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TN #:	216092
Document Title:	Air Force Plant 42 Air Installation Compatible Use Zone Study
Description:	This study is an update to the 2002 US Air Force Plant 42 (Plant 42), California Air Installation Compatible Use Zone (AICUZ) study. Plant 42 is a government owned, contractor operated facility for the development, manufacturing, and testing of high performance aircraft; the installation lies in northern Los Angeles County in the city of Palmdale (Figure 1-1). This update presents and documents the changes in aircraft operations occurring at Plant 42 and the land use setting in the vicinity since the issuance of the previous AICUZ study.
Filer:	Jonathan Fong
Organization:	California Energy Commission
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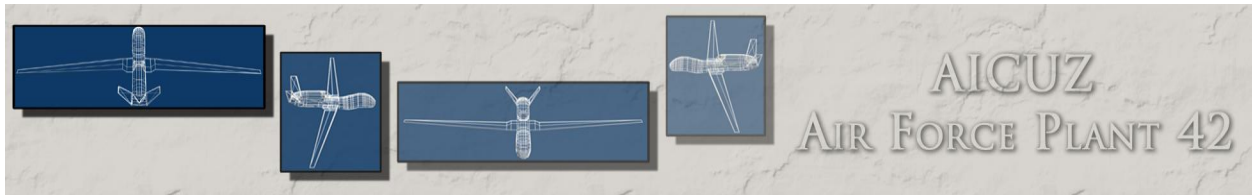


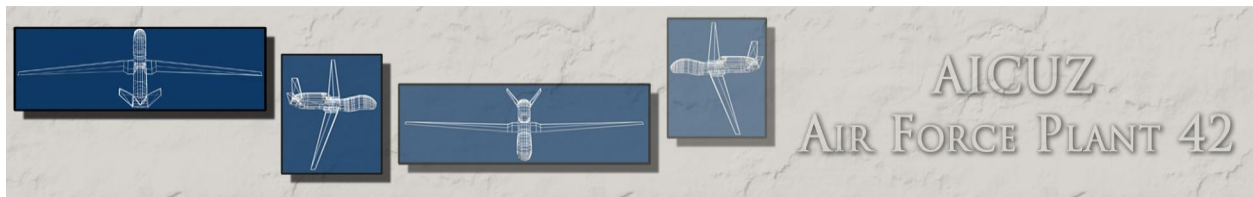
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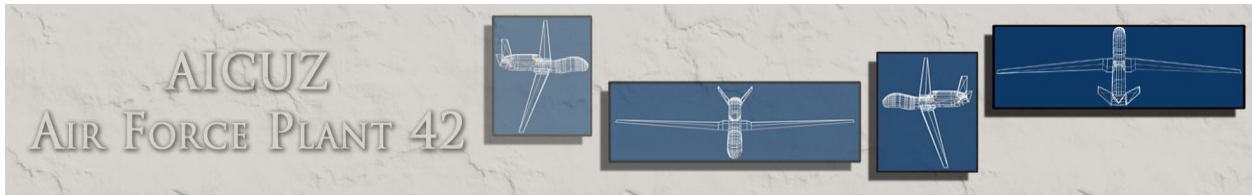
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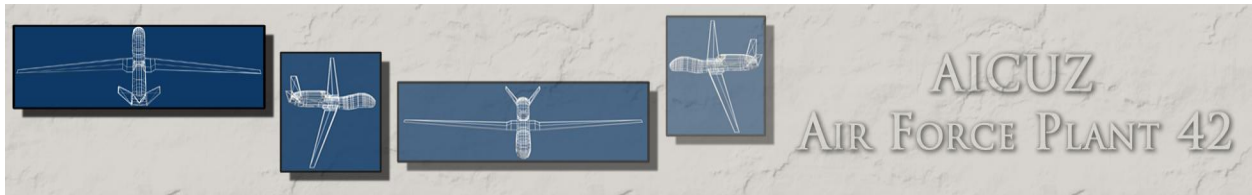
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ACRONYMS and ABBREVIATIONS

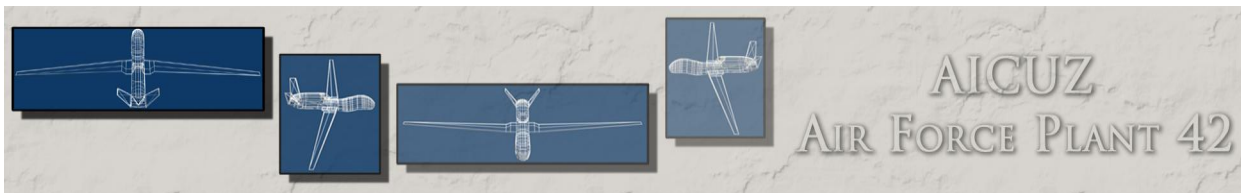
AFB	Air Force Base
AFH	Air Force Handbook
AFMC	Air Force Materiel Command
AGL	above ground level
AICUZ	Air Installation Compatible Use Zone
ALUC	Airport Land Use Commission
ANGB	Air National Guard Base
APZ	accident potential zone
ATC	air traffic control
CFR	Code of Federal Regulation
CNEL	Community Noise Equivalent Level
CNS	communications, navigation, surveillance
CZ	clear zone
dB	decibel
DNL	day-night average A-weighted sound level in decibels
DoD	Department of Defense
DoT	Department of Transportation
EIR	economic impact region
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
GPS	global positioning system
HUD	Housing and Urban Development
IFR	instrument flight rules
INM	Integrated Noise Model
ISR	intelligence, surveillance, and reconnaissance
LAWA	Los Angeles World Airports
MOA	military operations area
MSL	mean sea level
NAS	National Airspace System
NASA	National Aeronautics and Space Administration
Nm	nautical miles
OE/AAA	obstruction evaluation/airport airspace analysis
R	Restricted
SLUCM	Standard Land Use Coding Manual
SOFIA	Stratospheric Observatory for Infrared Astronomy
TRACON	terminal radar approach control
UAS	unmanned aircraft system
UFC	Unified Facility Criteria
USCB	U.S. Census Bureau
VFR	visual flight rules
VORTAC	very high frequency omnirange, tactical air navigation



AIR FORCE PLANT 42
CALIFORNIA

**CHAPTER 2 • INSTALLATION
DESCRIPTION**

AIR INSTALLATION COMPATIBLE USE ZONE



2.3 History of Air Force Plant 42

Plant 42 was officially established in 1953 to address the challenge of flight testing high performance jet aircraft away from heavily populated areas. The first lease with a private aircraft manufacturer was signed in 1956. Since then the facility has supported the production, engineering, final assembly, and/or flight testing of multiple airframes such as the B-1 and B-2 bombers, F-5E and F-117 fighters, the SR-71, and the U-B/TR-1. Additionally, the Space Shuttle orbiters were initially assembled and received mid-lifecycle refurbishments at Plant 42.

The history of Plant 42 begins during World War II when then Palmdale Airport was activated as Palmdale Army Air Field as an emergency landing strip and B-25 training. At the end of that war, the base was declared as surplus and sold to Los Angeles County for use as a municipal airport. In 1950, the Air Force reactivated the installation for the final assembly and flight testing of jet aircraft. In 1951, the Air Force purchased Plant 42 as a means to have a facility for the testing of high performance aircraft away from heavily populated areas. The Air Force envisioned Plant 42 as a facility that would meet the requirements for full war mobilization and expand the major aircraft manufacturing industry of southern California. The installation was officially designated Air Force Plant 42 in 1953 and ownership was transferred to the Federal Government the following year. In 1956 Lockheed signed the first lease to use Plant 42 as a final assembly and testing facility. Plant 42 has supported such projects as: Lockheed's production of the U-2/TR-1 *Dragon Lady* and SR-71 *Blackbird* support; Northrop's production of the F-5E *Tiger II* for foreign military sales; and, support of the Rockwell B-1B *Lancer* bomber. The final assembly and modification of the B-2 *Stealth* bomber occurred at Northrop Grumman's Plant 42 facility.

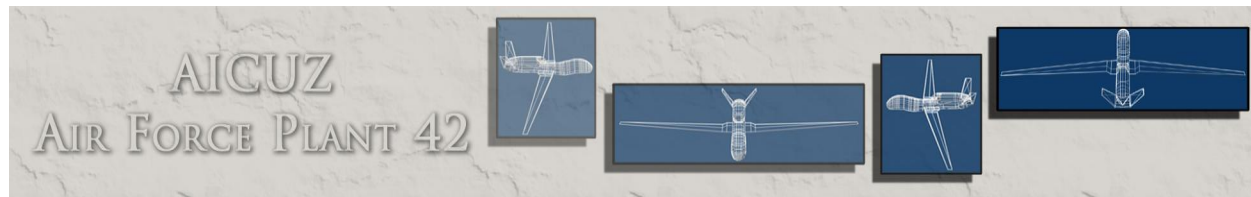
2.4 Mission

The Aeronautical Systems Center is the largest product center for the Air Force Materiel Command. It is located at Wright-Patterson AFB and is primarily responsible for the design, development, and delivery of aerospace weapon systems and capabilities for the Air Force, other U.S. military, allied and coalition-partner warfighters, in support of Air Force leadership priorities.

Detachment 1 of the Aeronautical Systems Center, a Product Center for the Air Force Materiel Command (AFMC) at Wright-Patterson AFB, Ohio, is the host unit for Plant 42 and is responsible for installation operations, including the airfield. The Plant 42 installation consists of eight separate production sites that share a common airfield infrastructure. The primary mission at Plant 42 is to provide and maintain facilities for:

- The final assembly of jet-powered, high performance jet aircraft;
- Production engineering and flight test programs; and
- Air Force acceptance flight test of jet aircraft.

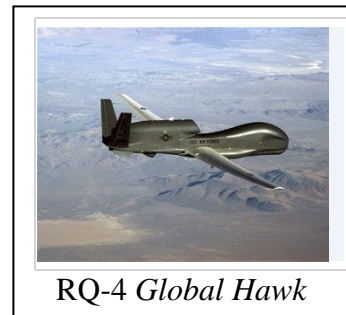
Currently, Plant 42 supports the major aircraft manufacturers Boeing, Lockheed, and Northrop Grumman. NASA also maintains a production facility on the installation. The aircraft manufacturers perform final assembly and testing of both military and commercial airframes at Plant 42, while NASA's mission includes test and research applications. Plant 42 is also Northrop Grumman's



maintenance depot for B-2 *Stealth Bomber* test and inspection. Because of the transitory nature of the missions of each tenant on Plant 42, the number and type of aircraft stationed at Plant 42 is highly variable. Both the aircraft manufacturers and NASA have some permanently assigned aircraft used for training and transportation. In addition to these aircraft, they also support various other airframes for a range of timeframes during their final assembly and acceptance testing, or for depot maintenance and inspection period.

Predominant Aircraft Types Using Plant 42

The RQ-4 *Global Hawk* is a high-altitude, long-endurance unmanned aircraft system (UAS) with an integrated sensor suite for worldwide intelligence, surveillance, and reconnaissance (ISR) capability. *Global Hawk* began as an Advanced Concept Technology Demonstration in 1995 and was determined to have military utility for providing evolutionary high-altitude, long-endurance ISR capability. It was first deployed operationally in November 2001 to support the global war on terrorism. Mission parameters can be programmed into the RQ-4 enabling it to autonomously taxi, take off, fly, and loiter above an area to gather intelligence, return, and land. Ground-based operators monitor and can update/change mission parameters during flight if required.



RQ-4 *Global Hawk*

The B-2A *Stealth Bomber* was first rolled out of Northrop’s assembly facility in Palmdale, CA on November 22, 1988 with its first flight occurring on July 17, 1989. It is designed for multiple missions such as deep strike penetration against heavily defended targets. It uses sophisticated low-observable technologies to give the aircraft a very low radar cross section, has an unrefueled range of greater than 6,000 miles, carries a 40,000 lb payload, and delivers near-precision munitions. The B-2A has four General Electric F118-GE-100 (non-afterburning) turbofan engines, each producing 17,300 lbs of thrust.

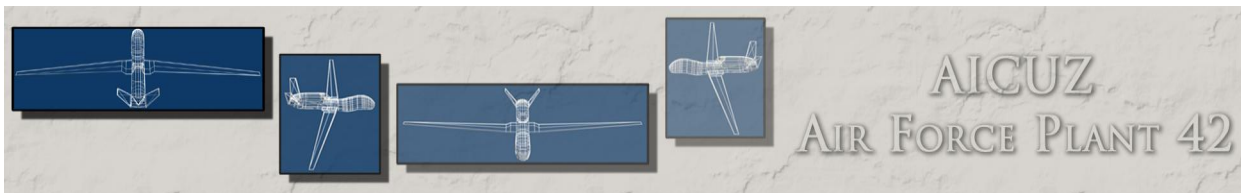


B-2A *Stealth Bomber*

The U-2S *Dragon Lady* is a single seat, single engine aircraft that provides high-altitude/near space reconnaissance and surveillance. Its long and narrow wings give it glider-like characteristics allowing it to attain unmatched altitudes and loiter there for extended periods of time. The U-2 is capable of obtaining a variety of imagery such as multi-spectral electro-optic, infrared, and synthetic aperture radar products which can be stored or sent to ground exploitation centers. In addition, it also supports high-resolution, broad-area synoptic coverage provided by the optical bar camera. A lightweight, fuel efficient General Electric F118-101 engine powers the U-2, and



U-2S *Dragon Lady*



allows for long duration missions without the need for air refueling. The U-2 first began flying missions in the late 1950s over the Soviet Union. All U-2s have been upgraded to the current S-version, beginning in 1994.



C-130 *Hercules*

The C-130 *Hercules* provides tactical airlift for the Air Force. The aircraft is capable of operating from a multitude of environments and is the prime transport for air dropping troops and equipment into hostile areas. The C-130J is the latest addition to the *Hercules* fleet, replacing the C-130E's. The C-130J integrates state-of-the-art technology such as fully integrated digital avionics, multifunctional liquid crystal and head-up displays, navigation systems with GPS, fully integrated defense systems, low-power color radar, and improved fuel, environmental and ice-protection systems. Four Rolls-Royce AE2100D3 turboprop engines with a six-bladed composite propeller provide substantial performance improvements.

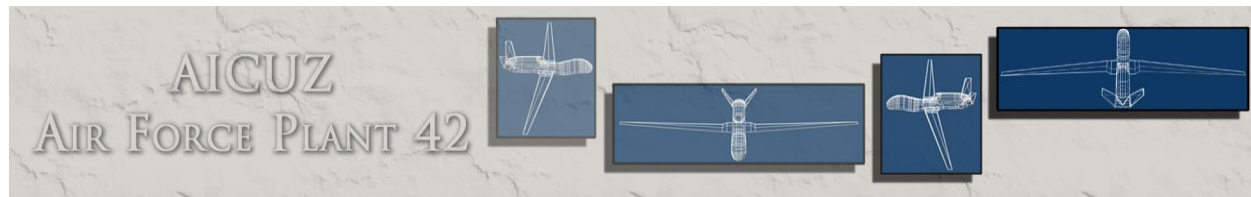


F-22 *Raptor*

The Plant 42 airspace and airfield is also heavily used by aircraft from other units for tactical training and proficiency sorties. The majority of these sorties are flown by aircraft from the 412 Flight Test Wing (Edwards AFB) and the 146th Airlift Wing (Channel Island ANGB) located on Naval Air Station Point Magu, approximately 60 miles southwest along the Pacific Ocean). From Edwards AFB, a wide variety of aircraft types that are undergoing flight testing and thus are using the facilities and airspace at Edwards AFB will also often use the airfield at Plant 42. These airframe types would include the C130 *Hercules*, the F-15 *Eagle*, the F-16 *Fighting Falcon*, the F-22 *Raptor*, and the T-38 *Talon*. From Channel Islands ANGB, the 146 Airlift Wing operates C-130 *Hercules* aircraft. Other transient aircraft may periodically use the airfield at Plant 42 on a case by case basis, placing additional demands on its future use. For example, the new F-35 is anticipated to use the airfield in the near future.

2.5 Economic Impact

Air Force Plant 42's economic region of influence is generally thought to extend approximately 25 miles, the majority of which is within Los Angeles County, but it does extend into southern Kern County. This area is generally known as the Greater Antelope Valley Economic Area. The general economic health of the region is good and is characterized by a well-diversified economy with manufacturing, retailing, professional, health care, scientific, and



education as the primary industries in the region. These sectors in aggregate provide 54.6 percent of the total jobs in the region (Table 2-2).

The US Census Bureau estimates that the median household income in 2009 inflation adjusted dollars was: \$49,567 (Lancaster), \$54,840 (Palmdale) and \$54,828 (Los Angeles County). This compares to a statewide median household income of \$60,392 and a nationwide median household income of \$51,425 in 2009 dollars.

Apart from physical proximity, numerous factors link Plant 42 with the surrounding communities. The relationship historically has been one of cooperation, mutual respect, and support. Strong ties between the local governments, the business community, and the military have existed for decades. Personnel employed at Plant 42 are actively involved in local affairs, frequently attending city meetings to discuss any Plant 42 issues that could potentially affect the city.

The economic impact of Plant 42 on Antelope Valley is significant, especially within the 25-mile radius of the economic impact region (EIR) generally associated with military installations. In 2010, the military, contractors and other tenants on Plant 42 employed 7,234 personnel. Approximately 15 are uniformed, military personnel. Since there is no base housing on Plant 42, these personnel live in the community or region. The annual total payroll in 2010 for Plant 42 was approximately \$622.9 million, and provided approximately \$133.2 million in local contracts (Table 2-3).

2.6 Flying Activity

Prior to the data collection that occurred in late 2010, the most recent AICUZ study for Plant 42 was accomplished in 2002. Since the previous AICUZ study, the aircraft types based at Plant 42 have changed, adding the B-2 *Stealth* bomber, the RQ-4 *Global Hawk*, as well as Boeing's 747-8 and 747SP models. The installation is no longer supporting the F-117 *Nighthawk* stealth fighter or B-1 *Lancer* bomber.

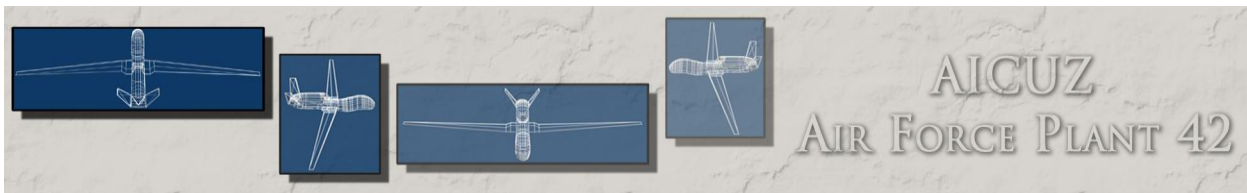


Table 2-2. Total Employment by Industry

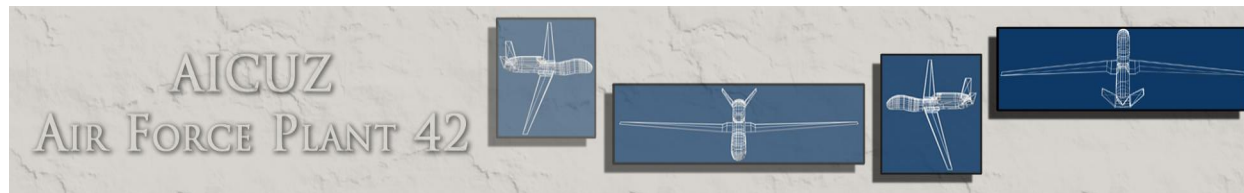
Sector	2005-2009 Estimate (# of persons)			
	Palmdale	Lancaster	Los Angeles County	Kern County
Civilian employed population 16 years and over	53,910	51,189	4,522,378	297,398
Agriculture, forestry, fishing and hunting, and mining	409	523	19,581	39,863
Construction	5,156	4,000	300,901	23,528
Manufacturing	6,827	5,239	533,779	15,632
Wholesale trade	1,418	1,054	181,661	10,391
Retail trade	7,175	7,215	477,613	32,752
Transportation and warehousing, and utilities	2,697	2,546	234,904	12,376
Information	1,507	1,312	200,129	4,284
Finance and insurance, and real estate and rental and leasing	3,519	2,974	318,809	13,969
Professional, scientific, and management, and administrative and waste management services	4,463	4,609	536,301	24,181
Educational services, and health care and social assistance	10,049	11,805	868,940	56,683
Arts, entertainment, and recreation, and accommodation and food services	5,066	3,567	437,046	23,380
Other services, except public administration	3,088	2,535	269,706,	14,460
Public administration	2,536	3,810	143,008	22,611

Source: U.S. Census Bureau, 2005-2009 American Community Survey 5-Year Estimates, 2403

Table 2-3. Plant 42 FY 2010 Estimated Economic Impact

Source	Economic Value
Annual Payroll	\$622,864,653
Local Contracts	\$133,209,491

Source: Greater Antelope Valley Economic Alliance



The mix of transient aircraft using Plant 42 can and does change from year to year. Transient aircraft generally fall into one of three categories: VIP transport (light business turboprop aircraft, such as the Gulfstream G-3 and Beechcraft C-12 *Huron*), heavy airlift (including cargo aircraft such as the C-130J *Hercules*) or fighter aircraft based elsewhere that are temporarily visiting Plant 42 or using it as an emergency divert field (e.g., F-16 *Fighting Falcon* and F-22 *Raptor*). The number of transient aircraft sorties also varies over time as operational requirements dictate and they represent a large fraction of airfield operations at Plant 42. Flying activities and types of aircraft utilizing the airfield at Plant 42 have changed dramatically since the 1992 and 2002 AICUZ reports, resulting in generally lower operational noise levels.

2.6.1 Flight Operations by Aircraft Type

An operation is defined as one takeoff, one arrival, or half of a closed pattern. A closed pattern consists of both a departure portion and an approach portion (i.e., two operations). In addition to the aircraft types either based at or supported by Plant 42 (B-2, *Global Hawk*, U-2S, B747-8, and B747SP), transient aircraft from other military installations often land and take off at Plant 42.

While the number of assigned, transient, and civil aircraft operations varies from day to day at an installation, the NOISEMAP computer program requires input of a specific number of daily flights and of aircraft maintenance engine run-up operations. For purposes of an AICUZ study, the “average busy day” is modeled in recognition that the level of flight operations can vary over the course of a year (Table 2-4). For example, at most bases, weekend flying operations are typically much less common. The use of an average busy day concept simply entails normalizing the data so that they are representative of the activity occurring when the Plant 42 is flying (i.e., less frequently on holidays and weekends).

A sortie is a single military flight from initial takeoff to its terminating landing. A sortie consists of at least two operations (a takeoff and a landing) and often additional circuits in the traffic pattern, called closed pattern operations. Closed patterns are counted as two operations because they include a departure and an arrival.

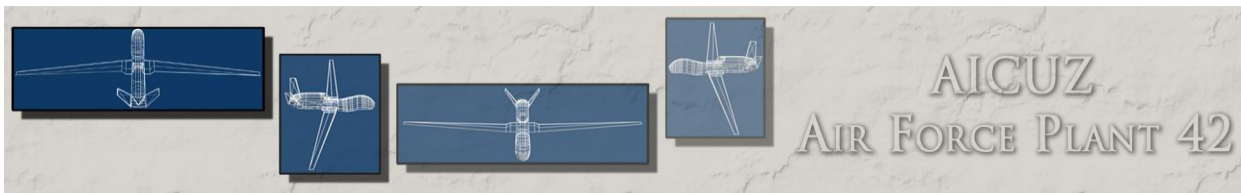
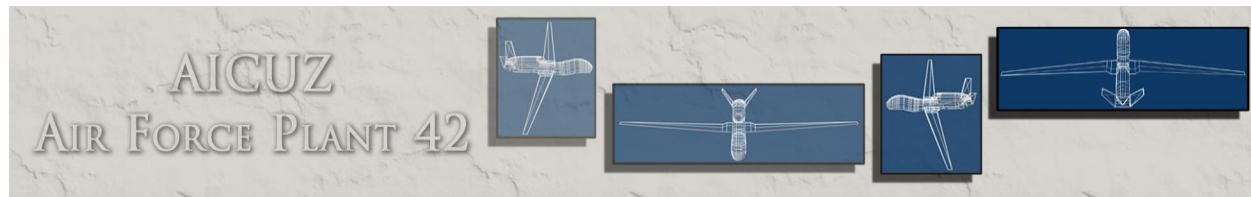


Table 2-4. Average Busy-Day Aircraft Operations at Plant 42 during FY10

Aircraft Type	Flying Days per Year	Average Daily Operations	Average Annual Operations
Plant 42			
B747-8F	350	2.40	840.00
U-2S	250	1.92	479.64
RQ-4 Global Hawk	250	0.34	84.00
C-12	250	0.34	84.00
B-2	250	0.22	54.00
B747SP (SOFIA)	260	0.38	100.00
ER-2	260	1.18	306.00
DC-8	260	0.96	250.67
F-22 (Depot FCF)	260	0.12	30.00
F-22 (Depot)	260	0.14	36.00
Channel Islands ANGB (146 AW)			
C-130	260	43.20	11,231.35
Edwards (412 FTW)			
C-12	252	12.19	3,072
F-22 (411 FTS)	260	0.35	90.00
T-38 (TPS)	260	28.00	7,280.00
F-16	260	2.95	768.00
KC-135	260	18.00	4,680.00
C-130	260	1.90	495.24
Transient	365	8.83	3,224.00
TOTAL		123.42	33,104.90



2.6.2 Flight Tracks over the Ground

For aircraft stationed at Plant 42 temporarily while undergoing depot maintenance or initial manufacturing and acceptance, the typical sortie consists of: a departure from Plant 42 on the runway heading; a turn toward the test and training airspace over Edwards AFB; air work in the Restricted Area or MOAs over Edwards AFB; and, an arrival back at Plant 42. For aircraft stationed at and arriving from Channel Islands ANGB or Edwards AFB (i.e., proficiency flights), the typical sortie consists of: a departure from either Channel Islands ANGB or Edwards AFB; an initial arrival into Plant 42; a varying number of closed circuit patterns with low approaches or touch and go landings; and, a final departure to return to the base at which the aircraft is stationed.

The flight patterns (also referred to as flight tracks) are designed taking several factors into account and the operations most commonly observed along these tracks are a function of several factors including:

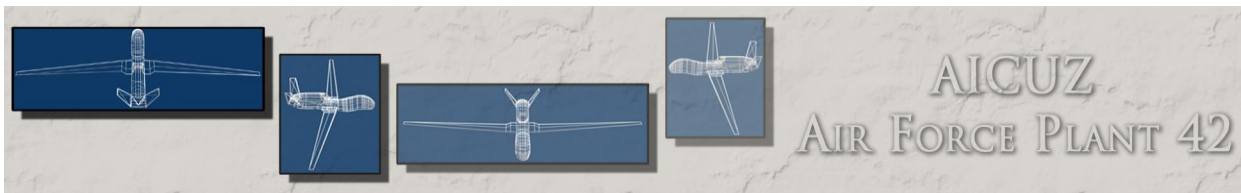
- The prevailing weather conditions, particularly the winds which influences the runway in use at an airfield at any given time;
- The mission or purpose for which the sortie is being flown, and, closely related, the locations of the most commonly used training airspace units;
- Terrain;
- Separation requirements from other aircraft in the vicinity including those in the mid- and upper altitude strata (greater than 10,000 feet above MSL); and
- Noise abatement considerations.

Of these factors, the prevailing winds (which influences whether operations occur on Runways 4/22, or 7/25) and the mission (i.e., what training or operational scenario is being flown to and from which areas) are the predominant factors that influence which of the many flight tracks possible are the ones most commonly observed.

Generally, operations occur from east to west on Runway 25 due to the prevailing winds, noise abatement, and other considerations such as air traffic in the area. It is the preferred calm wind runway.

Military fighter aircraft use an overhead arrival pattern in which the aircraft flies over the arrival end of the runway at pattern altitude (normally 1,500 feet above ground level (AGL), then banks sharply to the left or right, turning to a heading opposite that of the runway in use. This sharp turn is also called a "pitch" or a "break." Using the turn to slow down while holding pattern altitude, the aircraft is then flown parallel to the runway (downwind), configures its flaps and landing gear, and when beyond the threshold of the runway begins a descending turn toward final approach such that the plane rolls out wings-level at the proper airspeed on about a 1 mile final and about 300 feet AGL. This technique minimizes vulnerability to enemy fire and provides additional altitude in the event of aircraft malfunctions.

Civil aircraft ordinarily approach the runway, descending on a more gradual glidepath and seldom overflying the threshold at pattern altitude. The tight turns at high rates of speed that are required in order to stay within the vicinity of the airfield generate G forces beyond the design capabilities of most civil aircraft and would also result in an unpleasant ride for passengers not expecting such a vigorous maneuver.



2.6.3 Runway and Flight Track Utilization

The Federal Aviation Regulations governing aircraft flight operations describe two basic sets of flight rules under which aircraft may be operated: VFR, which requires certain minimum in-flight visibility and cloud ceilings, and IFR, which do not.

For all operations, if sufficient visibility exists, the pilot in command remains responsible for collision avoidance and aircraft separation, this is usually referred to as “see and avoid.” There are times, however, when this technique is impractical and reliance upon it would be inadvisable.

Examples would be flying through a cloud; flying at high speeds and high altitude; or flying in a very congested airspace.

Over the years, IFR has evolved to keep it effective as a separation method. Therefore, the FAA designates ‘controlled airspace’ within which it will provide ATC separation, specifies minimum equipment requirements to facility communications and radar surveillance of aircraft, and requires the filing of IFR flight plans and prior receipt of clearances before undertaking an IFR flight and the adherence to ATC instructions during such flight.

Departures from Runways 22 or 25 (i.e., on a southwesterly or westerly initial heading) typically turn right fairly quickly after departure (within a mile or two), heading generally north or northeastward to enter the Edwards airspace; aircraft heading toward Point Magu or Los Angeles typically proceed direct on course. If limited aircraft performance warrants it, a spiraling departure to gain altitude may occur prior the aircraft’s turning on course and heading toward higher terrain. Aircraft destined toward airfields to the east typically will also turn right off Runway 22 or 25, fly north for a few miles and then turn eastbound.

While relatively infrequent, departures from Runway 4 or 7 (i.e., on a northeasterly or easterly initial heading) will typically fly straight out for about three to five miles before turning on course.

For arrivals to Runway 22 or 25, a similar set of circumstances influences the flight tracks observed. Aircraft arriving from the airspace associated with Edwards AFB arrive from the north and join the final approach course (extended centerline of the runway). If conducting an instrument approaches, this join point occurs somewhere around 10 to 15 miles out; if a visual arrival is occurring and traffic permits it, the joint point can be as close as a mile or two although a five mile point is more typical. Aircraft arriving from the Los Angeles area or from the west would ordinarily fly toward the north side of the airfield, parallel to the runways.

As with departures, arrivals to Runway 4 or 7 are infrequent, occurring generally on the north or northwest side, avoiding Palmdale and the rising terrain to the south.

Other factors influencing the flight tracks observed at Plant 42 include:

- Takeoff patterns routed to avoid densely populated areas as much as practicable;
- Air Force criteria governing the speed, rate of climb, and turning radius for each type of aircraft;
- Efforts to control and schedule missions to keep noise levels low, especially at night; and
- Coordination with the FAA to minimize conflict with civilian air carrier and general aviation aircraft operations in the region.

DOCKETED

Docket Number:	08-AFC-09C
Project Title:	Palmdale Energy Project (Formerly Palmdale Hybrid Power Plant) - Compliance
TN #:	216092
Document Title:	Air Force Plant 42 Air Installation Compatible Use Zone Study
Description:	This study is an update to the 2002 US Air Force Plant 42 (Plant 42), California Air Installation Compatible Use Zone (AICUZ) study. Plant 42 is a government owned, contractor operated facility for the development, manufacturing, and testing of high performance aircraft; the installation lies in northern Los Angeles County in the city of Palmdale (Figure 1-1). This update presents and documents the changes in aircraft operations occurring at Plant 42 and the land use setting in the vicinity since the issuance of the previous AICUZ study.
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