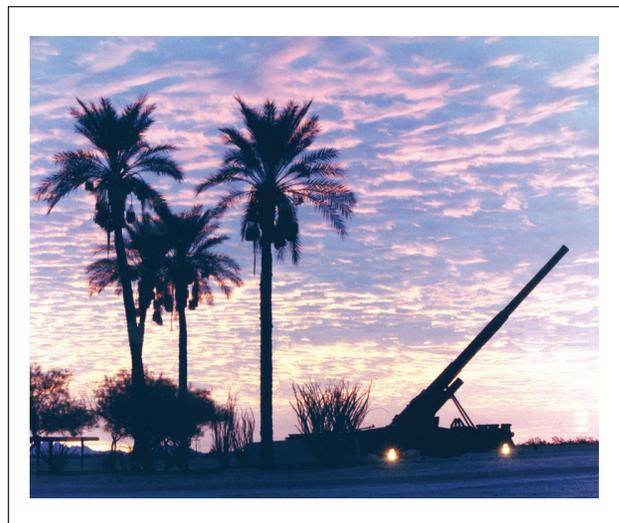
It is also important to note that a number of positive developments have occurred on the site of the former Williams Air Force Base in eastern Maricopa County. Many of these activities are related to military operations and the defense industry and provide important economic stimuli within the State's economy. However, it was the Study Team's determination that, while valuable, these activities were not appropriate for inclusion within this study.

While all of these activities are important economic components of the State's overall economy, they were not within the subject of this study. A broader, more far-reaching examination of the impact of military spending (e.g. all Department of Defense spending) both for military operations as well as for defense-related contracting could be undertaken and would yield overall impacts in excess of those estimated by this report. However, the purpose of this effort was to examine a more narrowly defined group of economic activities.

Linked Military Retirees

Beyond the economic activity (personnel and spending) of the military operations themselves, Arizona's economy receives substantial stimulus from the spending of military retirees. Prior studies and analysis have recognized a relationship between the location and accessibility of full service military installations and the residential locational choices of military retirees. Access to facilities including health care and commissaries on military installations are among a number of factors influencing the geographic residential locational decisions of military retirees. However, care must be taken not to overestimate the impact of military installations on the locational decisions of otherwise mobile military retirees, especially in states like Arizona. Arizona is one of a number of states that benefits from the general in-migration of mobile retirees, both military and non-military retirees. The State's climate, cost of living, and other quality of life considerations attract individuals.

Balancing the effect of the general attractiveness of Arizona with the desirability of proximity to an established military installation for mobile military retirees was the subject of substantial consideration by the Study Team. Ultimately, a two-criterion standard was established for estimating the portion of military retirees and their spending that were directly linked to the State's military installations and were therefore appropriate to include within the study. In general, the 2002 Study generally assumed that 25 percent of the military retirees living within a *50-mile radius* of one of the principal military installations would be included within the study. For these purposes, only the Davis-Monthan AFB, Fort Huachuca, Luke AFB, Yuma MCAS, and Yuma Army Proving Ground were considered to be principal military installations due to the availability of a wide range of services. In addition, certain identified military retirees linked to National Guard operations were also considered. Due to changes in the delivery of some services to military retirees, the Study Team considered reducing its criterion for military retirees linked to the installations to 20 percent. But, in the absence of any reliable quantitative analytical support, the methodology was kept consistent with the 2002 Study approach for comparison purposes. More detailed analysis of the service areas was also undertaken in this study effort.



Thus, more specifically, 25 percent of retirement income received by military retirees residing within a postal zip code area generally within a 50-mile radius of one of the principal military installations was included in the study. This amount was an estimate of the retirement income spending attributable to military retirees who would not be residents of Arizona, if the military installations were not located within the state. In some instances this general standard was adjusted to reflect geographic travel barriers as well as to avoid duplication for areas within 50 miles of more than one facility. The 50-mile standard was used to represent a one-hour travel time, which is a frequently used standard for proximity in economic and transportation studies.

Determination of Financial Inputs

Having determined the scope of the study, the Study Team began the development of a uniform, standardized list of financial inputs. In general, the Study Team sought to collect standardized information from all of the principal military operations within the State concerning their compensation for personnel and other direct spending activities for fiscal year 2014. Specifically, payroll information for a variety of different categories of personnel were identified, solicited, and collected from the principal military operations. Payroll information provides a general measure of disposable household income available for expenditure and use within the regional economy. However, a wide variety of adjustments must be and were made to the payroll information prior to its input into the IMPLAN econometric model. A more thorough discussion of the modifications made to the basic financial information is presented in Appendix Three.

The Study Team also sought and received consistent information from the various military operations on their contracts and purchasing expenditures. In assembling this information, extensive discussions were held among representatives of the various military operations within the State to insure general uniformity and consistency between facilities and operations. In addition, great care was taken by the Study Team to avoid double counting or duplication of information within the contracting and purchasing categories as well as in the personnel and payroll information.

Having determined its study methodology, the Study Team contacted both the operational commanders as well as the financial officers of each of the identified principal military operations within the State. A series of procedural discussions were undertaken with representatives of each of the operations and standardized definitions were developed for the identification and collection of financial information. This financial information, which served as the initial source of inputs for the IMPLAN econometric model, is summarized at the end of this section. *As mentioned above, due to the experience gained through the earlier study efforts and, most importantly, the availability of a number of key personnel at the various military installations that had participated in the earlier study efforts, the financial data collected for a number of the installations is significantly improved from the prior study. Consequently, not all of the changes in the reported impacts are entirely attributable to changes in the scope of operations; some changes, in some case significant amounts, are the result of better data collection and reporting.*

The IMPLAN econometric analysis was completed for each of the individual military operations on a countywide basis. In addition, inputs from all of the military operations included within the study were aggregated and the analysis was undertaken on a statewide basis. The principal focus of this study is the statewide impact of the various military facilities and operations within Arizona. Detailed information concerning individual facilities and their countywide impacts are summarized in the appendices to this study.



There are six major military installations in Arizona:

Army Intelligence Center and Fort Huachuca

Davis-Monthan Air Force Base

Luke Air Force Base, Yuma Army Proving Grounds

Marine Corp Air Station – Yuma

Naval Observatory Flagstaff

And four principal National Guard operations:

Arizona Army National Guard

Arizona Air National Guard's 162nd Fighter Wing

Western Army National Guard Aviation Training Site

(at Silver Bell Heliport)

Arizona Air National Guard's 161st Air Refueling Wing

Army Intelligence Center and Fort Huachuca

Fort Huachuca is located in Cochise County in southeastern Arizona, on the western slope of the San Pedro River Valley. The Fort supports a diverse mission set: as an individual training base for Military Intelligence and Unmanned Aircraft System (UAS) Soldiers; as an operations platform supporting Army Networks Operations and Tactical Signal elements; and as a communications, intelligence, and electronic warfare test and evaluation platform. These missions are conducted by the US Army Intelligence Center of Excellence, Network Enterprise Technology Command (NETCOM), US Army Information Systems Engineering Command (ISEC), the Joint Interoperability Test Command (JITC), and US Army Electronic Proving Ground (EPG), 2nd Battalion 13th Aviation Regiment, and the 40th Expeditionary Signal Battalion (ESB). Numerous additional tenant/partner support organizations and their missions are located on the Fort as well.

The Military Intelligence training mission encompasses training, organizing, and equipping MI professionals to support the nation's war fighting requirements

throughout the operational continuum. The Intelligence Center offers over 80 courses ranging from Noncommissioned Officer's Courses to the Officer's Advanced Course. During the year approximately 10,000 students will be trained and instructed at Fort Huachuca. The Intelligence Center's Capabilities Development and Integration Directorate is at the forefront of Military Intelligence Future Force and Doctrine development, ensuring the MI Corps is prepared for future operations. The Human Intelligence Training Joint Center of Excellence located at Fort Huachuca provides the Department of Defense premiere training. Rounding out the individual training mission is the 2nd Battalion 13th Aviation Regiment which trains all the Army and Marine UAS pilots and maintainers on the Shadow UAS as well as all the Army personnel operating the Gray Eagle UAS, in excess of 2,000 Soldiers and Marines this year.

NETCOM and 40th ESB are the primary operational mission elements on the Fort. The Headquarters for NETCOM is responsible for operating and defending the Army's network worldwide and is supported by

elements of the Communication Electronic Command's ISEC and the Communications Security Logistics Activity.

Because of the ideal terrain and topography of southeast Arizona, EPG at Fort Huachuca is the primary location for developmental testing of all the Army's Communications Electronics systems as well as the operational testing of all the Army's Intelligence Electronic Warfare systems. Co-located with the Department of Defense (DoD) JITC, almost every DoD system that communicates or collects intelligence on the battlefield will pass through one or both of the EPG and JITC during their development and eventual interoperability certification before final fielding to the Services.

The US Army Garrison at Fort Huachuca has command and control of functions which include operations, maintenance, and security of Fort Huachuca as well as responsibility for all stationing and quality of life (morale, welfare, recreation, child care and development). Many of the active duty military and their family members live on post in privatized housing with 1,064 individual homes in ten housing areas. As for military barracks locations, there are 4,825 units on Fort Huachuca.

Fort Huachuca's strategic assets that support the diverse missions performed are the Buffalo Soldier Electronic Test Range (BSETR) and the R2303 Military Restricted Airspace. The BSETR comprises 2,500 square miles in western Cochise and eastern Santa Cruz Counties in southeast Arizona. Codified in Arizona State Statute as a military electronics testing range, the BSETR provides a low electromagnetic noise environment that supports the Fort's diverse testing and training missions. The 946 square miles of the R2303 airspace is contained within the BSETR operations area and is completely separated from any competing commercial air traffic corridors. Fort Huachuca has scheduling and operational control of the Airspace including: Department of Defense

Unmanned Aerial Vehicle Training with three restricted areas (R-2303A, R-2303B, and R-2303C). The restricted airspace areas are activated for approximately 24 hours per weekday for unmanned aircraft testing, training, and activities, which are monitored and deconflicted by Libby Army Airfield Air Traffic Control Radar. When not in use by the military, typically the weekends and federal holidays, the airspace reverts to control by Albuquerque Central air traffic control.

Supported by Libby Army Airfields 12,000 foot long main runway, as well as multiple UAS airstrips and the 4,600 foot Hubbard Dirt Assault strip, main airspace users currently include the 2-13th for training on the Shadow Tactical Unmanned Aerial System, Gray Eagle class of air vehicles, and 111th MI Brigade's Special Electronic Mission Aircraft along with other testing used by the Electronic Proving Ground.

Other users of Special Use Airspace and the Joint-Use Libby Airfield include the Advanced Airlift Tactics Training School operated for the Department of Defense by Missouri Air Guard, the 162nd Fighter Wing with their F-16s, the 355th Air Wing's A-10s, the Forest Service for their air tankers, 214th Reconnaissance Group (AZ Air National Guard) and the US Customs/Border Patrol.

In addition to the BSETR and R2303 capabilities at the Fort, there are fourteen live fire ranges, two Demo Ranges, one laser and other training facilities including Rappel Tower/Cliffs, Leadership Reaction Course, Aircraft loading mock-up, Obstacle Course, Confidence Course, Mask Confidence Chamber, Assault Landing Strip, six Airborne Drop Zones, three Land Navigation Courses, Grenade Assault Course (non-firing), and four Urban Operations sites.

Fort Huachuca has been on the leading edge of our Nation's Defense since 1881 and remains a key resource for the Department of Defense.



Davis-Monthan Air Force Base – 355th Fighter Wing

The mission of the 355th Fighter Wing is to provide combat ready A-10C aircraft to theater commanders worldwide and to conduct initial qualification and recurring training for all A-10C pilots. Davis-Monthan AFB is located in the City of Tucson, Arizona.

Flying units at the base consist of two A-10C squadrons assigned to the 355 FW and two tenant units, the 55th Electronic Control Group (ECG), operating EC-130 aircraft, and the 563rd Rescue Group (RQG), operating HC-130 aircraft and HH-60 helicopters. The two A-10C squadrons consist of one Flying Training Unit squadron and one Operational Squadron. The two EC-130 units, 41st and 43rd ECS, of the 55 ECG represent unique capabilities as the US Air Force's entire Compass Call Fleet. The two flying units of the 563rd (RQG) are the 79th Rescue Squadron (RQS) operating HC-130 aircraft and the 55th RQS operating HH-60 helicopters.

The 354th Fighter Squadron "Bulldogs", an operational A-10C unit, provides worldwide day and night combat capability in Close Air Support, Air Strike Control, Combat Search and Rescue, Air Interdiction, and Battalion Air Liaison Officers.

The 357th Fighter Squadron "Dragons" train approximately 90 A-10C fighter pilots under three separate syllabi per year. Training includes Initial Qualification Training, Requalification Training, Central Instructor School Training, and the Air Force's first Night Vision Goggle Training at a Fighter Training Unit.

The 41st Electronic Combat Squadron "Scorpions" and 43rd Electronic Command Squadron "Bats" provide worldwide day and night offensive Information Warfare capability. These capabilities include: Acquiring, Directional Finding, Analyzing and targeting three Signals, preventing targeting of friendly signals, and linguists and analysts enabling real-time specific targeting.

The 79th RQS provides rapidly deployable combat search and rescue (CSAR) forces to theater combatant commands worldwide. It operates and tactically employs the HC-130 "Combat King" aircraft. The squadron conducts helicopter air refueling, airdrop of pararescue personnel and/or equipment, and trans-load operations on austere airfields for combat personnel recovery in denied territory, using covert low-level operations during the day or at night using night vision devices.

The 55th RQS provides rapidly deployable combat search and rescue (CSAR) forces to theater combatant commands worldwide. It operates and tactically employs the HH-60 "Pavehawk" helicopter. The squadron transports and provides close air support to pararescue personnel in covert rescue operations in any terrain.

The 607th Air Control Squadron "Snakes" Field Training Unit provides both Weapons Director and Surveillance Technician Initial qualification training for 126 students per year. The unit is located at Luke Air Force Base and completes 16,000 sorties and 38,000 hours annually. It is the Air Combat Command's largest Flying Hour Program. The 78 A/OA-10, 13 EC-130 H Compass Call, and seven EC-130 E ABCCC aircraft are assigned to the 355th Wing.

The 309th Aerospace Maintenance and Regeneration Group (309th AMARG) also operates from Davis-Monthan AFB. The 309th AMARG began in 1946 storing WWII bombers and cargo planes. The Group has since grown into a modern, high-tech industrial facility providing a broad range of aircraft and aerospace vehicle support services to the U.S. government and foreign allies. Services include aircraft and aerospace vehicle storage, parts reclamation, restoration to flight capability, limited aircraft-overhaul services (depot level maintenance), and aircraft disposal.



Luke Air Force Base

Located west of Phoenix, Luke Air Force Base is home to the 56th Fighter Wing (FW), the largest fighter wing in the world, five tenant units, nearly 6,000 military and civilian personnel, and oversees stewardship of 1.0 million of the 1.7 million acre Barry M. Goldwater Range (BMGR). Since 1941, Luke has graduated more than 59,000 pilots, and since 2014, has trained pilots to fly the Air Force's fifth generation fighter, the F-35A Lightning II. In 2015, personnel assigned to Luke volunteered 100,000 hours in the community.

Luke Air Force Base – 56th Fighter Wing

The mission of the 56th Fighter Wing is to build the future of airpower. With 128 aircraft and 24 squadrons, the 56th FW is the only active-duty Air Force F-35A and F-16 training wing.

On average, the 56th FW produces 425 pilots for the Combat Air Forces, 317 maintenance crew chiefs, 81 intelligence specialists, and graduates more than 240 surveillance technicians, weapons directors, and air battle managers annually. The 56th FW flies nearly 16,500 F-16 and 200 F-35 sorties totaling more than 21,800 flying hours. Additionally, 323 56th FW Airmen are deployed in support of operations around the world.

Of strategic importance to Luke's training of fighter pilots for the Combat Air Forces is the BMGR-E managed by the 56th Fighter Wing Range Management Office. The BMGR is absolutely essential for the effective combat training of this country's military air forces. Approximately 45,000 operations are flown annually on the Goldwater Range.

The 56th Fighter Wing has scheduling and operational control of Special Activity Airspace (SAA) including four Military Operations Areas (MOAs) and five Air Traffic Control Assigned Airspace (ATCAAs): Gladden and Bagdad MOAs/ATCAAs located northwest of Luke AFB, Sells MOA/ATCAA located west of Tucson and contiguous to the BMGR-E, and Sunny MOA/ATCAA

located northeast of Flagstaff. A fifth ATCAA, Yarnell, abuts the Gladden MOA/ATCAA and overlies Luke Radar Approach Control airspace. Scheduling and operational control also exists for eight low-level Military Training Routes which start to the east, south, and north of Luke AFB and terminate on the BMGR-E, and four Air Refueling Anchors.



The BMGR-E consists of Restricted Airspace areas R-2301E, R-2304, and R-2305 that encompass eight sub-ranges, including four manned air-to-ground weapons delivery ranges, three tactical air-to-ground weapons delivery ranges, and one air-to-air gunnery training range. The 56th Fighter Wing flies approximately 50% of all the missions scheduled on the Goldwater Range.

The other primary users of the BMGR-E include the 355th Fighter Wing at Davis-Monthan AFB, the Arizona Air National Guard's 162nd Wing at Tucson International Airport and Total Force Training Center at Davis-Monthan AFB, and the Arizona Army National Guard's 1-285th and 2-285th Aviation Regiments at Silverbell Army Heliport in Marana and Papago Park Military Reservation in Phoenix.

U.S. Navy units, U.S. Marine Corps units, and U.S. Air Force Reserve units also utilize the Goldwater Range for training.

**Luke Air Force Base - Air Force Reserve –
944th Fighter Wing**

The 944th Fighter Wing was activated at Luke Air Force Base on July 1, 1987. The mission of the 944th Fighter Wing is to train and provide combat ready Airmen, anytime, anywhere. The wing, nearing a population of 2,000 personnel, has 25 subordinate units consisting of four groups, 11 squadrons, three detachments, two flights, four operating locations, and one test center which include geographically separated units at Davis Monthan Air Force Base, Seymour Johnson Air Force Base, Holloman Air Force Base, and Eglin Air Force Base.

The 944th Fighter Wing supports Luke's active duty 56th Fighter Wing's mission by providing reserve F-16 and F-35 pilots through the associate pilot program, which was activated March 3, 2000. More than 70 reserve pilots administratively work for the 944th Fighter Wing, but they fly active-duty 56th Fighter Wing aircraft to train active-duty student pilots. Beyond that, every 944th Fighter Wing squadron and staff section works in concert with their 56th Fighter Wing counterparts and deploy throughout the world to support all contingency operations as well as humanitarian missions around the world.

The 944th enjoys a rich heritage. It was the first Reserve F-16 Fighter unit to participate in Provide Comfort II and to carry the AIM 120A (AMRAAM) missile. The wing was also given the opportunity to participate in "Coronet Harbor," a NATO sponsored exercise involving units from stateside bases, plus a number of countries within the NATO alliance such as Belgium, France, Germany, Italy, Portugal, and the United Kingdom. The exercise enabled the 944th to train in virtually every possible mission the F-16 can perform. It was also the first US Air Force Reserve or Air National Guard unit to conduct air combat training with the MiG 29.

944th Fighter Wing honors include five Air Force Outstanding Unit Citations, five Air Combat Command Flight Safety Awards, 13 first place awards during Gunsmoke fighter competitions, three Maintenance Effectiveness Awards, Daedalian Award for Best Aircraft Maintenance, Air Force Chief of Safety Outstanding Achievement Award for Ground Safety, two first place Hawgsmoke awards and several other command level awards.

**Luke Air Force Base -
Navy Operational Support Center-Phoenix**

The mission of Navy Operational Support Center Phoenix is to generate mobilization readiness by providing administrative services, training support, and world class customer service to Navy Reserve personnel in support of surge and operational requirements for the Navy and Marine Corps team, and Joint Forces.

**Luke Air Force Base -
U.S. Marine Corps Reserve Bulk Fuel Company C**

USMC Bulk Fuel Company C is the largest drilling Reserve Company in the Marine Corps. Their mission is to provide general support and engineering support of a deliberate nature to the Marine Expeditionary Force, to include survivability, counter-mobility enhancements, and general supply support incident to the handling, storage and distribution of water and fuel.

Bulk fuel Company C supplies, handles, stores and distributes water and fuel during peacetime and wartime operations; instructor-inspector staff provides guidance and oversight for Reserve counterparts.



U.S. Army Yuma Proving Ground

U.S. Army Yuma Proving Ground (YPG) is located in Yuma County, Arizona, approximately 25 miles north of the City of Yuma. It is situated in southwest Arizona's Sonoran Desert in one of the hottest and driest areas in the United States. The proving ground is Yuma County's largest single employer of civilians and the county's primary high tech workplace.

In the modern world, Yuma Proving Ground plays a vital role in maintaining the high quality of America's military arsenal. The focus of the between 60 and 100 tests conducted at YPG each week ensures that weapon systems and munitions provided to American forces work reliably, safely, without fail, and in all weather extremes.

YPG is one of the largest military installations in the western world at 1,300 square miles in size. YPG's mission is to ensure the success and dependability of systems used by American military forces. The proving ground's test and development facilities are capable of testing nearly everything in the Army's combat arsenal, from main battle tanks and artillery systems to unmanned aircraft, cargo and personnel parachute systems, and technologies that defeat roadside bombs.

Friendly foreign nations routinely conduct air and ground test activities at the proving ground to supplement their own assets. Recent test customers include Britain, Germany, Sweden, Canada, Japan, Egypt, Singapore, and India, among many others

YPG features one of the longest overland artillery ranges (40 miles) in the nation, the most highly instrumented helicopter armament test range in the Department of Defense, over 200 miles of improved road courses for testing tracked and wheeled vehicles, 11 cleared drop zones, over 1500 miles of fiber-optic cable linking test locations, the most modern mine test facility in the western hemisphere, a new vertical wind tunnel, and simulated overseas urban areas specifically constructed to defeat the threat of improvised explosive devices.

Five airfields are located at the proving ground, with extensive unmanned aerial system (UAS) testing offered through 2,000 miles of restricted airspace over a variety of terrain conditions, from gentle valleys to craggy peaks. Almost unlimited airspace is available over the proving ground, including above the neighboring Kofa National Wildlife Refuge. This airspace is restricted in most areas up to the altitude of 80,000 feet, and in some areas, into space. YPG is the busiest test location within the Army for the testing of weapons systems.

The proving ground's clean air, low humidity, limited rainfall—only about three inches per year—and annual average of 350 sunny days, combine for near perfect testing and training conditions.



Of the four natural environments recognized as critical in the testing of military equipment, three fall under the management authority of Yuma Proving Ground – desert, tropic, and arctic. Realistic natural environment testing ensures that American military equipment performs as designed, wherever deployed around the world. Desert environmental testing occurs at Yuma Test Center, at YPG, with cold weather testing conducted in Alaska at the Cold Regions Test Center, and tropic testing at the Tropic Regions Test Center, which operates in Hawaii, the Republic of Panama, Suriname, and other tropic areas.

YPG has priority use of ten special-use restricted airspace areas including R-2306 A, B, C, D, and E; R-2307; R-2308 A, B, and C; and R-2311. YPG schedules and controls airspace use.

The YPG range complex is comprised of the Kofa Range, where most artillery, mortar, and direct fire weapon testing takes place, the Cibola Range, over which most aviation testing occurs, and the Laguna Test Area, where most automotive testing occurs. The Cibola Range has been designed and instrumented to test Army aviation systems with: 360 degree firing capabilities, 11 separate drop zones, day and night High Altitude High Opening (HAHO) and High Altitude Low Opening (HALO) parachute operations, full air delivery rigging capabilities/ Department of Defense Explosives Safety Board (DDESB) certification, and C-5 and C-17 cargo aircraft capable runways.



In addition to testing, YPG conducts many cross-service training operations. Numerous military units take advantage of the proving ground's resources each year. The training schedule has increased tenfold in recent years, due to the proving ground's live fire capabilities, range instrumentation, clear visibility, and good weather. The Army Special Operations Command's Military Freefall School (MFFS) and the Air Force's Special Operations Terminal Attack Controller Course (SOTACC) are permanently based at the proving ground and train over 1,000 students per year.

YPG actively supports the Marine Corps in its Weapons Tactics Instructor (WTI) courses and TALONEX exercises. The proving ground hosts training of military working dogs and their handlers, including the Army's Specialized Search Dog and Mine Detector Dog course and the Marine Corp's Inter-Service Advanced Skills K9 and Combat Tracker dog course. A growing partnership is taking place with the Arizona National Guard that enables the organization to conduct realistic desert training, including intensive live fire activities, on the proving ground's vast ranges.



The Kofa Range is the Army's premier long-range artillery range with direct and indirect fire activities at over 400 firing positions and designated impact locations. Range facilities include mine and countermine test facilities, ammunition loading plants, system maintenance facilities, and an extensive data gathering instrumentation that transmit over a fiber-optic network.

Marine Corp Air Station - Yuma

The mission of the Marine Corp Air Station (MCAS) Yuma is to provide aviation ranges, support facilities, and services that enable its tenants, other Marine Corps commands, visiting military and interagency forces to enhance their mission capability and combat readiness.

MCAS Yuma is the Marine Corps' premier aviation training base. With access to more than one million acres of bombing and aviation training ranges and superb flying weather, MCAS Yuma supports 80 percent of the Corps' air-to-ground aviation training. Each year, the air station hosts numerous units and aircraft from U.S. and NATO forces.

Approximately 193,000 operations annually make MCAS Yuma the busiest airfield in the Marine Corps and the sixth busiest in the Navy. Yuma International Airport also utilizes MCAS Yuma's airfields and taxiways and MCAS Yuma is the only Marine Corps shared use facility.

Tenant Units at MCAS Yuma include Marine Aircraft Group-13 which consists of four squadrons: Marine Attack Squadrons-214 and 311 (VMA-214, VMA-311) plus Marine Fighter Attack Squadron-211 (VMFA-211); Marine Wing Support Squadron-371 (MWSS-371); Marine Aviation Logistics Squadron-13 (MALS-13); and, Marine Unmanned Aerial Vehicle Squadron 1 (VMU-1). In November 2012, Marine Fighter Attack Squadron 121 (VMFA-121) became the world's first operational F-35B squadron at MCAS Yuma. The arrival of the F-35B marked the beginning of a new chapter in Marine Corps aviation history, bringing the latest and greatest aircraft in the world to the tip of America's expeditionary spear. This past year, VMFA-121 relocated to MCAS Iwakuni, Japan. VMA-211 transitioned from the AV-8B Harrier to the F-35B as Marine Fighter Attack Squadron-211 (VMFA-211), continuing Yuma's tradition of leading the way in making aviation technology history every day.

Additional Tenant Units include the Marine Aviation Weapons and Tactics Squadron-1 (MAWTS-1), Marine Fighter Training Squadron-401 (VMFT-401) and Marine Operational Test and Evaluation Squadron-1 (VMX-1). MAWTS-1 coordinates and supervises the development and presentation of formal courses, both academic and flight, for all aviation units in the Marine Corps. They conduct a semi-annual Weapons and Tactics Instructor (WTI) course for U.S. and allied military forces. VMFT-401 is a reserve squadron flying the F-5 Tiger II. The "Snipers" of VMFT-401 are the United States Marine Corps' only adversary squadron. VMX-1 is the Corps' premier fixed wing, tilt rotor, aviation command and control, and unmanned aerial systems test squadron. The remaining units include Combat Logistics Company-16 (CLC-16), Marine Air Control Squadron-1 (MACS-1), and Headquarters & Headquarters (H&HS).



MCAS Yuma has scheduling and/or operational control of the special use airspace including five Military Operating Areas (MOAs) - Abel North/South/East/ Bravo MOA, Turtle MOA, Dome MOA, Quail MOA, Kane East / West / South MOA, four Low Level Military Training Routes – VR-1266, VR-1267, VR-1267A, VR-1268, and two Air Traffic Control Assigned Airspaces - Imperial North/South.

The Western portion of the Barry M. Goldwater Range (BMGR) consists of the Restricted Airspace (R2301W) and includes the Urban Target Complex (Yodaville), Cactus West Airspace (Inert Bombing target), and Tactical Aircrew Combat Training System/Electronic Warfare Range.



The Chocolate Mountain Aerial Gunnery Range (R2507 North, South and East) is used for live Air to Ground ordnance training.

Additional restricted and target areas coordinated on behalf of Yuma Proving Ground, include R2306/07/08/09. Targets 101, 103 (R2510), Target 68, 95 (R2512) are scheduled on behalf of Fleet Area Control Surveillance Facility San Diego.

There are 32 tactical military Drop Zones throughout the R 2507, R2510, R2512 and R2301W.

MCAS Yuma is located in Yuma, Arizona and the main location occupies approximately five square miles in southwest Yuma just about midway between San Diego, California and Phoenix, Arizona.

U.S. Navy Naval Observatory, Flagstaff, Arizona

Located within the ponderosa pine forest on the Colorado Plateau, U.S. Naval Observatory, Flagstaff Station, (NOFS) is the US Naval Observatory's dark-sky site for optical and near-infrared astronomy. In 1955 the Observatory moved its largest telescope from Washington, D.C. to its current location five miles west of Flagstaff, Arizona, thereby establishing NOFS. It is administratively a tenant of Naval Air Facility El Centro and operationally reports to the U.S. Naval Observatory in Washington, D.C.

The mission of the Observatory is to make, analyze and interpret astrometric and photometric dark sky observations and to conduct a research program to improve the observational methods and the accuracy of astronomical data required by the Navy and other components of the Department of Defense. The Observatory also performs other functions or tasks as may be directed by higher authority, such as providing backup analysis of the Earth's orientation.

As part of its core mission, the Observatory operates the Navy Precision Optical Interferometer (NPOI) with Lowell Observatory and the Naval Research Laboratory at Anderson Mesa, Arizona, which takes remarkably high resolution observations of celestial bodies.

At 7,600 feet above sea level, the observatory is the Navy's highest elevation observatory and a national dark sky observing site. The Observatory operates several large telescopes and uses cryogenic camera systems. Although light pollution threatens its mission, the observatory has successfully managed to maintain its dark sky by working collaboratively with federal, state, and local agencies and private and commercial landowners.



Arizona Army National Guard

The Arizona Army National Guard (AZARNG), (also referenced herein as Papago Park) is an organization of Citizen-Soldiers dedicated to serving, protecting, and defending the nation, the state of Arizona, and the diverse communities within our state. The mission of the AZARNG is to provide well-led and well-trained Soldiers and units capable of performing unified land operations and Defense Support to Civil Authorities (DSCA) in accomplishing our dual federal and state missions.

As of May 2017, the AZARNG consists of six major commands with an assigned end-strength of approximately 5,300 Soldiers. The major units include: 158th Maneuver Enhancement Brigade, consisting of the 1-158th “Bushmasters” Infantry Battalion, 153rd Brigade Support Battalion, 850th Military Police Battalion, and 253rd Engineer Battalion; 198th Regional Support Group, consisting of the 158th Combat Sustainment Support Battalion Headquarters and 1120th Transportation Battalion; 98th Aviation Troop Command, consisting of the 1-285th Attack Reconnaissance Battalion and the 2-285th Assault Helicopter Battalion; 215th Regional Training Institute; Recruiting & Retention Battalion, Medical Detachment, and Joint Force Headquarters. Arizona is a growth state and the AZARNG is well postured to meet increased end-strength authorization.

The AZARNG currently supports two full-time operations with direct ties to local law enforcement and first responders. The Joint Counter Narco-Terrorism Task Force is a fulltime, joint Army/Air National Guard program that provides investigative case analysis, camera room and communications, engineer, and ground and aerial reconnaissance support to 30 local, state, federal, and tribal law enforcement agencies throughout Arizona. The 91st Civil Support Team-Weapons of Mass Destruction (CST-WMD) is a fulltime, 22 member

joint Army/Air National Guard unit that provides sophisticated detection, analytical, and protective equipment that enable operations in environments hazardous to life safety, and provides the ability to act as a CBRN (chemical, biological, radiological, and nuclear) reconnaissance force that provide first responders an enhanced view of the incident site. Through 2016, the AZARNG also supported Operation PHALANX, a multistate effort with operations in Texas, New Mexico, Arizona, and California that performed aerial detection and monitoring in support of U.S. Customs and Border Protection utilizing UH-72A Lakota helicopters. Operation PHALANX ended in 2016, but future variations of this mission are possible pending Congressional approval.

The strength of the National Guard resides in its connection to the community, and the AZARNG is proud of its long-standing relationship with Arizona communities and will remain a ready, community-based organization both now and well into the future. The AZARNG has 32 Readiness Centers (Armories) and 3 Army Aviation Support Facilities located in 20 different communities throughout Arizona, with a combined footprint of over 300 facilities that support the readiness of the Soldiers assigned to those installations. In addition, the AZARNG has two large training sites in the state: Camp Navajo, which totals over 28,000 acres near Flagstaff and is a former U.S. Army Ordnance Depot that was transferred to the AZARNG as part of the 1988 Base Realignment and Closure; and Florence Military Reservation, which totals nearly 25,000 acres near Florence on a combination of State Trust Land and Federal Land withdrawn in 1912 for military use. These two training sites, in addition to the Buckeye Military Reservation, the Western Army Aviation Training Site (WAATS), and smaller training sites around the state, provide joint, multi-component, and combined-arms training for the AZARNG. Joint and combined-arms





training opportunities also exist at Fort Huachuca, Yuma Proving Ground, Gila Bend Aux Airfield (Luke AFB) and Barry M. Goldwater Range.

The AZARNG performs more annual flying hours than any other state's Army National Guard unit, in part because Arizona has some of the finest helicopter gunnery ranges in the world, including quick access to over 7,200 square miles of training space and the Barry M. Goldwater Range for low level tactical training and realistic helicopter gunnery operations with over 350 days of flight training weather a year. At Silverbell Army Heliport located in Marana, the Western Army Aviation Training Site (WAATS) is a TRADOC (Training and Doctrine Command) accredited, Army National Guard Aviation Training Site entrusted to the state of Arizona to train professional Army Aviators and Enlisted Leaders across all components and in support of our foreign national partners. It is described in more detail below.

The Arizona Army National Guard is a premier force of Citizen-Soldiers who live and work in our communities. Members come from all walks of life and have many different professions, yet when called upon to serve our state and nation, quickly transition from citizen to Soldier. The AZARNG is the First Choice in securing our homeland and supporting civilian partners here in the state of Arizona. The AZARNG is the Proven Choice for the Warfight, having transformed into an operational force and deploying over 11,000 Soldiers in support of Overseas Contingency Operations since September 11, 2001 and standing ready to fight our nation's enemies when called to duty. The AZARNG is the Enduring Choice, accomplishing our missions at home and abroad through the building and sustaining of decades-long partnerships as diverse as those from local and state law enforcement and emergency management to those with the Republic of Kazakhstan and Republic of Singapore. Through training, professional development, and leadership engagements, the AZARNG continues to be a force capable of accomplishing the myriad of missions assigned. AZARNG Soldiers are professionals who balance civilian careers, families, and academic advancement. This is the essence of being Citizen-Soldiers "Always Ready, Always There."

Arizona Army National Guard – Camp Navajo

Camp Navajo is the Headquarters for the Arizona Training Centers and is a Joint National Training certified training area. Located west of Flagstaff in Bellemont, it has Interstate (I-40) access and dedicated rail operations. Camp Navajo encompasses over 28,000 acres in a temperate climate at higher elevation. Camp Navajo is the largest training site in the command and is critical to training operations due to the overall size and available facilities. Camp Navajo not only serves Arizona Army National Guard units, but all active duty and allied nation forces and is recognized as a multi-service training site. Camp Navajo is the primary training facility for units performing their annual training and maneuver training because of its capability to support battalion size units. Training ranges and areas available consist of:

- Three live-fire ranges providing training and qualifications for pistol, rifle, light-medium machine gun, thrown and launched grenades;
- Engineer training areas (demolition pits, rock crushing pits, demolition training range, etc.);
- Virtual Training Systems for weapons and operations;
- Support facilities, including classrooms, administrative offices, billeting for 600 personnel, computer labs, dining facilities, and maintenance facilities;
- Non-live fire training opportunities, to include a MOUT (Military Operations in Urban Terrain) site, driver's course, land navigation, IED-defeat lanes, munitions ranges, obstacle courses, bivouac sites, drop zones, landing zones, and dismounted and mounted training areas; and
- Support operations including security, fire department, safety, and seasonal café and general store.



In addition to the primary training mission at Camp Navajo, a secondary mission exists that is a unique, state-run service operation known as DEMA (Arizona Department of Emergency and Military Affairs) Ordnance Operations utilizing the installation's legacy U.S. Army munitions depot storage and transportation infrastructure. Camp Navajo has traditionally been a storage, logistics, and multi-modal transportation facility for the Department of Defense and federal partners, and per statutory authorization, DEMA Ordnance Operations can offer those storage, logistic, and trans-load services to non-federal customers, especially to support local commerce and industry that benefit the Northern Arizona economy at large. Additionally, DEMA Ordnance Operations is also exploring a variety of public/private partnerships to include Enhanced Use Lease agreements that would benefit from Camp Navajo's unique location and access to transportation infrastructure, providing additional economic opportunities that benefit Northern Arizona and Camp Navajo's neighboring communities.

Arizona Army National Guard – Florence Military Reservation



Florence Military Reservation (FMR) is the second largest training site in the command and the most heavily used training site by the Arizona National Guard, all active duty and allied nation forces, and inter-agency partners. FMR is the closest training site to the Phoenix metropolitan area and is used extensively during the winter months. FMR is a multi-service training installation and serves not only military/DoD users but also local law enforcement, prison system support staff, Department of Homeland Security, Department of Defense Research and Development, and several youth organizations. Located approximately five miles north of the City of Florence on Highway 79, it is 45 minutes southeast of the Arizona Army National Guard Headquarters and is easily accessible from either Tucson or Phoenix, making it a prime training location. FMR is approximately 25,000 acres of both State Trust land and federal land withdrawn in 1912 for military use and is in the Sonoran Desert environment. FMR has training ranges consisting of:

- 15 live-fire ranges providing training and qualifications for pistol, rifle, light-medium-heavy machine gun, thrown and launched grenades, anti-tank rockets, mortars and artillery;
- Military restricted air space up to 30,000 feet that supports multiple unmanned aerial systems (UAS) and vertical firing opportunities;
- Engineering training areas (demolition pits, demolition areas, burrow pits, etc.);
- Virtual Training Systems for weapons and operations;
- Support facilities including classrooms, tents, administrative offices, billeting for 200 personnel, computer labs, dining facilities, and maintenance facilities; and
- Non-live fire training, including forward operating base (FOB) operations area, MOUT site, driver's course, land navigation, IED-defeat lanes, practice hand-grenades, mine-detection course, individual movement and training lanes, rock crusher, obstacle courses, bivouac sites, drop zones, landing zones, and dismounted/mounted training areas.

Western Army National Guard Aviation Training Site (WAATS) – Silverbell Army Helicopter at Pinal Airpark

The Western Army Aviation Training Site (WAATS) is a Field Operating Activity (FOA) for National Guard Bureau managed by the Arizona Army National Guard located at Silverbell Army Helicopter (SBAH) in Marana, AZ. The site encompasses 725 acres.

The WAATS and SBAH facilities include: WAATS Headquarters (HQ) and Support Battalion (BN) Facility with multi-media classrooms and state of the art simulation systems, TASS BN HQ with multi-media classrooms, state of the art simulation systems and Troop Medical Center, Enlisted Training Center with multi-media classrooms and state of the art simulation systems, Maintenance BN HQ with aircraft hangar, Student and Cadre Dining Facility, 136 dorm rooms, 24/7 manned fire station, parking for 54 permanently assigned aircraft, 1-285th Attack Reconnaissance Battalion (ARB) Armory and Field Maintenance Shop 3 (FMS3), Army Aviation Support Facility #2 (AH-64 Hanger), 90,000 Gal Fuel Farm, Army Reserve/AZNG BRAC building. Additionally, Peace Vanguard (Republic of Singapore AH-64D Training) is located on site.

WAATS Mission: The Western Army Aviation Training Site (WAATS) is a U.S. Army Training and Doctrine Command TRADOC accredited, Army National Guard Aviation Training Site entrusted to the State of Arizona to train professional Army Aviators and Enlisted Leaders

across all components and in support of our foreign national partners. WAATS enhances Army Aviation Readiness through exceptional basic and graduate level pilot training, regional simulation support, Non-Commissioned Officer professional development, and MOS (Military Occupational Specialist) qualification courses that strengthen the core of the U.S. Army's Aviation Enterprise as directed by Headquarter, Department of the Army (HQDA), U.S. Army Training and Doctrine Command, National Guard Bureau (NGB), and Joint Force Headquarters – Arizona (JFHQ-AZ).

Inclusive to this mission is providing regional flight simulation support in the UH-60A/L Blackhawk, UH-72 Lakota, and AVCATT for US and allied Aviators. Personnel from the following countries have been trained, or are currently being trained at the WAATS: Singapore, Bahrain, Turkey, Israel, Jordan, Greece, Saudi Arabia, and United Arab Emirates.

The WAATS plays a vital role in meeting the nation's Warfighting requirements, to date flying over 160,000 student training hours and producing nearly 13,000 trained Active Duty, National Guard, and Army Reserve Combat Aviators and Enlisted Leaders. Courses taught at the WAATS meet all TRADOC accreditation requirements.



Courses Currently Conducted at the WAATS

Pilot Courses:

- UH-72 Lakota Aircraft Qualification Course (AQC)
- UH-72 Lakota Instructor Pilots Course (IPC)
- UH-72 Lakota IPC Transition Course (IPCT)
- UH-60A/L Blackhawk Aircraft Qualification Course (AQC)
- UH-60A/L Blackhawk Instructor Pilots Course (IPC)

Enlisted & Non-Commissioned Officers Courses:

- UH-72 Lakota Enlisted Flight Instructors Course (EFIC) (FI)
- UH-72 Lakota Maintainers Course
- 15P10 (Flight Operations) Reclassification
- 15P (Flight Operations) Advanced Leaders Course (ALC)
- 15P (Flight Operations) Senior Leaders Course (SLC)
- Common Aviation Maintenance Advanced Leadership Course (CAM ALC)
- Common Aviation Maintenance Senior Leadership Course (CAM SLC)
- Army Basic Instructor Course / Small Group Instructors Course (ABIC/SGIC)

In addition to Army Aviation Training, WAATS is an FAA Training Certification Testing Site and will begin instructing the Airframe and Power Plant Certification Course in FY18.

The WAATS has been missioned to develop and begin instructing the following additional military courses beginning FY18/19:

- UH-60A/L Maintenance Test Pilots Course (MTP)
- UH-60A/L Repairer Transition Course
- UH-60A/L Enlisted Standardization Instructor Course (SI)
- 15T (UH-60 Repairer) Advanced Leaders Course – Phase 3
- Prerequisite Course for the PAX River Navy Test Pilot Course

WAATS Vision: Continue to transform the Western Army Aviation Training Site (WAATS) into the Army's premier Aviation training center with fully modernized facilities, state of the art classrooms, and a world class Aviation Maintenance Program. We will lead the way into the 21st century and beyond with skilled professionals who understand the needs of the combatant commander and who are dedicated to producing warfighters and Army Aviation leaders who comprehend and can apply operational variables to the operational environment they must operate in. WAATS will posture with a capacity to surge in support of Army Aviation training across all three components and in support of our foreign partners.

Today and in the future, the WAATS will continue to be a vital provider of highly trained combat aviators and enlisted leaders. Quick access to over 7,200 square miles of training space and the Barry M. Goldwater Range provides for low level tactical training and realistic helicopter gunnery operations. Finally, the abundant sunshine allows for over 350 days of flight training weather a year.



Arizona Air National Guard – 162nd Wing – Tucson International Airport

The 162nd Wing is the Air National Guard's premier F-16 fighter pilot training unit and the second largest Air National Guard wing in the U.S.

Since its activation in 1956, the 162nd Wing has fulfilled a federal and state mission. The dual mission, a provision of the US Constitution, results in each Guardsman holding membership in the National Guard of Arizona and in the National Guard of the United States. Specifically, the wing serves the United States and allied nations by providing the finest fighter training programs in the world, securing our nation's skies and providing global intelligence surveillance and reconnaissance precision attack in support of joint force missions around the world.

The wing's federal mission is to maintain well-trained, well-equipped units available for prompt mobilization during war and to provide assistance during national emergencies (such as natural disasters or civil disturbances). Currently, the 162nd deploys its members as part of the Air and Space Expeditionary Force to provide combat forces in support of U.S. Air Force missions.

When 162nd Wing Guardsmen are not mobilized or under federal control, they report to the Governor of Arizona and are led by the Adjutant General of the state. Under state law, the wing provides protection of life and property and preserves peace, order, and public safety. These missions are accomplished through emergency relief support during natural disasters such as floods, earthquakes and wildfires; search and rescue operations; support to civil defense authorities; maintenance of vital public services; and counterdrug operations.

The 162nd is the “face of the United States Air Force to the world”, providing the best-trained coalition war-fighting partners for the United States Air Force. The wing has trained pilots from more than 25 countries that fly the F-16 today while developing strategic partnerships and building strong international relationships based on performance, friendship, and trust.

The wing operates the 214th Attack Group at Davis-Monthan Air Force Base and Fort Huachuca. The unit is transitioning to the MQ-9 Reaper remotely piloted aircraft and will fly daily combat missions, providing troops on the ground with around the clock intelligence, surveillance, reconnaissance and precision attack. At Fort Huachuca the unit will operate a launch and recovery facility and maintain a small fleet of RPAs to train aircrew for mission currency and to conduct takeoffs and landings, one of five such units in the United States. The unit will be prepared to support local agencies and fulfill state mission requirements.



Also located at Davis-Monthan, the 162nd Wing operates a 24/7 alert detachment to provide a rapid reaction force ensuring air sovereignty over the Southwest and the Total Force Training Center provides support for visiting flying units from around the world looking to train in the optimal weather conditions and ample ranges of Southern Arizona.

The wing manages a fleet of more than 70 F-16 C/D Fighting Falcons. There are three flying squadrons and numerous maintenance squadrons and flights assigned to the wing. Under the 162nd Operations Group are the 152nd, 195th, and 148th Fighter Squadrons. Supporting these units are the Mission Support Group, the Maintenance Group and Medical Group.

The 162nd has more than 48 years of experience in fighter training, and more than 28 years of experience in international military training. The wing graduated more than 7,600 fighter pilots since 1969. Instructor pilots average more than 2,900 fighter hours. Aircraft maintainers average 14 years of experience in fighter aircraft.

The 162nd resides on 92 acres next to the Tucson International Airport. The wing shares use of the runway, security, and fire control with the airport.



Goldwater Air National Guard Base, 161st Air Refueling Wing – Arizona Air National Guard - Phoenix Sky Harbor International Airport

Goldwater Air National Guard Base is home to the 161st Air Refueling Wing; a unit that consists of 800 Airmen and eight KC-135R Stratotanker aircraft. Arizona's only tanker unit, located on the south side of Phoenix Sky Harbor International Airport, is a world-class air refueling and mobility force for the state and nation.



The wing's federal mission is to train, equip, and maintain units and individuals to meet worldwide requirements in support of the U.S. Air Force's global reach mission. It is a combat force multiplier for nuclear deterrence, rapid mobilization, worldwide deployment, airlift, aeromedical evacuation and sustained aerial refueling operations for United States and partner nation air forces.

As a component of the Arizona National Guard, the wing's state mission is to protect life and property, and preserve peace, order and public safety. These missions are accomplished through emergency relief support during natural disasters such as floods; earthquakes and forest fires; search and rescue operations; defense support to civil authorities; maintenance of vital public services and counterdrug operations.

Goldwater Air National Guard Base is centrally located in the heart of the nation's best military training airspace where the demand for air refueling is unparalleled. Within the state, the 161st is the primary tanker support for Luke Air Force Base, Davis-Monthan Air Force Base, and the 162nd Wing based at Tucson International Airport. For every KC-135 assigned to the 161st, there are 31.8 potential receivers within a 30-minute flight time, more than any other tanker base in the country.

To better meet this demand, the Arizona Air National Guard is working to acquire four additional KC-135s. The base has capacity today to operate and maintain 12 tankers; however, Guard officials are working to expand the unit's aircraft ramp eastward to more easily house them in the future.

With air refueling, aeromedical evacuations, disaster relief efforts, and delivery of cargo and personnel, the 161st is one of the busiest tanker units in the Air Force and the Air National Guard. The wing deploys the tanker globally, landing and operating in both foreign and domestic soil in order to support multinational military and humanitarian missions.

In 2015, the wing flew 5,325 hours, flew 1,037 sorties, delivered fuel to 1,709 receiver aircraft, and offloaded 2.3 million gallons. The wing was designated as an Air Force Outstanding Unit that same year.

The unit was first established as the 197th Fighter Squadron on Dec. 12, 1946. The flying mission transitioned to air refueling in 1972 and, over several decades, the unit grew to be the wing it is today. The 161st evolved into a powerhouse for mobility operations and a primary source of air refueling support in the Southwest.

In December 2016, the 161st officially named its installation after former U.S. Senator Barry M. Goldwater, a founding member of the Arizona Air National Guard in 1946.

Employment

The starting point for the economic analysis of the principal military operations in Arizona was the number, type, and characteristics of employees at each operation. Personnel headcounts and payroll spending were collected, reviewed, and standardized for each operation. Personnel at the different operations were accumulated into several broad categories. These categories included: active duty, permanent party military personnel; reserve personnel; rotational personnel; students (attending training, but normally based elsewhere); and civilian employees (both Department of Defense and other). Not all operations had headcounts attributable to each general category. The standardized headcount information for each of the principal military operations by category is displayed in Table 3-1. (Additional information concerning the input received from each operation is available in Appendix Three.) These personnel figures have not been converted to full-time equivalent personnel.



In total, almost 55,000 individuals were routinely employed on a full-time or part-time basis in fiscal year 2014.

TABLE 3-1:

SUMMARY OF BASIC PERSONNEL STATISTICS

Arizona's Principal Military Operations (Personnel Headcounts)

Active Duty			Students		
Permanent Party	Reserves	Rotational	(Military)	Civilians	TOTAL
15,732	10,953	867	8,000	19,194	54,746

Military Retirees

In addition to those individuals employed at the principal military operations throughout the state, a substantial number of military retirees receive regular payments for retirement benefits. These retirement benefit payments are closely equivalent to regular payroll in terms of their utilization by the recipients and their effect on the economy. The Study Team determined that some portion of the military retirement benefits paid to military retirees in Arizona should be included in the analysis. The proper treatment of these benefit payments was carefully considered and an appropriately conservative methodology was developed. The prime methodological issue confronting the Study Team was which retirees to identify as inexorably *linked* to the military operations being analyzed. In summary, one-quarter of the military retirees living within an approximately one hour travel radius of the key military facilities were included in the study as representing those individuals who were so strongly linked to a military installation (and the services available there) that they would not reside in Arizona if the facility were not located here and who would relocate if it were closed. The one-hour travel radius was measured by including those postal zip code areas that were at least partially within a fifty-mile radius of the facility. In some instances, the zip codes included were adjusted to reflect geographic and travel barriers. In other instances, allocations between facilities were required due to overlapping regions. A more detailed discussion of the methodology and treatment of military retirees is presented in Chapter One and Appendix Two. Table 3-2 displays the total number of military retirees, who generally are those within zip code areas that are, at least partially, within fifty miles of a major facility. It also illustrates those that are linked to an installation, who are generally the one-quarter included in this analysis. Only military operations located at installations that offer services (medical and commissary services) to retirees were allocated military retirees.

It should be noted that the Study Team considered other methods of allocating and incorporating the economic impact of military retirees. In fact, some previously completed analyses conducted by others have employed alternative approaches while others have simply estimated the total impacts excluding any military retiree benefits or included all military retiree benefits. After significant consideration, the Study Team determined that it was most comfortable with the methodology selected. However, the Study Team recognized that other, more complex techniques could be used.

In total, roughly 13,000 military retirees were included in the economic and fiscal impact analysis. Additionally one quarter of the military retiree benefits paid within the fifty-mile zip code radius were included, totaling just over \$289 million.

TABLE 3-2

SUMMARY OF MILITARY RETIREE STATISTICS *Arizona's Principal Military Operations*

	Military Retirees Within 50-Miles	Linked Retirees (25 percent)
Davis-Monthan AFB	19,321	4,830
Fort Huachuca	1,068	267
Luke AFB	27,817	6,954
Yuma Marine Corp Air Station	2,393	598
Yuma Proving Ground	0	0
Air National Guard 161st	0	0
Air National Guard 162nd	0	0
Silver Bell Army Heliport	0	0
Papago Park Army National Guard	0	0
US Naval Observatory	0	0
TOTAL	50,599	12,650

Data Source: Department of Defense, Office of the Actuary



Military Retiree Tourism

In addition to the military retirees who are full-time residents of Arizona, a substantial number of out-of-state military retirees travel to Arizona. This travel occurs particularly in the winter tourism season due to the location of the various full service military installations in the warm winter climates of central and southern Arizona. The influx of these winter visitors is reflected in higher utilization levels at the various service centers located on principal military installations. Where such information is available, medical, legal services and commissary operations reported significantly higher utilization rates in the winter months. However, due to the limited availability of such data and in recognition of a likely, at least partial, offset due to travel by Arizona military retirees during summer months, no specific amounts were included in the analysis. Consequently, the total economic and fiscal impact of military retirees may be understated in this study.

Payroll & Retirement Benefit Information

Payroll and retirement benefit payments were included in the analysis for the employees of the principal military operations and the linked retirees determined as described in the preceding section. These payroll and benefit payment amounts represent gross spendable income for recipient households and directly contribute to the level of economic activity in their region and the state. Table 3-3 illustrates the payroll and retirement benefit payments information included in the analysis.

In total, over \$2.6 billion in annual payroll and retirement benefits are directly added to the Arizona economy by the principal military operations in the state.

TABLE 3-3

SUMMARY OF PAYROLL AND RETIREMENT BENEFITS

Arizona's Principal Military Operations (\$ millions)

Active Duty Permanent Party	Reserves	Rotational	Students (Military)	Civilians	Linked Retirees	ARIZONA TOTAL
\$899.8	\$213.2	\$39.7	\$180.9	\$1,058.7	\$289.9	\$2,682.3



Contract and Other Spending

While payroll and retirement benefit payments represent an important source of economic input, other spending by the military operations in Arizona is an equally important source of economic stimulus to the state's economy. Furthermore, this spending results in additional, subsequent activity in the economy as suppliers of goods and services to the military operations pay their employees and in turn purchase goods and services to meet their production needs. A substantial portion of the contract and other spending of the military operations occurs within the local region and the state; however, not all goods and services are available regionally or statewide. As purchases occur outside the region or the state, the re-circulation of that spending is lost to the regional or statewide economy. It is also

important to note that a wider array of goods and services are available in the larger metropolitan regions of Maricopa and Pima counties and to a lesser extent Yuma County, and therefore a greater proportion of spending is retained and re-circulated in these areas relative to the non-urbanized regions of the state. Similarly, a greater proportion of spending is often captured in the statewide economy than in any single region, or for that matter in the sum of the regional activities.

TABLE 3-4

SUMMARY OF SPENDING STATISTICS *Arizona's Principal Military Operations*

(\$ millions)

Contracts and direct spending:	
 maintenance and operations	\$211.5
Construction & Buildings	
 maintenance and repair	\$725.2
Spending for Supplies	\$587.8
Utilities	\$60.6
Education Payments	\$13.1
Health Services	\$335.5
Commissary & Exchange Sales	\$529.2
TOTAL	\$2,462.6



CHAPTER FOUR: **ECONOMIC IMPACTS OF ARIZONA'S PRINCIPAL MILITARY OPERATIONS**

As described more completely in Chapter One and Appendix One, the Study Team used the IMPLAN Pro economic impact model software to estimate the economic impact of the principal military operations in Arizona. The IMPLAN econometric model uses actual input and output information in a tailor-made model designed for each individual study region, in this case the state of Arizona and the individual counties in Arizona that contain one or more of the military operations included within the analysis.

The IMPLAN econometric model operates by estimating the **indirect** and **induced** impacts generated by the direct economic activity. **Direct** economic impacts are those attributable to the initial economic activity; for example, an operation with ten full-time employees creates ten *direct* jobs. **Indirect** economic impacts are those economic activities undertaken by vendors and suppliers within the supply chain of the direct activity as a result of the initial economic activity. For example, suppliers of goods, materials, and services used in the direct activities produce *indirect* economic impacts. **Induced** economic impacts result from the spending of wages paid to employees in local industries involved in direct and indirect activities. These wages, which are analogous to household spending, support additional local activities, such as the purchase of goods and services within the region. In turn, that portion of spending that accrues to local businesses and employees is once again re-circulated within the local economy, producing additional activity in the economy. The econometric model measures the amount of economic activity in each round of spending until all of the spending within the local region has been exhausted. In each iteration, a certain portion of spending is attributed to economic activities (purchases) outside of a local (study) region. Once money is spent outside the local region, it is not included in subsequent iterations. Thus, each iteration recycles an ever-declining amount of economic activity.

The extent to which economic activity recycles within the local region is defined for each specific region (in this study, counties and the state) based upon the input and output relationships among industries and their suppliers in the region, which are derived from Bureau of Economic Analysis data.

The Study Team selected the IMPLAN model due to its frequent use in economic impact analysis within Arizona in conjunction with its development independent of local influences.

The inputs to the IMPLAN software were derived from the direct spending of basic payroll, retirement benefits, contract spending, and other spending information collected from the military operations as described more completely in the preceding chapter. Modifications were made to the basic information received to facilitate the proper formatting of the information for the model specifications and to ensure completeness, while avoiding duplications or overstatement. A more complete discussion of the modifications undertaken to convert the basic financial information received from the military operations into the IMPLAN model input is included in Appendix Three – Econometric Model Inputs.

In summary, payroll information was adjusted and categorized into household income levels to facilitate recognition of the variation in spending patterns of households with different income levels. Retirement benefits received by “linked” military retirees were also adjusted and categorized into household income levels. In addition, all wage and income data was adjusted to reflect taxes paid and savings amounts that are not available for spending within the local economy.

Non-payroll spending by the military operations was classified into the IMPLAN industrial classifications for input into the software model. As discussed in Chapter One, only the portion of spending that occurs in the study region creates additional, local economic effects.

Special care was taken by the Study Team to avoid double counting of inputs as well as including inputs that are estimated as a part of overall economic activity by the IMPLAN software. For example, a portion of commissary sales activity is attributable to spending by employees of the principal military operations and linked military retirees. The model generates an economic impact equivalent to this amount as a derived portion of economic activity based on the household income of those employees and linked military retirees. To include both amounts would result in an overstatement of economic activity.

In a similar fashion, output from the IMPLAN software was adjusted as appropriate. For example, employment figures produced by the model were converted to full time equivalent (FTE) employees.

Table 4-1 summarizes the economic impact of the principal military operations within Arizona. In total, these operations provide 46,038 direct jobs and produce \$6.2 billion in direct economic output. Arizona’s military industry, which includes the principal military operations as well as the businesses they support, is responsible for creating 76,714 jobs and \$11.5 billion in economic output.

Arizona’s military industry, including the principal military operations as well as the businesses they support, is responsible for creating or supporting over 76,000 jobs that are dispersed through a wide variety of industries. The largest number of total jobs is within the government sector, which is logical since the military operations are themselves government entities. In addition to the government sector employment, over 15,000 jobs are supported in the service sector, over 6,000 jobs in the retail trade sector, almost 1,600 in the construction sector, almost 300 in the manufacturing sector, and thousands more distributed throughout the economy.

TABLE 4-1
**SUMMARY OF STATEWIDE
 ECONOMIC IMPACTS**
Arizona’s Principal Military Operations

	Employment	Output (\$ Billions)
Direct Impacts	46,038	\$6.192
Indirect Impacts	15,079	\$2.379
Induced Impacts	15,596	\$2.892
TOTAL IMPACT	76,714	\$11.462



Regional Economic Impact of Military Operations

In addition to the statewide impacts described above, the countywide impact of each of the individual military operation was separately examined. The specific economic impacts for each military operation are included in Appendix Five. As described in Chapter One, the statewide economic impact of all the principal military operations generally exceeds the sum of the individual county impacts because the statewide economic impact calculation captures spending that occurs outside the county of each of the individual military operations, but still within the state of Arizona.



CHAPTER FIVE: **STATE AND LOCAL TAX REVENUES DERIVED FROM ARIZONA'S PRINCIPAL MILITARY OPERATIONS**

In addition to estimating the economic impact of Arizona's military industry, the Study Team estimated the amount of state and local government revenues paid by employees at the state's principal military operations, linked military retirees, and the individuals and businesses in Arizona supported by those operations. Special care was taken to recognize the special and unique characteristics of military personnel and their households.



In order to estimate the taxes paid by the military industry, individuals employed in the military industry (and their income) were allocated to five distinct categories. These categories were designed to separate these individuals according to their household and residential characteristics. In estimating income tax revenues, it was also critical for the Study Team to recognize and compensate for the ability of military personnel to select a state of residence, for tax purposes, other than their physical location. Not surprisingly, those eligible to make such discretionary choices tend to disproportionately select states with no state or local income taxes. A more complete discussion of the methodology used to estimate the fiscal impacts of the military industry, including the five categories of individuals, is contained in Appendix Three – Econometric Model Inputs.

TABLE 5-1
SUMMARY OF STATEWIDE FISCAL IMPACTS
Arizona's Military Industry (\$ millions)

	Annual Local	Annual State	Annual Total
Sales Tax	\$42.0	\$43.9	\$86.0
Property Tax	\$107.6	\$0.0	\$107.6
Income Tax	\$9.3	\$52.9	\$62.3
Total	\$158.9	\$96.8	\$255.9

Statewide Fiscal Contribution of Military Operations

The Study Team estimated payments of state and local sales taxes (technically transaction privilege taxes), state and local property taxes, and state income taxes. Revenues derived from state-imposed sales and income taxes were allocated to the state and local governments consistent with the existing statutory distribution formulae.

The following table summarizes the fiscal contributions of the military industry to the state of Arizona and local governments within the state. In total, the industry provides over \$255 million to fund the operations of the state and local governments in Arizona. Of that amount, over \$96 million flows to state government and over \$158 million is received by local governments. Table 5-2 also illustrates the fiscal contributions of the military industry within Arizona. The principal military operations and the individuals they employ directly pay over \$144 million in taxes each year.

Regional Fiscal Impacts

In addition to the statewide fiscal impacts, the fiscal impact of each individual military operation within its county of location was calculated and is included in Appendix Five. The specific fiscal impacts for each separate military operation were also calculated. Generally, the statewide fiscal impact of **all** the principal military operations exceeds the sum of the individual county impacts because the statewide impact calculation captures spending that occurs outside the county of each of the individual military operations, but still within the state of Arizona.

TABLE 5-2

STATEWIDE FISCAL IMPACTS Arizona's Military Industry (\$ millions)

	Annual Total
Direct Impacts	\$144.7
Indirect & Induced Impacts	\$111.2
Total	\$255.9



CHAPTER SIX: **COMPARISONS TO THE MILITARY INDUSTRY IN ARIZONA**

As the earlier chapters delineate, the principal military operations in Arizona and the businesses those operations support form a substantial and vibrant industry. Arizona's military industry creates thousands of jobs, billions of dollars of economic activity and hundreds of millions of dollars of state and local tax revenue.

Characteristics of Arizona's Military Industry

Some of the special characteristics of the economic activity supported by these military related activities are as important as the size and scope of the economic and fiscal impacts of the military industry in Arizona.

It is important to reiterate the discussion of organizations and economic activities *excluded* from this analysis. As discussed in Chapter One, the Study Team applied specific standards when evaluating whether a particular economic activity should be included in this analysis. The Study Team sought to consistently, but narrowly, define Arizona's military industry. A wide variety of military-related activities throughout Arizona were reviewed and ultimately many were excluded from this effort. These excluded businesses included many of the largest Department of Defense contractors in the state such as the Boeing Company and Raytheon Company, as well as smaller endeavors located at the former Williams Air Force Base and elsewhere. The exclusion of these businesses and activities should not be interpreted as reflecting any diminishment of their importance or their positive contribution to the State's economy. Similarly, the Study Team utilized a conservative, but reasonable, methodology for determining which military retirees to consider "linked" to one of the principal military installations and the various services offered thereon.

Consequently, the impacts documented in this effort represent a conservative analysis of total military-related spending in Arizona. Even so, the economic and fiscal impacts determined through this study demonstrate the substantial and impressive impact that Arizona's military industry has on the state's economy. As the following sections illustrate, the size and breadth of the employment and tax revenues produced by the military industry compare very favorably with a variety of other industries and major employers in the State.

The jobs created and supported by Arizona's military industry are an especially valuable part of Arizona's economy because they are largely unaffected by routine economic cycles. Federal defense spending is not subject to substantial fluctuations as a result of normal economic cycles. Unlike many other Arizona industries and businesses, military operations in the state do not contract substantially during economic slowdowns or recessions (nor do they increase dramatically during economic expansions). Similarly, the tax revenues generated in Arizona by the employees at the military operations and in the businesses supported by those operations remain relatively constant throughout all phases of the normal economic cycle. The stability of employment and tax revenues produced by the military industry adds substantially to their value as a component of Arizona's economy.

The State's military industry has provided a stable and reliable component of the economy as Arizona's economy has developed and diversified from the traditional "Five C's", with the development of more high tech employment, the expanded tourism industry, and other industrial shifts. As Arizona's economy continues to grow and diversify, the military industry will continue to be an important and positive contributor to the state's economic vitality. However, shifts in Department of Defense priorities and technological advances in military operations can result in base closures within the state along with the resultant loss of this stabilizing force in local economies. Arizona would do well to guard this economic asset and preserve its viability.

Comparison of Statewide Employment

In order to provide a reasonable framework to evaluate the magnitude of the military industry in Arizona, the Study Team compiled employment statistics from several sources for a variety of employers and industries within the state to illustrate the general, comparative magnitude of the military industry. Among the information reviewed were the findings of the *Cluster Mapping Project* of the Institute for Strategy and Competitiveness at the Harvard Business School and the survey of top employers completed and published by *The Arizona Republic*. The Institute for Strategy and Competitiveness describes a "cluster" as a "geographically proximate group of interconnected companies and associated institutions in a particular field, including product producers, service providers, suppliers, universities, and trade associations."

The Cluster Mapping Project separates industries into clusters. These clusters are divided between "traded" and 'local' based on the degree of industry dispersion across geographic areas. Local industries are those present in most if not all geographic areas, are evenly distributed, and hence primarily sell locally. Traded industries are those that are concentrated in a subset of geographic areas and sell to other regions and nations. Among traded industries, clusters are identified using the correlation of industry employment across geographic areas. The principle is that industries normally located together are those that are linked by some external economies. These industries, then, constitute a cluster.



The *Arizona Republic* conducts an annual survey of the largest employers throughout Arizona and publishes its findings. The most relevant complete survey was conducted in 2015.

The table on the following page illustrates the number of jobs created by Arizona's military industry both *directly* as well as *in total* (including indirect and induced impacts) in comparison to other major employers and industries.



As illustrated in table 6-1, the military industry in Arizona *directly* provides 46,038 jobs and supports a total of 76,714 jobs statewide. The principal military operations in the state *directly* employ over 46,038 individuals, which is approximately equal to the number of jobs at the top two private sector employers in the State – Wal-Mart and Banner Health Services as measured by *The Arizona Republic* survey.

The total number of jobs supported by Arizona’s military industry exceeds the number of jobs in the hospitality and tourism industry and the heavy construction industry as measured by the *Cluster Mapping Project* of the Institute for Strategy and Competitiveness at the Harvard Business School.

TABLE 6-1
COMPARISON OF MAJOR INDUSTRIES / EMPLOYERS IN ARIZONA

	Employment
Distribution & Electronic Commerce ¹	90,722
Military Industry – TOTAL ²	76,714
Hospitality & Tourism	74,798
Financial Services	48,728
Military Industry – DIRECT ³	46,038
Education & Knowledge Creation	41,286
State of Arizona ⁴	34,161

Arizona’s Largest Private Employers ⁵

Banner Health System	38,527
Wal-Mart	32,000
Fry’s	16,856
Wells Fargo & Co.	14,613
Albertsons	14,490
McDonald’s	13,853
Intel Corp.	11,000
Fort Huachuca (Direct)	13,084
Davis-Monthan AFB (Direct)	10,220
Luke AFB (Direct)	6,929

Sources and Notes:

1. Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School Copyright © 2014 President and Fellows of Harvard College
2. Includes Direct, Indirect and Induced employment
3. Includes only Direct employment, based on full time equivalents
4. Approximate, excludes Universities
5. Arizona Republic, April, 2015 – Employer Survey

Comparison of State and Local Fiscal Impacts of Arizona’s Military Industry

As discussed in the preceding chapter, the military industry in Arizona produces a substantial amount of state and local tax revenues. The revenues that result from the economic activity of Arizona’s principal military operations and the businesses those operations support provide significant support to the State of Arizona, local governments throughout the state, and especially the local governments in their regions.

Conclusion

The several large military operations examined in this study and the businesses they support comprise Arizona’s military industry. It is an industry that provides substantial, stable employment, draws on the same private, non-governmental vendors and suppliers, as many private commercial enterprises in the state, and serves as an important building block in the state’s overall economy.

Historically the impact of these operations has often been overlooked in discussions and analyses of Arizona’s economy. The economic and fiscal impacts of the Arizona’s military industry calculated in this analysis and presented here are significant and represent a key component of the state’s economy. Maintaining these operations and the jobs and economic output they support should be a priority of state and local government. In so doing, appropriate steps should be identified and undertaken to ensure the continued vitality and viability of this industry in Arizona and its strong, stable contribution to the state’s economy.



The military industry in Arizona annually contributes \$158.9 million in local tax revenues to local governments throughout the state. In addition, it contributes \$96.8 million to state government for a combined total of \$255.9 million.

As mentioned previously, this is the third study of the Economic Impact of the Military in Arizona. The first study completed in 2002 looked at the activity of federal fiscal year 2000 (FY 2000 – October 1999 through September 2000), the second completed in 2008 studied FY 2005, and this study examines FY 2014.

Many significant events affecting the military operations in Arizona have transpired over the time from FY 2000 to FY 2014.

One measure reflective of the changes over the period is the number of US Armed Forces in Afghanistan and Iraq.

In FY 2000 (after the first study), according to the Congressional Budget Service, troops in Afghanistan and Iraq totaled 5,200 (all in Afghanistan). By FY 2005 that number had grown to almost 163,000 and by the beginning of FY 2014 was only slightly over 43,000. Significant numbers of contractor personnel were also utilized over the period in a somewhat similar deployment pattern.

Direct employment at the principal military operations in Arizona increased by nearly 10% from FY 2000 to FY 2005 and by only a net 1% from FY 2005 to FY 2014, the current study period. Overall statewide employment attributable to those 46,038 positions – direct, indirect and induced employment – declined by slightly more than 20%.

During the same period, from FY 2000 to FY 2014, total economic output from Arizona’s military operations more than doubled, while the direct output increased just less than 57%.

TABLE 7-1
**MILITARY INDUSTRY EMPLOYMENT
FY 2000, FY 2005, AND FY 2014**

	FY 2000	FY 2005	FY 2014
Direct Employment	41,647	45,568	46,038
Indirect Employment	18,191	39,492	15,079
Induced Employment	23,668	11,269	15,596
TOTAL EMPLOYMENT	83,506	96,328	76,714

TABLE 7-2
**MILITARY INDUSTRY ECONOMIC OUTPUT
FY 2000, FY 2005, AND FY 2014**

	FY 2000	FY 2005	FY 2014
Direct Employment	\$2.411	\$3.248	\$6.192
Indirect Employment	\$1.326	\$4.412	\$2.379
Induced Employment	\$1.926	\$1.461	\$2.892
TOTAL EMPLOYMENT	\$5.664	\$9.121	\$11.462



APPENDICES

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Model Background

The Study Team utilized IMPLAN Pro software to conduct the economic impact analysis of Arizona’s principal military operations. IMPLAN Pro software was created by the IMPLAN Group, LLC as a tool for impact analysis. (IMPLAN stands for Impact Analysis for PLANning.) Analysis of economic impacts depends on inputs to the analyzed activities available in the analyzed region. The “multiplier” effect occurs as spending is recirculated throughout the economy within the study area. For example, when a factory creates 10 new jobs paying \$30,000 per year, the resultant \$300,000 in income to those workers and the increased output of the factory manifests itself in new economic activity of three major types.

The *direct* impact is the additional activity itself (i.e. 10 direct jobs). *Indirect* impacts consider the interactions among industries (backward buyer-supplier linkages) to quantify the additional activity in other industries caused by the increase in activity in the factory, such as raw materials and transportation and wholesaling of product inputs. Some of the new economic activity involved in direct and indirect impacts manifests itself as wages paid to employees in local industries, which are analogous with household¹ spending. This additional household spending represents the induced effect which supports local activity (both through services imparted directly, like a haircut at the local salon, as well as through the purchase of products which are manufactured and sold in the region.) The portion of that spending which accrues to local businesses and employees is recirculated to an extent defined by the input-output relationships specific to the region (derived from Bureau of Economic Analysis data.) The model reiterates until all of the spending is “leaked” outside of the regional economy.

The model uses actual input and output information for each county in the United States and is therefore tailor-made for the study region. Study areas are generally single counties, multi-county regions, one or more states, or national². Generally speaking, impacts are greater the larger the study area chosen, since they are based on the amount of recirculation of spending which is done before the impact of each dollar is fully “leaked” out of the study area. Impacts can be equal or smaller for larger areas in special cases since the average productivity of workers in each industry and other industries in its supply chain will vary by geographic region. This is also determined through the use of input-output data at the county level.

Study Areas

Military operations analyzed are listed in Chapter Two. For each military operation, the study area was defined as the county where the operation is located with two exceptions. The Silver Bell Army Heliport is located on the border of Pinal and Pima Counties and is more accurately linked with the communities of Pima County. Fort Huachuca is linked with both Cochise County and Pima County. Total impacts for the state of Arizona were arrived at by summing adjusted model *inputs* from the military operations and running the model with the state as the geographic definition of the study area, rather than the individual counties where the operations are located.

¹ This analysis understates the actual economic components of the military activities studied since only military income is considered, as opposed to attempting to estimate the household income of non-military spouses and children.

² Regions can also be based on zip code, which use a mixture of county and zip code level data.

Input Adjustments and Calculations

The original data provided by military operations appears in Appendix Three. A number of adjustments to this data were necessary for its use in the model.

Payroll and Household Income Adjustments

One classification of inputs used in this analysis is the payrolls of the military operations and the household incomes of the associated retirees (discussed further below). Payrolls were converted into average household income per classification of employee (i.e. DOD Civilians, Reserves, etc.). Average household incomes are important because households at different income levels spend differently. For example, households in the lowest income bracket spend a higher percentage of their income on food³. The model applies these different spending patterns to household spending.

Military retirees are themselves important to consider in understanding the economic impact of a military operation on the community in which it resides. Some retirees have chosen their residential location based on the desirability of being located in proximity to a military operation and the facilities it provides, ranging from the availability of commissary and/or an exchange to make retail purchases to on-site medical facilities. Appendix Two details the methodology used to estimate the number of retired military households present in the sphere of influence of each military operation analyzed in this study.

Aggregate Income Adjustment

All wage and income data (for employees and retirees, respectively) was adjusted downward by 20 percent to reflect funds dedicated to savings and taxes which are not available to be spent and recirculated in the local economy.

Industry and Commodity Impacts

The non-payroll activities of military operations were classified into the 509 IMPLAN industries and entered into the model⁴. The model applies regional accounts data to each industry impacted in order to determine the percentage of inputs purchased that are local. Only the local portion of expenditures creates additional economic impacts.

Double Counting

Double counting is a substantive issue in economic impact analysis which this study goes to great lengths to avoid. Since the model estimates all *backward* relationships inherent in spending and/or output (by households and in a particular industry respectively), the most accurate and reasonable estimation of impacts come from the economic impact model when household spending and final products are used as inputs, and intermediary products⁵ are excluded. This concept is relaxed somewhat in the case of the military “industry,” due to the lack of a market price for its output (discussed further in the output adjustments section).

³ Using the salary of the military employee as a proxy for household income necessarily understates actual household income to the extent that spouses and/or children are employed.

⁴ Fuel is one specific expenditure that was dealt with uniquely. There are two major IMPLAN industries associated with fuel (gasoline): “Automobile Dealers and Service Stations” and “Petroleum Refining.” The latter is more appropriate with modifications. Under the assumption that actual petroleum refining does not take place in the study area, it was necessary to enter the data as a commodity purchased at a federal government margin.

⁵ For example, the economic impact of a factory includes the value of intermediate products used to make its output, including the electricity purchased to run needed machinery and light the factory. Running the output or employment level of the factory and its expenditures on utilities would overstate the economic impacts.

Utilities

Data concerning utilities expenditures was collected from the military operations and make up a significant proportion of all expenditures (typically 1 to 5 percent of all non-personnel expenditures). Utilities are (in this case and generally speaking) an intermediate good. To count the utilities expenditures of the military operations separately and in other activities as well (such as the utilities commodities purchases of on-site households and contract activities) would be double counting. The Study Team used household spending by military employees on utilities as the input for direct expenditures on utilities. To the extent they did not exceed the data provided from direct military operations, the difference was also included as an input into the model.

Commissary

Similarly, analyzing commissary *total* sales would overstate the economic impacts of the activity since we have accounted for the spending (on- and off-site) of the base employees through the household impacts. The Study Team used the ratio of the total retirees which it was assumed would not relocate if their nearest military operation closed, to the total number of persons (retirees and full time active duty personnel) shopping at the commissary. Thus commissary sales associated with the 75 percent of retirees that would not relocate are the only ones run separately through the IMPLAN model.

Output Adjustments

Full Time Equivalent Employment

Model employment outputs are not produced initially in terms of full-time equivalent (FTE) employment. This conversion is made using national data⁶ for major industries (two digit NAICS Codes) concerning average hours worked compared to the average work week of 40 hours per week and 52 weeks per year (2,080 hours). Model employment output in each of the 509 IMPLAN industries was multiplied by the conversion factor of the associated NAICS Code. In keeping with the methodology utilized in the 2005 report, activities without an associated NAICS Code, such as government, were not adjusted.

Household Impacts

When household expenditures (payrolls and retiree spending) are used as inputs to the IMPLAN economic model, they result in the three types of outputs associated with any impact (direct, indirect, and induced). Technically, however, all of the impacts of this household spending are induced (by definition).

To account for this discrepancy, all household impacts were run through the model separately and aggregated together to be one component of the induced impacts shown in this report.

⁶ The State of Arizona's Department of Economic Security does not maintain data for all economic sectors but for the sectors where data was available, it is highly similar to national averages.

Direct Impacts

Procedurally, the model is most typically used by entering a level of employment in a certain industry as an input. That industry's production function (essentially the ratio of employment to output associated with the industry in the study region) is used to calculate the output of the industry. In order to generate that output, a variety of inputs are needed. Thus the model "spends" in the associated categories that would be needed to create that output. Military activities are generally somewhat unique as applied to this modeling process, as they do not technically have a production function due to the difficulty in placing a market price on such things as national security.

The approach used to compensate for this issue was to obtain detailed spending information from the military operations and classify it in the appropriate IMPLAN industries to run through the model. The result of this process is "direct" outputs that are, by the standard definition, indirect (i.e. in support of the core industry studied). Thus in our process, direct employment at the base was the sole direct effect and other effects which were run through the model as direct were reclassified more appropriately as indirect effects.

TABLE A1-1:

CONVERSION TO FULL TIME EQUIVALENT (FTE) EMPLOYMENT, 2014

NAICS Code	NAICS Description	FTE Conversion Factor
11	Agriculture, Forestry, Fishing, Hunting	1.103
21	Mining	1.103
22	Utilities	1.103
23	Construction	0.979
31-33	Manufacturing	1.018
42	Wholesale Trade	0.972
44-45	Retail Trade	0.785
48-49	Transportation and Warehousing	0.974
51	Information	0.906
52	Finance and Insurance	0.940
53	Real Estate and Rental Leasing	0.940
54	Professional and Technical Services	0.904
55	Management of Companies and Enterprises	0.904
56	Administrative and Waste Services	0.904
61	Educational Services	0.821
62	Health Care and Social Assistance	0.821
71	Art, Entertainment and Recreation	0.657
72	Accommodation and Food Service	0.657
81	Other Services	0.796

NOTE: FTE Conversion Factor is average annual hours as a percent of average work year (2,080 hours annually)



APPENDIX TWO: "LINKED" RETIREE METHODOLOGY

Military retirees are themselves important to consider in understanding the economic impact of military operations on the communities in which they reside. *Some* retirees have chosen their residential location based on the desirability of being located in proximity to a military installation and the facilities and services it provides, ranging from the availability of commissary and/or an exchange to on-site medical facilities.

A statewide database was obtained from the Department of Defense Office of the Actuary detailing the number of retirees and payments to them by zip code. In order to ensure that retirees were allocated to only one military operation, the Study Team distributed the population using mapping software. Only military operations which provide services to retirees were included in the analysis. A fifty-mile radius was drawn around each operation and all the retirees located in the zip codes in the ring were included.

The 50-mile radii of Davis-Monthan and Fort Huachuca overlap. The overlapping zip codes were allocated to each installation based on assumed driving patterns according to transportation routes and geographic barriers. The YMCAS and YPG radii also overlapped. The allocation of retirees between these two military operations was more difficult due to their proximity. It was assumed that the YMCAS was drawing more retirees than YPG due to its proximity to the freeway and larger commissary. Therefore, all retirees in zip codes shared by the two military operations were attributed to YMCAS.



APPENDIX THREE: **ECONOMETRIC MODEL INPUTS**

In order to measure the economic and tax impacts of the military operations, some rather detailed information about their operations was necessary. This included payroll, spending on construction and various contracts, and other spending. Data was obtained through a questionnaire and face-to-face meetings with representatives of the military operations, with numerous phone and email follow-up conversations for clarification purposes. Each military operation provided a different level of detail concerning its contracts and spending patterns, which are detailed in the following tables. The basic information provided by each operation is summarized at the end of this appendix. NOTE: In some instances, the detail does not add to the total.

Necessary adjustments to the inputs for their use in the economic and fiscal impact models are discussed in the following sections.

Economic Model Inputs

The following adjustments were made to the basic information provided by each operation for use in the IMPLAN Pro Software. More information about the IMPLAN Pro Software is contained in Appendix One.

- Percent of year reserves actively employed: 20.5%
 - o Based on 75 days of service out of 365 in the year
- Percent of retirees moving upon closure: 25%
 - o Figure used in the 2002 analysis which was from a University of Arizona study for Davis- Monthan, January 1994
- Household income factor: 80%
 - o Discounted to remove dollars not recirculating through the economy (i.e. taxes and savings)
- Commissary
 - o Total sales multiplied by the ratio of 75% of retirees to the sum of active duty plus retirees to avoid double counting sales to households accounted for in the model
 - o Commissary sales were allocated across IMPLAN retail categories using the ratios from the Consumer Expenditure Survey
- Utilities
 - o Model derived utilities expenditures for households living on-site were used as direct utilities expenditure inputs. The estimated expenditures were subtracted from the totals and the remainder was also included as direct input.
- Percent of travel expenditures made in local county: 10%
 - o Based on estimates from military operations
- Percent of IMPAC (International Merchant Purchase Authorization Card) spending made in local county
 - o Based on estimates provided by each military operation (varied by operation)
- Percent of IMPAC spending which went to taxes
 - o Total spending discounted to exclude taxes. This figure varied based on the sum of the state, county and average municipal rate in the county where the operation is located.
- Percent of Fort Huachuca student income spent locally: 14%
 - o Based on data provided by Fort Huachuca
 - o The majority of Fort Huachuca students do not have the opportunity to spend their income locally.



Fiscal Model Inputs

The model utilized here was developed by the Study Team to measure the tax implications from the presence of the analyzed military operations in this state. Tax impacts were calculated for each military operation for the county in which it resides⁷ and the aggregate impact of the analyzed military operations was calculated on the state as a whole. The results of the county analysis and statewide analysis are not intended to be added; they are simply two different presentations of the same data with minor differences. For each member of the military operation, five populations were analyzed across three tax areas. In all cases, special consideration was taken into account for the unique factors involved with military related households and activities.

Population Scenarios

Tax impacts were calculated based on five population scenarios. Taken into consideration for each scenario were total persons and their total income. The five scenarios analyzed were:

1. Persons employed at the military operation who live on-site are full time military personnel. Students and rotational personnel assigned to Davis-Monthan AFB, Fort Huachuca, Luke AFB and Yuma Marine Corp Air Station were included in this category. For the other military operations, they were included in the off-site category. The majority of the data was provided by the military operation.
2. Persons employed at the military operation who lived off-site are a mixture of military and civilian personnel. Students and rotational personnel assigned to Yum Proving Grounds and the National Guard were included in this category. For the other military operations they were included in the on-site category. The majority of the data was provided by the military operation.
3. Military retirees in the surrounding community represents those military retirees who live in proximity to the respective military operations and are likely to use the services offered there. This model only measured the impact of 25 percent of these persons, assuming that this would be the percent which would move if the related military operation closed. This data was provided by the Department of Defense and the National Guard operations.
4. Indirect employment generated by direct activities of the military operation: This data represents the indirect employment generated in the supply chain caused by the direct activities of the military operation. This data is the output of the IMPLAN model. Appendix One contained more information on how the IMPLAN model generates employment and earnings data.
5. Induced employment generated by direct activities of the military operation: This data represents the induced employment generated by the spending of households directly related to the military operation, as well as the household spending of jobs created in the supply chain. This data is the output of the IMPLAN model. Appendix One contains more information on how the IMPLAN model generates employment and earnings data.

⁷Although Silver Bell Army Heliport is physically located in Pinal County, this analysis uses Pima County to generate impacts due to the installation's proximity to the Pima County Border. Similarly, although Fort Huachuca is located in Cochise County, this analysis splits expenditures between Cochise County and Pima County.



County Tax Impacts

Three categories of tax impacts were measured: sales tax, property tax, and state income tax. The county level impacts measured include the impact of the individual military operation on its county and local taxing jurisdictions as well as the state. The methodology and inputs are discussed here.

Sales Tax

The sales tax analysis is based on the off-installation household spending of the five population scenarios discussed previously. While the commissary and exchange are retail activities, their sales are excluded from state and local sales taxes.

Income was used as the basis for calculating sales tax revenues. However, not all income is spent for taxable activities. According to an analysis of household spending data from the 2014 Consumer Expenditure Survey for the West Region, 37.3 percent of the average household's budget is spent on general taxable items (like retail spending). Food purchased in stores for consumption at home accounts for 5.8 percent of a household's budget and is taxed in only some municipalities. The Study Team used the Consumer Expenditure Survey by income range to estimate the projected retail spending by employees and the resulting sales tax receipts is calculated.

In addition to these adjustments for the level of taxable expenditures, the amount spent on taxable items was reduced further to reflect spending at the commissary and exchange. Different factors were used for employees living on an installation than for employees living off an installation and retirees. The indirect and induced populations were assumed to conduct all of their retail spending at non-military stores. Since there are more shopping alternatives available in metropolitan areas, Fort Huachuca, located in rural Cochise County, was assigned a lower rate for local purchases.

The sales tax rates for the various jurisdictions being analyzed were then applied to the adjusted incomes. The state tax rate of 5.6 percent was subdivided into three components: (1) amount retained by the state, (2) amount shared with counties, and (3) amount shared with municipalities. Of the amount shared with counties, only that amount allocated to the county in which the military operation resides was analyzed⁸. Of the amount shared with cities, the total amount allocated to all of the municipalities in the respective county was used. Allocations are based on population.

In addition to state sales taxes, most counties and municipalities also collect sales taxes. The model applies the county tax rate to the adjusted income to derive the county impact. In order to account for the diverse tax rates of the municipalities in one county, a weighted-average rate was calculated (weighted by population).

⁸Although Silver Bell is physically located in Pinal County, this analysis uses Pima County to generate impacts due to the installation's proximity to the Pima County border.



Property Tax

The property tax analysis is based on the off-installation home value of four of the five scenarios discussed previously. Those persons employed at an installation and live on an installation are not included in this analysis. While there is real property on the site of the military operations, including residences, it is not subject to local property taxes.

The analysis begins by calculating the value of the homes for the four population groups. The total number of worker-households was calculated by reducing the total workers by a factor of 1.2, which represent the state average workers per household. In contrast to the worker-households, each retiree-household was assumed to contain only one retiree. The number of households was then reduced by the county average home ownership rate to account for only those people who own their own home. These owner-occupied households were then multiplied by the 2014 median market value in the applicable county. Home values were then reduced by 12.5 percent to reflect the inherent under-valuation of property by county assessors.

Six average rates⁹ were calculated based on Arizona Department of Revenue data from the Department's 2015 Annual Report. These rates were then applied to the assessed property values. Impacts shown are for both the primary and secondary tax assessments.

Income Tax

This income tax analysis is based on the household income of the five population scenarios discussed previously.

Military personnel are able to claim a state of legal residence for tax purposes that is different from the state in which they reside. Based on Department of Defense data, the ratio of the number of military personnel who claim Arizona as their state of legal residence to the number of military personnel stationed in Arizona is 0.815. This means that for every five persons stationed in the state, four persons pay income taxes in the state. However, it is important to note that this ratio is based on aggregate data for the state; it therefore includes those persons paying taxes in Arizona who are stationed in the state as well as persons paying taxes in Arizona who are not stationed in the state. It was assumed that all rotational and student military personnel pay taxes out of state and all reserves pay taxes in the state.

This analysis uses data provided by the Arizona Department of Revenue on average taxes by household income range. The factor is applied to the projected wage levels of each of the populations. The total number of worker-households was calculated by reducing the total workers by a factor of 1.20, which represents the state average of workers per household. In contrast to the worker-households, each retiree-household was assumed to contain only one retiree.

⁹Although the State of Arizona does not have a statewide property tax, certain high valuation school districts pay a supplemental tax into the State's general fund to pay for school-related costs. Since the Arizona Department of Revenue lists this as "state" taxes, this report is consistent with their nomenclature. See A.R.S. § 15-992 for details on this tax.

State Tax Impacts

Similar to the County Tax Impacts section, three categories of tax impacts were measured: sales tax, property tax, and state income tax. This analysis measures the aggregate impact of all military operations analyzed in the state. The methodology used is nearly identical to that discussed previously in the County Tax Impacts Section. Differences between the two methodologies are discussed here.

Population Scenarios

In the statewide analysis, all of the population and income inputs are identical to the countywide analysis except for the Indirect and Induced inputs. The Indirect and Induced inputs in the statewide analysis are the results of running the aggregate direct inputs from all analyzed military operations through the IMPLAN model for Arizona.

Sales Tax

State revenue sharing to counties and municipalities in the statewide analysis includes 100 percent of the shared revenues. In the individual military operation analysis presented previously, only the amount of revenues shared with the communities in the respective counties was presented in order to present the impacts to that county alone.

Locally-imposed county and municipal sales taxes were calculated for the aggregate of all analyzed military operations based on a weighted-average county and municipal tax rate for all jurisdictions in the state (weighted by population) in order to simulate the average county and municipality tax collections in Arizona.

TABLE A3-1:

SUMMARY OF BASIC PERSONNEL STATISTICS

Personnel Category	Davis- Monthan AFB	Fort Haachuca	Luke AFB	Yuma MCAS	Yuma Proving Ground	Silver Bell Army Heliport
Active Duty Permanent Party	5,957	2,498	3,391	3,185	163	150
Living On-Base	1,123	1,300	971	1,520	100	0
Living Off-Base	4,834	1,198	2,420	1,665	63	150
Reserves	1,949	134	1,750	0	0	401
Living On-Base	2	8	0	0	0	0
Living Off-Based	1,947	126	1,750	0	0	401
Rotational	0	2	0	644	221	0
Students (Military)	160	3,560	1,129	0	3,064	0
Civilians	3,703	6,997	2,050	2,225	2,163	273
DOD Civilians	2,195	3,290	853	995	706	244
Non-Military Employees	0	0	0	0	1,369	0
Non-Appropriated Fund Employees	0	0	0	0	88	0
Non-Military Employees	1,508	3,707	1,197	1,230	0	29
Linked Retirees	4,830	267	6,954	598	0	0

Personnel Category	AZ ANG 161st (Sky Harbor)	AZ ANG 162nd (Tucson)	Papago Park ANG	US Naval Observ.	ARIZONA TOTAL
Active Duty Permanent Party	90	298	0	0	15,732
Living On-Base	0	19	0	0	5,033
Living Off-Base	90	279	0	0	10,699
Reserves	761	863	5,095	0	10,953
Living On-Base	0	0	0	0	10
Living Off-Based	761	863	5,095	0	10,943
Rotational	0	0	0	0	867
Students (Military)	0	87	0	0	8,000
Civilians	255	816	688	24	19,194
DOD Civilians	235	745	688	23	9,974
Non-Military Employee	0	0	0	0	1,369
Non-Appropriate Fund Employees	0	0	0	0	88
Non-Military Employees	20	71	0	1	7,763
Linked Retirees	0	0	0	0	12,650

TABLE A3-2:

SUMMARY OF BASIC PAYROLL STATISTICS (\$000s)

Personnel Category	Davis- Monthan AFB	Fort Hauchuca	Luke AFB	Yuma MCAS	Yuma Proving Ground	Silver Bell Army Heliport
Active Duty Permanent Party	\$353.5	\$100.6	\$225.1	\$167.3	\$9.4	\$15.3
Living On-Base	\$66.6	\$49.9	\$26.6	\$79.9	\$5.4	\$0
Living Off-Base	\$286.8	\$50.7	\$198.4	\$87.5	\$4.0	\$15.3
Reserves	\$72.8	\$2.5	\$45.8	\$0	\$0	\$1.8
Living On-Base	\$0.2	\$0.5	\$0	\$0	\$0	\$0
Living Off-Based	\$72.6	\$2.0	\$45.8	\$0	\$0	\$1.8
Rotational	\$0	\$0.2	\$0	\$33.8	\$5.6	\$0
Students (Military)	\$4.0	\$26.2	\$33.1	\$0	\$115.3	\$0
Civilians	\$209.0	\$453.5	\$72.5	\$38.2	\$131.6	\$20.3
DOD Civilians	\$141.5	\$275.2	\$63.1	NA	\$70.7	\$18.8
Non-Military Employees	\$0	\$0	\$0	NA	\$58.6	\$0
Non-Appropriated Fund Employees	\$0	\$0	\$0	NA	\$2.3	\$0
Non-Military Employees	\$67.6	\$178.3	\$9.3	NA	\$0	\$1.6
Linked Retirees	\$128.4	\$8.7	\$139.2	\$13.7	\$0	\$0

Personnel Category	AZ ANG 161st (Sky Harbor)	AZ ANG 162nd (Tucson)	Papago Park ANG	US Naval Observ.	ARIZONA TOTAL
Active Duty Permanent Party	\$4.2	\$24.5	\$0	\$0	\$899.9
Living On-Base	\$0	\$4.2	\$0	\$0	\$232.7
Living Off-Base	\$4.2	\$20.3	\$0	\$0	\$667.2
Reserves	\$4.6	\$6.8	\$78.9	\$0	\$213.2
Living On-Base	\$0	\$0	\$0	\$0	\$0.7
Living Off-Based	\$4.6	\$6.8	\$78.9	\$0	\$212.5
Rotational	\$0	\$0	\$0	\$0	\$39.7
Students (Military)	\$0	\$2.3	\$0	\$0	\$180.9
Civilians	\$19.4	\$60.4	\$51.7	\$2.1	\$1,058.7
DOD Civilians	\$18.7	\$56.6	\$51.7	\$1.9	\$698.2
Non-Military Employee	\$0	\$0	\$0	\$0	\$58.6
Non-Appropriate Fund Employees	\$0	\$0	\$0	\$0	\$2.3
Non-military Employees	\$0.7	\$3.8	\$0	\$0.2	\$261.5
Linked Retirees	\$0	\$0	\$0	\$0	\$289.9

TABLE A3-3:

SUMMARY OF BASIC DIRECT SPENDING STATISTICS (\$000s)

Expenditure Category	Davis- Monthan AFB	Fort Hauchuca	Luke AFB	Yuma MCAS	Yuma Proving Ground	Silver Bell Army Heliport
Contracts & Direct Spending: Maintenance & Operations	\$25.9	\$445.2	\$121.1	\$0	\$126.2	\$2.9
Contracts: Construction & Building Maintenance/Repair	\$33.5	\$46.3	\$34.4	\$50.8	\$25.9	\$0.8
Spending for Supplies	\$232.6	\$43.5	\$143.5	\$40.8	\$8.7	\$8.3
Utilities	\$10.9	\$16.3	\$5.9	\$7.9	\$4.1	\$1.2
Education Payments	\$4.2	\$1.1	\$2.6	\$1.3	\$0.4	\$3.5
Health Services	\$28.4	\$35.1	\$261.0	\$6.5	\$3.7	\$0.6
Commissary& Exchange Sales	\$92.8	\$299.6	\$99.9	\$29.6	\$7.3	\$0

Expenditure Category	AZ ANG 161st (Sky Harbor)	AZ ANG 162nd (Tucson)	Papago Park ANG	US Naval Observ.	ARIZONA TOTAL
Contracts & Direct Spending: Maintenance & Operations	\$0.2	\$0.7	\$2.7	\$0.3	\$725.2
Contracts: Construction & Building Maintenance/Repair	\$3.0	\$6.3	\$9.8	\$0.80	\$211.5
Spending for Supplies	\$21.2	\$69.6	\$19.4	\$0.2	\$587.8
Utilities	\$0.6	\$1.3	\$12.4	\$0.1	\$60.6
Education Payments	\$0	\$0	\$0	\$0	\$13.1
Health Services	\$0	\$0.2	\$0	\$0	\$335.5
Commissary & Exchange Sales	\$0	\$0	\$0	\$0	\$529.2



APPENDIX FOUR: **DETAILED STATEWIDE MODEL OUTPUT**

The following table summarizes the detailed output of the IMPLAN Pro software economic impact by major industry category. Additional detailed information is available upon request.

TABLE A4-1:
SUMMARY OF EMPLOYMENT STATISTICS

	Agriculture	Mining	Construction	Manufacturing
Direct				
Employment				
Output (\$000s)				
Indirect				
Employment	6	3	1,491	93
Output (\$000s)	\$1,320	\$867	\$224,510	\$23,962
Induced				
Employment	96	6	204	166
Output	\$16,026	\$1,805	\$42,628	\$79,287
Total				
Employment	102	9	1,695	259
Output (\$000s)	\$17,346	\$2,672	\$267,138	\$103,249
	Transportation & Utilities	Wholesale	Retail	Financial & Real Estate
Direct				
Employment				
Output (\$000s)				
Indirect				
Employment	250	108	4,397	1,140
Output (\$000s)	\$55,338	\$26,861	\$344,855	\$213,877
Induced				
Employment	526	494	2,078	2,646
Output	\$148,228	\$134,865	\$248,816	\$908,866
Total				
Employment	776	602	6,474	3,786
Output (\$000s)	\$203,566	\$161,726	\$593,671	\$1,122,743
	Information	Services	Other	TOTAL
Direct				
Employment				46,038
Output (\$000s)				\$6,191,784
Indirect				
Employment	165	7,358	67	15,079
Output (\$000s)	\$83,119	\$1,382,026	\$21,882	\$2,378,618
Induced				
Employment	265	8,558	558	15,596
Output	\$161,587	\$1,034,457	\$115,480	\$2,892,047
Total				
Employment	430	15,916	625	76,714
Output (\$000s)	\$244,707	\$2,416,483	\$137,362	\$11,462,449



APPENDIX FIVE: **REGIONAL IMPACT INFORMATION**

The following table illustrates the detailed output of the IMPLAN Pro software economic information for the individual military operations within their individual county, as more fully described in Appendix Three.

TABLE A5-1:

LOCAL ECONOMIC IMPACTS OF INDIVIDUAL DEPLOYMENTS

	Davis- Monthan AFB	Fort Hauchuca	Luke AFB	Yuma MCAS	Yuma Proving Ground	Silver Bell Army Heliport
Jobs						
Direct	10,220	13,084	6,929	6,054	5,611	505
Indirect	3,106	4,947	4,396	989	1,311	135
Induced	3,354	3,296	3,745	776	1,168	176
Total	16,679	21,327	15,070	7,819	8,089	816
Wages (\$ mil)						
Direct	\$639.3	\$583.0	\$376.5	\$239.4	\$262.0	\$37.5
Indirect	\$121.8	\$254.4	\$316.7	\$36.0	\$68.8	\$6.1
Induced	\$170.0	\$161.8	\$229.8	\$36.2	\$54.3	\$8.9
Total	\$931.15	\$999.2	\$923.0	\$311.6	\$385.1	\$52.5
Output (\$mil)						
Direct	\$1,654.5	\$1,508.9	\$974.4	\$619.5	\$678.0	\$97.0
Indirect	\$291.6	\$753.6	\$760.6	\$103.6	\$197.0	\$16.0
Induced	\$653.7	\$606.0	\$697.4	\$164.5	\$243.0	\$34.4
Total	\$2,599.7	\$2,868.5	\$2,432.4	\$887.6	\$1,118.0	\$147.4

	AZ ANG 161st (Sky Harbor)	AZ ANG 162nd (Tucson)	Papago Park ANG	US Naval Observ.
Jobs				
Direct	501	1,378	1,732	24
Indirect	160	650	221	11
Induced	164	467	591	10
Total	826	2,496	2,545	45
Wages (\$ mil)				
Direct	\$28.2	\$93.9	\$130.6	\$2.1
Indirect	\$9.3	\$23.4	\$13.3	\$0.4
Induced	\$10.3	\$23.5	\$37.7	\$0.4
Total	\$47.8	\$140.8	\$181.7	\$3.0
Output (\$ mil)				
Direct	\$73.0	\$243.1	\$338.0	\$5.4
Indirect	\$17.4	\$51.5	\$28.9	\$1.4
Induced	\$31.5	\$89.0	\$117.3	\$1.9
Total	\$121.9	\$383.6	\$484.2	\$8.7



PHOTO CREDITS

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COVER:	Arizona Army National Guard; Army Proving Grounds – Yuma; Arizona Air National Guard 162nd Fighter Wing; Arizona Army National Guard; Arizona Air National Guard 162nd Fighter Wing; Army Intelligence Center and Fort Huachuca (counterclockwise from top center)

