355th Fighter Wing
Davis-Monthan AFB

The enclosed Wyle Laboratories Draft Preliminary Study Report titled: "Operation Snowbird Safety Procedures and Operational Study Services" is provided without Air Force comment or endorsement. This draft study report was undergoing review when the contract for the study was terminated in favor of a more comprehensive Environmental Assessment, including established public involvement procedures, under the National Environmental Policy Act. The Environmental Assessment will formally evaluate environmental impacts of the training plan for Operation Snowbird.

Some names have been redacted in accordance with the Freedom of Information Act
in order to protect personal privacy interests.

4/15/2010

Operation Snowbird Safety Procedures and Operational Study Services

Preliminary Study Report

Table of Contents

Introduction 5

PART I – Overview of Operation Snowbird History, Mission and Training Details 6

History 6

1972 6

1975 7

1978 7

1979 8

1988-1992 10

1992 10

1995 10

1998 11

1999 11

2000 12

2001 12

2002 13

2004 13

2005 13

2007 14

2008 15

2009 16

2010 17

Mission 17

1975 17

1995 18

1999 18

2000 18

2010 18
Training details 19
1975 19
2001 19
2010 20
PART II – Reporting and Analysis of all known OSB Operational Data 21
Introduction to OSB EA of 1978 21
Operations Data – Noise 22
1975 22
1977 22
1982 23
1990 23
1991 23
1994 23
1995 23
1998 24
2000 24
2001 24
2002 24
2003 25
2004 25
2005 25
2006 26
2007 26
2008 26
2009 26
2010 27

PART III – Safety Precautions Implemented for OSB 34

PART IV – Analysis of General United States Air Force (USAF) mishap data from as early as 1975 and a comparison to DMAFB-specific pertinent mishap data 35

Analysis 36

Class A Mishap rate per flying hour multiplied by flying time (exposure time) = Risk Factor 37

Operation Snowbird Risk Factors by Aircraft Type 38

355th Wing Risk Factors by Aircraft Type 44

PART V – Based on available data, recommendations to mitigate perceived quality of life concerns of excessive noise from operations and safety concerns related to perceptions that pilots who temporarily train at DMAFB are properly following specific safety precautions 51

Summary 51

Findings 52

Recommendations 54

References 55

TABLES

Table 1 – USAF Mishap Data and DMAFB Mishap Data, 1975 – 2009 48

Table 2 – USAF Aircraft Participating in OSB, Mishap Rates, 1975 – 2009 49

Table 3 – RAF Aircraft Participating in OSB, Mishap Rates 50

Operation Snowbird Safety Procedures and Operational Study Services

Preliminary Study Report

In August 2009, Wyle was contracted by the US Air Force to conduct a study of the National Guard Bureau's Operational Snowbird program managed by the 162nd Fighter Wing at Davis-Monthan AFB and prepare a report. The purpose of the study, as defined in the statement of work, is to mitigate on-going public concern over Snowbird operations. The report is offered as a presentation of the facts for the readers – government and citizen alike—to consume. Wyle's vision is this report will facilitate the parties' dialogue in seeking a balance between safeguarding the mission and protecting the environment. The report is attached; it includes:

- PART I. Overview of OSB history, mission, and training details.
- PART II. Reporting and analysis of all known OSB operational data from as early as 1975 from available data to current. Data includes aircraft type, sorties, flying hours, flight tracks, noise contours, and reasons for any fluctuations, if provided.
- PART III. Safety precautions implemented for OSB.
- PART IV. Analysis of general United States Air Force (USAF) mishap data from as early as 1975 and a comparison to DMAFB-specific pertinent mishap data.
- PART V. Based on available data, recommendations to mitigate perceived quality of life concerns of excessive noise from operations and safety concerns related to perceptions that pilots who temporarily train at DMAFB are properly following specific safety precautions.

Introduction

The 162nd Fighter Wing (162 FW) Detachment 1 at Davis-Monthan AFB supports "Operation Snowbird", a National Guard Bureau program that has been in existence since 1975. The purpose of Operation Snowbird is to provide support for visiting flying units from the Air National Guard and other units from around the world looking to train and exercise in the optimal weather and flying conditions and ample ranges of Southern Arizona.

PART I – Overview of Operation Snowbird History, Mission and Training Details.

History

1972

The Air Force and Air National Guard Bureau were not able to provide documentation for the official activation or authorization of the Operation Snowbird program. In response to Wyle's requests, the Air National Guard History Office, wrote "We don't have a historical file on this important ANG Exercise.[i]" Wyle conducted research at the Air Force's Historical Studies Office at Bolling Air Force Base, Washington, DC. Wyle's research uncovered evidence Snowbird operations began in 1972. The following excerpt was found in Twelfth Air Force's official history: "Operation Snowbird began in 1972 as a series of limited winter deployments to Arizona for selected Tactical Air Command gained Air National Guard units. Air National Guard units from three locations in the U.S. deployed to Davis-Monthan to escape the adverse winter conditions which restrict unit training at their home bases. They travel[ed] as self-contained units with their own maintenance and support people. Davis-Monthan provided the equipment and facilities and support services to all the visiting Air National Guard Units.[ii]" Wyle's research also revealed Operation Snowbird had a humble beginning. According to an article in *El Tigre News,* the Snowbird operation, "...began as a small operations building and a vehicle maintenance shop on a dirt compound inside a chain link fence..."[iii]

The lack of official documentation suggests the program started in an informal and ad hoc manner. The lack of formal processes to stand up the unit is reflected in e-mail exchanges written in 2001. In April of that year, an e-mail was sent from National Guard Bureau Director of Programs (XP) to the National Guard Bureau Director of Operations (XO). It read, "I'm forwarding for DO [XO] action the Mission proposal by the State of Arizona to formalize the Snowbird Operations at DM, Arizona. As you remember by your participation, the Panel felt this was a day to day operations action and not a new mission. Although active for several years, the State still does not have a formal manning document establishing the unit which they are proposing as a detachment.[iv]" The e-mail went on to state, "The state submitted a very comprehensive review of the current snowbird operation and their recommendation to formalize this action. Key aspect is to validate the requirement for the snowbird function and corresponding[ly] develop a manning document to meet that requirement." Two months later, in June, the then Operation Snowbird commander wrote the following to the Air National Guard Bureau: "I would look forward to an audit, SATAF, or any other vehicle that will help formalize a mission that has been taking place since 1975.[v]"

Also in 1972, [redacted], a civilian living in Tucson, begins writing federal, state and local officials regarding the "noise and warning of the potential danger of the approach to Davis-Monthan.[vi]"

1975

Based on a number of articles, Operation Snowbird's ad hoc status gave place to an official status in 1975. A 2001 memorandum to the Air National Guard Bureau speaks to an "official" start date; it read, "Snowbird has been in operation (officially), since 1975[vii]. Again, in a 2010 PowerPoint briefing on the unit's mission, on a slide titled "History," a bullet states the unit was, "Established in 1975[viii]." Lastly, Wyle found the following reference in the Official History of the 162d Fighter Wing: "The 162 Fighter Wing Operation Snow Bird, a deployment support facility located at Davis-Monthan AFB, operated for the Air National Guard Executive Operations Director. Officially in operation since 1975, it was originally set up at the request of National Guard Bureau to provide northern-tier Air National Guard units a place to train during the winter months when their units were essentially locked in by inclement weather."

1978

23 September 1978, Headquarters Tactical Air Command, Langley Air Force Base, Virginia published an Environmental Assessment for Air National Guard (ANG) Snowbird Operation.

According to the Environmental Protection Agency's website, "The NEPA [National Environmental Policy Act] process consists of an evaluation of the environmental effects of a federal undertaking including its alternatives. There are three levels of analysis depending on whether or not an undertaking could significantly affect the environment. These three levels include: categorical exclusion determination; preparation of an environmental assessment/finding of no significant impact (EA/FONSI); and preparation of an environmental impact statement (EIS).

At the first level, an undertaking may be categorically excluded from a detailed environmental analysis if it meets certain criteria which a federal agency has previously determined as having no significant environmental impact.

At the second level of analysis, a federal agency prepares a written environmental assessment (EA) to determine whether or not a federal undertaking would significantly affect the environment. If the answer is no, the agency issues a finding of no significant impact (FONSI). The FONSI may address measures which an agency will take to reduce (mitigate) potentially significant impacts. An EA describes and identifies the following:

- Purpose and need for the proposed action.
- Proposed action.
- Alternatives considered (including the "no action" alternative).
- Affected environment (including baseline conditions).
- Environmental consequences of the proposed action and alternatives.
- Agencies and persons consulted.
- Where mitigation is required, any mechanism (for example, special grant conditions) needed to ensure that mitigation is carried out.

If the EA determines that the environmental consequences of a proposed federal undertaking may be significant, an EIS is prepared. An EIS is a more detailed evaluation of the proposed action and alternatives. The public, other federal agencies and outside parties may provide input into the preparation of an EIS and then comment on the draft EIS when it is completed.[ix]"

26 October 1978, an A-7D assigned to the 355th Tactical Fighter Wing crashed short of the airfield when its engine failed while on approach to Davis-Monthan AFB. The pilot ejected and the aircraft crashed into a neighborhood killing two people.

28 October 1978. [redacted] writes a letter to President Carter concerning the 26 October 1978 mishap.

16 November 1978. In its reply to [redacted], in a letter approved by the White House, the Department of the Air Force stated: "We are continually trying, through operational analyses and cooperative land-use planning, to reduce the risk to the absolute minimum. A number of actions are currently being implemented or are being considered at Davis-Monthan in an effort to reduce the potential for a similar accident in the future:

- The conversion from the A-7 to the A-10 is already underway and will be completed by mid-1979.
- Work with the Federal Aviation Administration (FAA) will continue to insure that air traffic in the Tucson Control Zone minimizes activity over urban areas.
- Use of other airfields in the local area for practice instrument approaches will increase.
- Working with Tucson International Airport (TIA) and the FAA, we are evaluating a 50% reduction of practice instrument approaches to runway 12 by Davis-Monthan assigned aircraft.
- We are looking into doing more training at satellite fields which would not necessitate landings and takeoffs.
- We will continue to work with local authorities to encourage compatible land use planning.
- Several other possible solutions are being explored.
- Change the runway headings. Essentially, there are two parallel runways in the control zones – one at Davis-Monthan and another at Tucson International Airport. Reorientation may be feasible; however, it is likely to result in an impact on other sections of the city.
- Reduce the Air National Guard activity at Davis-Monthan. We will explore the possibility of alternate sites and limiting the use of Davis-Monthan to Air National Guard aircraft that are similar to those stationed at Davis-Monthan and would be compatible with Davis-Monthan operations. The letter closed by saying, "Please be assured that we are concerned about this problem and are working to minimize it within our capabilities. The actions addressed above are being evaluated and/or implemented by Davis-Monthan officials. We sincerely appreciate your interest and are hopeful that you will continue to work with local civilian and Air Force officials on this matter. "

1979

According to the History of Twelfth Air Force, "One ARF [air reserve forces] problem developed in 1979 over Operation Snowbird. Under this program, northern tier based ARF units received two weeks of winter training at Davis-Monthan AFB in Arizona. The opposition was based upon a claim of overcrowded air space in the Tucson area, and this opposition was undoubtedly strengthened by memories of a 1978 crash of an A-7 in Tucson which had killed two women."

The History goes on to say, "As early as 3 October 1979, the National Guard Bureau found it necessary to deny rumors that the Fiscal Year 1980 Snowbird program was being changed." It

added, “By 9 October 1979, however, Twelfth Air Force was in fact offering alternative sites to Tactical Air Command. During a 30 October 1979 meeting at the Air National Guard Support Center at Andrews Air Force Base, there was established a revised Snowbird program which moved a number of units to two other Twelfth Air Forces bases—George and Luke. This solution reduced the number of Snowbird aircraft at Davis-Monthan by 30%. In addition, by substituting two A-10 units for A-7 units, it reduced the number of participating A-7 units from five to three, thus affording the local citizenry the additional security of two-engine planes overhead. This solution received a favorable reaction from the local press.[x]”

31 March 1979, the University of Arizona released a report titled, “Air Traffic.” The report noted, “The diversity of public attitudes in Tucson regarding DMAFB's presence and activities is impressive. It appears that the central and most common position is the realistic perception that the presence of DMAFB has a risk-benefit tradeoff.” The report later said, “We believe that the risk side of the relation has increased to an unacceptable level, and some reasonable degree of reduction in risk is called for.” It went on to say, “The reduction of risk is an apparent common objective of all participants in the planning of revised procedures. However, one notes the absence of a unanimously acceptable, quantitative definition of "risk."

“In summary, it is clear that revised procedures, practices, and facilities must be developed in order to reduce both risk and annoyance for the-residents of Tucson while still allowing the basic missions of DMAFB and TIA to be accomplished successfully. It is also clear that the impetus for development of these revisions came only as a result of public clamor following an urban accident. One cannot escape the conclusion that, in the absence of some sustained external force favoring minimum public risk, air traffic practices that are not maximally oriented to the public safety and comfort will once again evolve. It is predictable that public outcry will arise whenever an accident impacts the urban area. All concerned might be better served if procedural matters were routinely subjected to quantitative urban risk analysis and a history of risk exposure values recorded. Then, even in the emotional climate following an accident, quantitative comparison of present and past values of risk exposure could be made. Again, determining an acceptable definition of risk and a method for calculating risk exposure would appear attractive and useable.” The report concluded:

A vocal minority of the community holds the view that DMAFB should cease operations.

A large majority of observers believes that DMAFB can carry out its training mission and substantially reduce military air traffic over the more densely populated parts of the city, especially the low-altitude, high-noise-level traffic. The committee, after an examination of the facts, holds this view. Operation in this manner would be seen by most as a satisfactory solution to the problem of living with an active Air Force Training Base in the corner of one's community. Several other things seem quite clear.

First, increasing urban encroachment upon the DMAFB environs has reached a level which makes the fighter pilot training mission incompatible with acceptable levels of risk if-the activity were to be continued at the DMAFB field exclusively. This constraint upon DMAFB's utility will predictably become worse, not better. At best, the trend may be decelerated only. The participation by city and county governments in a continued IAWG might prompt beneficial action by their respective Planning Departments.

Second, the satisfactory solution referred to above can be accomplished by implementation of the practices, and procedures enumerated in the Recommendations section (below).

Third, when forced by circumstance (e.g., public pressure), the seemingly undesirable or impossible can become workable. An example is the now-proposed greater use of Redington Pass as a flight route into and out of the Tucson valley for military aircraft.

Fourth, sustained minimization of risk for Tucson citizens will require two things; a) a broader view of what constitutes risk, *i.e.,* one more inclusive than the now dominant concern for aircraft separation, and b) the establishment of some permanent mechanism (e.g., the IAWG) to maintain a current quantitative assessment of risk level as time passes and operations change in the long term.[xi]"

1988-1992

The type of aircraft flying in Operation Snowbird converted from F-100 and A-7 to F-16 during this period[xii].

1992

An Air Installation Compatible Use Zone (AICUZ) Study for Davis-Monthan Air Force Base was published. The AICUZ was an evaluation of aircraft noise and accident potential related to U.S. Air Force (USAF) flying operations. On page 32 of the 1992 AICUZ, the Air Force defined its responsibilities:

"In general, the Air Force perceives its AICUZ responsibilities as falling with the areas of flying safety, noise abatement, and participation in the land use planning process.[xiii]"

1995

Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for Expansion of National Guard Facilities at Davis-Monthan AFB. According to the FONSI documentation, "The Air Force, in conjunction with the ANG, proposes to construct additional facilities to supplement its existing compound in support of the ANG Snowbird Deployments. The additions will support personnel deployment and include both temporary and permanent facilities. The upgrade involves construction of a modular building of 5,200 square feet for use as an interim facility, pending completion of a permanent, 10,400 square [foot] facility. Two asphalt parking lots, approximately 25,000 and 45,000 square feet, will be constructed to accommodate vehicles for military and civilian deployment personnel. No additional aircraft or flying hours are associated with the proposed action.[xiv]" The EA package contained a memorandum; its subject was "Number of Snowbird." It addressed Snowbird operations. The memorandum's second and third paragraphs are as follows:

"2. The first year for Snowbird deployments was 1975. Fifteen units deployed that year. The number of Air National Guard units deploying to Davis-Monthan each year has always been between 13 and 15. There has been no indication from the National Guard Bureau that this number will change in the next three years."

3. The facilities for operations and maintenance at Snowbird were built to accommodate the 50 to 85 TDY [temporary duty] personnel associated with the F-100 and A-7 deployments. The F-16

deployment size is usually around 150 personnel because of the increased complexity of the aircraft. The total number of aircraft deployed to Snowbird and the number of flying hours has not changed. The facilities need to be upgraded to support the additional personnel that deploy with the aircraft.[xv]"

The EA's "Purpose and Need" were as follows: "The ANG has undertaken the Snowbird program providing tactical aircrew training for northern tier units that are weather restricted. Facilities are required for operations, aircrews, and support personnel to conduct exercises and operations. These include combat proficiency of air-to-air with dissimilar aircraft and air-to-ground. Snowbird has been ongoing since 1975, though the type of aircraft used were converted from F-100 and A-7 to F-16 during the period 1988 to 1992; numbers of aircraft, sorties, and flying time has remained virtually constant since the program's inception. Snowbird has had adequate ground support through use of DMAFB blgs [buildings] 1711, 1712, and 4414. However, bldg 4414 is no longer available to the ANG. Bldg 1712 is undersized and marginally able to support a single Snowbird unit deployment. Some 140 members of the ANG, which had been assigned to bldg 4414 during the period from October through May, require additional space since bldg 1712 is already crowded with 140 members present. The proposed additions in the vicinity of bldg. 1712 are for administrative facilities only."

Upgrade of facility is significant to national security, the primary function of the ANG and USAF.[xvi]"

1995 EA Conclusion. "Based on the findings of the Environmental Assessment, Expansion of the Air National Guard Facility, and adherence to standard operating procedures with regard to site preparation and construction, operation and maintenance, no significant impacts are expected from the proposed action. Further, the action does not constitute a major federal action of significant magnitude to warrant preparation of an Environmental Impact Statement. Issuance of a Finding of No Significant Impact (FONSI) is thus warranted.[xvii]"

1998

Twenty years after the 26 October 1978 355th Tactical Fighter Wing 'A-7 Mishap, the Tucson Monthly, October 1998, published an article in which the author graphically described the mishap sequence and the resulting deaths .[xviii]"

1999

Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for Expansion of National Guard Facilities at Davis-Monthan AFB. According to the FONSI documentation, "The ANG will construct a dormitory complex for 120 personnel, a 2,500 square foot permanent party facility, and a 2,400 square foot maintenance facility to complement its existing compound, as permitted by the US Air Force.[xix]" The EA described the purpose and need for the above expansion project as follows: "The Arizona Air National Guard (ANG) is also referred to as the 162nd Fighter Wing, and is sometimes informally known as the Snowbird program since units from the northern tier visit during the winter months for training. The ANG, under an outgrant with the USAF, proposes to expand its existing facilities at DMAFB. The new additions will include a dormitory, a permanent party facility, and a maintenance facility."

"The ANG has been undertaking the Snowbird program since 1995 when several facilities were constructed. However, the success of the program is making additional facilities necessary for its continued operation. Specifically, dormitory space for 120 additional personnel is needed along with a maintenance facility of 2,400 square feet, and a permanent party facility of 2,500 square feet.

Upgrade of the facility is significant to national security, the primary function of the ANG and USAF.[xx]"

1999 EA Conclusion: "Based on the findings of the "Environmental Assessment, Expansion of the Air National Guard Facility, Davis-Monthan A.F.B. (1995), and adherence to standard operating procedures with regard to site preparation and construction, operation, and maintenance, no significant impacts are expected from the proposed action. An issuance of a Finding of No Significant Impact (FONSI) is thus warranted. This action does not constitute a major federal action of significant magnitude to warrant preparation of an Environmental Impact Statement.[xxi]"

2000

According to a Talking Paper on "GSU Status for Operation Snowbird" written by the Operation Snowbird commander, [redacted], 5 November 2000, the "AEF [air expeditionary forces] has resulted in dramatic growth at "Operation Snowbird" and change in mission emphasis over past five years.[xxii]" He added the following bullets:

"-- No longer just a winter-basing site for Northern tier flying units

--- "Spin up" for real world deployments takes place at Snowbird year-round

--- "Paying customers" include USMC, USN, AFRES, USAF, RAF and GAF".

2001

The unit was approved status as Detachment 1, Arizona Air National Guard. During this year, it was reported by the Air National Guard Bureau, "Snowbird is manned by 25 individuals (mixture of full-time and traditional on Special Training days), out-of-hide from the 162d FW.[xxiii]" In a memorandum to the Air National Guard Bureau, the following was noted:

"- Snowbird is in a building and growth period

-- Early on, they were a 6-month operation during winter months—out-of-hide from the 162 Fighter Wing.

-- Their schedule now shows full 12-month operation. Their operational focus is still 6-month winter training (sortie generation) for fighter wings, however, during their off-season months, they host non-fighter units, non-flying units, Air Force, Air Force Reserve, foreign Air Forces, Marine Corps, Navy, AATC, and AATTC.

-- By the end of September, they will move into a new Operations building.

-- Currently one dedicated dorm (60 rooms, 120 beds). When built (date TBD) four new dormitory buildings will have 156 rooms. Davis-Monthan has signed over land near Snowbird Operations site for new dormitory facilities.

-- Other initiatives include increased ramp space, fuels, and munitions facilities.[xxiv]

2002

An article published in El Tigre in March 2002 titled, "The Torch Passes at Snowbird to Pilot," described the growth of Operation Snowbird: "The Operation Snowbird that Wilper commands today boasts facilities for the largely self-contained operation of two simultaneous fighter squadron deployments." Originally opened for Air National Guard annual training deployments for fighter units during winter months, Snowbird now hosts both Air Reserve Force and active duty units from all branches of the military on a year-round basis. Each flying unit brings about 12 aircraft and 150 people. During two week deployment, they will typically fly 200 sorties and drop their annual allotment of ordnance. Pilots typically use the deployment to attain proficiency and currency with live munitions. The Snowbird ramp can hold up to 50 fighter aircraft.[xxv]"

2004

Air National Guard established a manning document for Operation Snowbird.[xxvi]

November 2004, Davis-Monthan AFB, Tucson, Pima County Joint Land Use Study (JLUS) published. "The Arizona Department of Commerce (ADOC) completed a Davis-Monthan Air Force Base/Tucson/Pima County Joint Land Use Study (JLUS) in February 2004. The City of Tucson adopted the recommendations from the JLUS into its land use ordinances in October 2004. Pima County also adopted the JLUS recommendations into its zoning ordinances in December 2008."[xxvii]

2005

26 January 2005, [redacted] sent a letter to Dr. James G. Roche, Secretary of the Air Force regarding military training. He wrote, "The situation has been worsened as a result of recent action of the Tucson City Council which would result in the construction of thousands of new homes in the south east flight path of DM, thereby completely encircling the base with urban landscape. In addition it is reported that there will be a new generation of planes coming in, even noisier than those now at the base."

"Recently, representatives of at least seven neighborhood associations in the central city have been meeting to exchange ideas about the problem. These neighborhoods were excluded from the Joint Land Use Study (JLUS) even though they are severely impacted by the DM flights. Tucson is the only urban area of its size in the country over which military low altitude training flights occur almost daily. The health and safety problems are obviously of great concern to all of us, not merely those who live in the central and southeast parts of the city but to all who frequent the Campus or other places in the central city."

"We do not ask for closure of the base, but for a reasonable program of mitigation of the problem, so that the city and DM may live together harmoniously and safely. The letter from the Air Force to [redacted] in 1978 after the tragic crash that year illustrates a constructive response to the problem. The actions of the base at that time were very helpful, but unfortunately with the passage of time, these improvements were not sustained and the situation today is potentially worse.[xxviii]"

2007

An Air Installation Compatible Use Zone (AICUZ) Study for Davis-Monthan Air Force Base was initiated to update the 1992 AICUZ Study. In the Draft report, regarding Snowbird Operations, the AICUZ reported: "Operation Snowbird is a National Guard Bureau program that trains at Davis-Monthan AFB and is supported through the 162d Fighter Wing (162 FW). The Arizona Air National Guard (ANG) base in Tucson, next to TIA, is the headquarters of the 162 FW. The AICUZ reported the types of aircraft flown during Operation Snowbird were: A-10, F-15, F-16, and GR-4 aircraft. It added, Snowbird operations are flown year round.[xxix]" The AICUZ was delayed due to contract problems as well as fighter wing deployments.

355th Wing Commander implemented additional flight safety and noise abatement procedures, the actions included:

1. Overhead pattern changed to keep aircraft 86% higher over populated areas
2. Aircraft remain 56% higher until within 3 miles from north end of runway
3. New procedures published for local and transient aircraft
4. Visual approaches no longer conducted from the North, only instrument approaches are authorized from the North
5. Helicopter departures re-routed over less populated areas
    a. Raised altitude to 800' feet (60% increase)
    b. New published procedure: "Depart helo pad and fly perpendicular to Rwy 12, to cross the extended runway centerline with in the airfield boundary (approx 210 degree heading). Fly this heading until intercept I-10. Fly I-10 until abeam A Mountain, then proceed on course."
6. Added procedures requiring that night departures and arrivals be conducted to the southeast to the maximum extent possible. During transition from day to night flying, the SOF will facilitate RWY 12 departures and RWY 30 recoveries when possible
7. Published guidance to ensure missions are planned using other airfields for practice approaches to the maximum extent possible. Majority of required practice approaches now occur at airfields other than Davis-Monthan AFB
    a. Fort Huachuca
    b. Gila Bend
8. Published guidance requiring that noise and safety factors be examined when significant changes to flight operations are considered. These factors will be formally reviewed during the quarterly DMAFB Air Operations Board.
9. The 355th Fighter Wing will use the MCRC and other media to publicize significant changes to flight operations
10. Revamped website to be more comprehensive and user-friendly with direct links to a calendar, FAQs, maps, other relevant websites.
    a. Provided a form for submitting comments/questions
    b. DMAFB link is www.dm.af.mil
11. Increased interaction with local media, city, county, state, and federal leadership with regard to the MCRC process
    a. Published all D-M press releases on the website
    b. Engaged Tucson Chamber of Commerce, City Council, Rotary, U of A, TUSD, neighborhoods, and a host of other functions as a community partner
12. Supported Creation of MCRC
    a. Actions:Bring together Davis-Monthan AFB, the City of Tucson, Pima County, business and neighborhood interests, and other associations
    b. Monitor MC3 recommendation implementation
    c. Share information
    d. Collaborate for mutually satisfactory solutions

14 November 2008 – DMAFB Environmental Protection Committee recommends Environmental Assessment be prepared.

17 November 2008 – 355 CES/CE-2 prepared an AF Form 813"Request for Environmental Impact Analysis," entitled "Evaluation of visiting aircraft and Operation Snowbird at Davis-Monthan AFB." It was determined that the proposed action did not qualify for a CATEX and that an EA was to be prepared by a private environmental consulting contractor. DMAFB sent the signed Air Force Form IMT 813, and draft Statement of Work, to Headquarters Air Combat Command. The continuation sheet for the Air Force Form IMT 813 stated the following:

"4.0 Purpose and Need for Action

4.1 Purpose of the Action

The purpose of Operation Snowbird is to provide support for visiting flying units from Air National Guard units and other units from around the world looking to train in the optimal weather conditions and ample ranges of Southern Arizona.

4.2 Need for Action

The ANG has utilized DMAFB for cold weather maneuvers for units from other states for over 20 years, often called "snowbird" operations. For c.y. [calendar year] 2007, some 48 F-16 aircraft conducted 832 sorties totaling 1165 hours, 24 A-10 aircraft conducted 287 sorties totaling 486.8 hours, and 9 GR-4 aircraft conducted 123 sorties for 158.5 hours. These figures were approximately 5% of the total number of flights and hours by all aircraft at DMAFB. These figures have been stable in recent years.

5.0 Description of the Proposed Action

The proposed action is to continue Snowbird Operations at Davis-Monthan AFB (ACC), Arizona.

5.2 Description of Alternatives

5.2.1 Alternative A: Relocate Snowbird operations to another USAF facility

5.2.2 Alternative B: Relocate Snowbird operations to Tucson International Airport where the ANG has existing facilities.

5.2.3 No Action. Since Snowbird is ongoing, No Action could be construed as simply allowing it to continue.

5.3 Anticipated Environmental Impact

Expect no adverse impact on the current environment.[xxx]"

20 November 2008, [redacted] sent a letter to the Secretary of Defense, The Honorable Robert M. Gates; she also courtesy copied Senator Jon Kyl. [redacted] letter was signed by 478 citizens of Tucson, Arizona who were concerned about their safety and quality of life due to Operation Snowbird aircraft[xxxi].

4 December 2008, Senator Kyl sent a letter to Colonel Michael Chandler of the Air Force Senate Liaison Office. Senator Kyl enclosed [redacted] letter and stated, "The enclosed information is sent for your consideration. Please forward to me the necessary information for response to my constituent, [redacted].[xxxii]"

6 March 2009, Lt Gen Harry M. Wyatt III, Director, Air National Guard responded to [redacted] 2008 letter; General Wyatt sent his letter to Senator Kyl. General Wyatt's letter addressed "the safety and quality of life concerns of the citizens of Tucson, regarding the Snowbird Program based at Davis-Monthan Air Force Base (DMAFB).[xxxiii]" Among his statements are the following:

"Snowbird has an impeccable safety record and has not had an aircraft loss since its inception in 1975."

"Snowbird is home to major national and international exercises. It averages 1,500-2,000 sorties per year and since September 11, 2001, has provided pre-deployment training for more than fifty units who subsequently deployed to combat operations around the world."

"Although a DMAFB-conducted Environmental Impact Study (EIS) of the Snowbird facilities resulted in no significant findings, an EIS on the noise generated by aircraft operating out of Snowbird is scheduled for late 2009 and will be made available to the Military Community Relations Committee.[xxxiv]"

25 March 2009, [redacted] sent a letter to Senator Kyl; her letter responded to Lt Gen Wyatt's 6 March letter. The letter states, General Wyatt's letter was very nice and we do appreciate his commitment to work diligently to improve safety and quality-of-life concerns of the Tucson community. Unfortunately, the General appears to have missed the point of our letter." The letter requests: "We therefore ask your help in having a relatively independent agency such as the DOD Inspector General, review the situation here and have the Secretary's staff sign off on the report.[xxxv]"

7 May 2009, Lieutenant Colonel Marvin T. Baugh (Deputy Chief, Programs Division and Legislative Division, Office of Legislation, Office of the Secretary of the Air Force) responded to [redacted] March 2009 letter; Colonel Baugh sent his letter to Senator Kyl. Colonel Baugh claimed, "Over the past several years, the size, number and type of flight operations making up Operation Snowbird have not changed enough to trigger a separate environmental analysis on these transient operations. Operations Snowbird flight operations make up between five and seven percent of the total flight operations at Davis-Monthan AFB. Colonel Baugh also wrote, "The Air Force places great importance on being a good neighbor with nearby communities and in this light, Davis-Monthan AFB, along with the Air National Guard, are already taking the necessary steps to carry out a study of the flight operations associated with Operation Snowbird to validate the statements and concerns raised by [redacted] and other members of the Tucson community.[xxxvi]"

26 May 2009, [redacted] sent a letter to Senator Kyl; her letter responded to Colonel Baugh's 7 May letter. She wrote, "We were pleased, and pleasantly surprised, to see that this time Colonel Baugh did begin to answer our original letter by stating the Air Force would conduct a study of the impact of Snowbird aircraft on Tucson residents. This study comes after 3 years of strenuous denial of any impact of the revised Snowbird Program on the City of Tucson. The letter continued, "An independent study is the first step. There are two additional issues that remain to be addressed. The Air Force itself recognized the over-flight safety problem in Tucson following the DM crash in 1978 near the University of Arizona when it advised the community that the A-10 would replace the A-7 and promised to look into limiting future ANG aircraft assignments to DM. She added, "Lastly, the Neighborhoods have made several suggestions, e.g., that high-risk and noisier Snowbird aircraft be sent to less-encroached nearby fields such as the Yuma Marine Harrier Base or the Gila Bend Air Force Auxiliary Field. Both of these are significantly closer to the critical Barry Goldwater Range than Davis-Monthan AFB."[xxxvii]"

29 May 2009 – DMAFB published Sources Sought for Operations Snowbird Safety Procedures and Operational Study Services.

21 July 2009 – DMAFB published Solicitation for Operations Snowbird Safety Procedures and Operational Study Services.

18 August 2009 – Operations Snowbird Safety Procedures and Operational Study Services contract awarded to Wyle.

10 September 2009, Mr. Michael A. Fleishman, on behalf of his clients, sent a letter to the Secretary of Defense, The Honorable Robert M. Gates. Mr. Fleishman's letter referred to [redacted] 2008 letter. The letter was concerned with "increased safety risks and noise concerns related to the Operation Snowbird program based at Davis-Monthan Air Force Base in Tucson, Arizona. Mr. Fleishman's letter echoed several of [redacted] points. For example, he said, "The Air Force promised in its 1978 letter to the Tucson community that the conversion from single engine A-7s to dual engine A-10s would be completed at the Base over the course of the following year. In addition, the letter discussed reducing Air National Guard activity at the Base by limiting the use of ANG aircraft to those similar to the Air Force aircraft stationed at the Base (e.g., the A-10s)." He added, "The revamping and expansion of the Program is contrary to the assurances given in the Air Force's 1978 letter. The expansion is also contrary to the current AICUZ, completed in 1992."

Mr. Fleishman quoted a base representative as saying, "The Air Force operations, maintenance, and safety processes all strive to minimize risk but we'll never make it zero." Mr. Fleishman added, "Because the base has experienced severe encroachment by heavily populated neighborhoods and such accident will undoubtedly be catastrophic, as was the accident in 1978. The Air Force recognized the risk at that time and assured the Tucson community that it was committed to limiting future risks. Nonetheless, the revamped Program has increased the risk by bringing in aging aircraft, often non-USAF aircraft ,whose maintenance history and problems are unknown to the Program's operations personnel and whose pilots (foreign and US) do not know Tucson airspace. [xxxviii]"

October 2009 – DMAFB officials working with Air Combat Command officials decided to postpone release of a new AICUZ study scheduled to be released in November 2009, pending release of this study. According to officials at Davis-Monthan, the Draft 2009 AICUZ was initially delayed due to contract problems and the delay was exacerbated by fighter wing deployments of key personnel. In the end, due to the significant delays in its release, the 2009 AICUZ (2007 data) will require revalidation to current Davis-Monthan operations prior to release.

2010

Operation Snowbird has been in operation for 25+ years; its assets include the following:

- Four acre compound.
- Ramp space for 38 fighters / 12 sunshades.
- 15,000SQ feet of facilities.
- Use of Live Load Area (LOLA).
- Dedicated weapons storage.
- Operation Snowbird's mission and operations will be discussed in the next two sections.

Mission

1975

Operation Snowbird's original mission, as described in the 23 September 1978 Environmental Assessment (EA), was: "During the inclement winter months in the northeastern portions of the United States, Air National Guard units flying tactical aircraft are not able to conduct Tactical Air Command required training, jeopardizing operational readiness. The southwestern portions of the United States suffer from no inclement weather to speak of, and offer the capability for daily flying

on an almost uninterrupted basis. Tactical ranges and low level flying operations can be conducted with few restraints. Therefore, Operation Snowbird was developed to enable northeastern Air National Guard units to deploy to Davis-Monthan AFB, AZ, with sufficient equipment and personnel to conduct deployed tactical training/operational readiness inspections for two week periods basically between the months of January thru April." [xxxix]

1995

Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for Expansion of National Guard Facilities at Davis-Monthan AFB. The EA's "Purpose and Need" were as follows: "The ANG has undertaken the Snowbird program providing tactical aircrew training for northern tier units that are weather restricted. Facilities are required for operations, aircrews, and support personnel to conduct exercises and operations. These include combat proficiency of air-to-air with dissimilar aircraft and air-to-ground. Snowbird has been ongoing since 1975, though the type of aircraft used were converted from F-100 and A-7 to F-16 during the period 1988 to 1992; numbers of aircraft, sorties, and flying time has remained virtually constant since the program's inception.[xl]"

1999

Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for Expansion of National Guard Facilities at Davis-Monthan AFB. The 1999 EA described the expansion of the program: "...the success of the program is making additional facilities necessary for its continued operation..[xli]"

2000

[redacted], 5 November 2000, wrote the "AEF [air expeditionary forces] has resulted in dramatic growth at "Operation Snowbird" and change in mission emphasis over past five years.[xlii]" He added the following bullets regarding Operation Snowbird's mission:

"-- No longer just a winter-basing site for Northern tier flying units

--- "Spin up" for real world deployments takes place at Snowbird year-round

--- "Paying customers" include USMC, USN, AFRES, USAF, RAF and GAF"

2010

According to a 2010 Operation Snowbird unit mission brief, mission goals include:

- SUPPORT THE WAR EFFORT
- Maximize "AOR LIKE" training for flying units pre-deployment to Theater
- Irregular Warfare Center of Excellence

The final slide describes Operation Snowbird as: "a tremendous ANG asset on ANG real estate providing some of the best "unit tailored" pre-deployment training in the world."[xliii]

The 162d Fighter Wing's website describes Operation Snowbird as, "a National Guard Bureau program located at D-M established in 1975 as a winter deployment site for northern tier ANG flying bases. Six to 12 squadrons deploy for two weeks of training between the months of November through April each year. Each deployment package consists of 24 pilots and 116 support personnel. Ten people from the 162nd FW are assigned as permanent party. Located on four acres of property adjacent to the

north ramp, the compound consists of an operations complex, a maintenance control complex, and a support facility. "[xliv]

Wyle asked the Air National Guard Bureau for their "corporate view' of Operation Snowbird's mission. The Air National Guard's answer was, "See Memo (dated 06 Mar 09) from NGB/CF, Gen Wyatt to Senator Kyle regarding OSB..."[xlv] Gen Wyatt, in his 6 March 2009 letter to Senator Kyl, described Operation Snowbird as follows: "Snowbird is home to major national and international exercises. It averages 1,500-2,000 sorties per year and since September 11, 2001, has provided pre-deployment training for more than fifty units who subsequently deployed to combat operations around the world. Snowbird is an indispensible resource in the Global War on Terror and absolutely vital to our Air Force's combat readiness.[xlvi]"

The most recent and authoritative statement of the unit's mission, as of 14 April 2010, according to the National Guard Bureau, is to:

a. Facilitate leading edge world class aviation training for US and allied forces for irregular warfare, deployment spin-up, and military exercises/inspections through continuous improvement of training opportunities based on the lessons learned from current military conflicts.
b. Become the Irregular Warfare Center of Excellence for the Air National Guard
c. Provide access to a multiple realistic live and inert targets arrays on the Barry Goldwater Ranges
d. Allow access to the Link 16 and Gateway DATA link architecture in the Southwest US
e. Support US Military exercises and conferences by providing a quality facility[xlvii]

Training Details

1975

Operation Snowbird's original training charter was described in the 23 September 1978 Environmental Assessment (EA). It broadly described training as, "During the inclement winter months in the northeastern portions of the United States, Air National Guard units flying tactical aircraft are not able to conduct Tactical Air Command required training, jeopardizing operational readiness. The EA went on to say, "Therefore, Operation Snowbird was developed to enable northeastern Air National Guard units to deploy to Davis-Monthan AFB, AZ, with sufficient equipment and personnel to conduct deployed tactical training/operational readiness inspections for two week periods basically between the months of January thru April.[xlviii]"

2001

10 September 2001 Air National Guard memorandum described specific Operation Snowbird training areas as: "Snowbird allows ANG Fighter Wings use of the Air Force tactical range complex for.

1. Air-to-Air;
2. Air-to-Ground;
3. Low level routes;
4. Live fire (missiles, rockets, and bombs);
5. Combat search and rescue;
6. Large Force Exercises;
7. Night vision goggle training; and
8. Precision-guided munitions delivery[xlix]".

2010

According to the 2010 unit mission brief, the training is geared to preparing units for war and unique to each deployed unit. The mission brief describes Operation Snowbird's training as: "…unit tailored, pre-deployment training…" It also included the following descriptions: "Maximize "AOR LIKE" training for flying units pre-deployment to Theater.[l]"

In January 2010, Wyle asked the Air National Guard Bureau what documentation they had regarding Operation Snowbird's training details. The Air National Guard's answer was, "Operation Snowbird has evolved over the years pretty much on a self-governing operation. The units deploy to OSB with similar but different objectives in order to train and prepare for their individual needs."

Framing a question, Wyle stated, "Clearly, OSB's mission has changed." Wyle then asked, "Was the Air National Guard involved in the changes? Did you document the changes? Or did the changes occur in an evolutionary manner and no one noticed the small changes that occurred over three decades?" The Air National Guard answered as follows: "Changes in OSB's original mission statement, from my perspective (a little over a year in the job) was that of an evolutionary manner; as units deployed to SB to fill their training requirements, they added and subtracted mission sets in order to meet their new requirements in an ever-changing real time threat. Even though the training has changed from the pilot's perspective, the flying (admin of departing and arriving) remains the same (unchanged) to the local population in the fact they aren't considering what type of training is conducted, they just notice the airplanes and the by-product…noise."[li]

Wyle asked the Air National Guard, "How does Operation Snowbird support the ANG mission?" The Air National Guard answered, "Operation Snowbird supports the Air National Guard mission in a multitude of ways; for the Northern Tier units, Operation Snowbird provides a location where an unit can deploy for two weeks to in order to complete RAP [ready aircrew program] training requirements when it would be normally difficult to complete in the home inclement weather. This allows the units to train and complete their taskings which result in their C or Combat status. By maintaining the C status, they stay on track for their current AEF deployments and remain available for any unforeseen contingency operations, therefore increasing the ANG's ability to deploy to any contingency worldwide in support of the Active Duty.[lii]"

Wyle asked the Air National Guard, "How does Operation Snowbird support the war effort?" The Air National Guard answered: "Operation Snowbird supports the war effort by allowing units to "train to the fight" in an environment similar to the Area of Responsibility while being conducive to increased sortie generation as a byproduct of the predictable and excellent weather that the Tucson area provides. Air National Guard A-10 and F-16 units train to Close Air Support (CAS) scenarios that the United States is currently engaged in overseas like Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF)." Indeed, the unit's war-time training focus is written on its emblem, wrapped around top the Operation Snowbird patch are the words, "Train Like We Fight."

The Air National Guard offered the following illustration of Operation Snowbird's war-time training: "Here is an example of how Operation Snowbird supports the war effort; the 177 Fighter Wing is deploying in March 2010 to OIF (AEF 5/6). This exercise was last minute scheduled due to unit inspection requirements (ORI) in October of 2009 and was executed 3 months later to an incredible result:

177 Fighter Wing Snowbird results: 4 to 15 January 2010

- 109 sorties scheduled, flew 107 Continuation Training sorties (plus 2 incentive sorties)
  - 54 heavyweights employed
    - 34 GBU-12s and 20 GBU-38s
    - Approximately 5,500 round of 20mm Training Rounds
  - 18 pilots participated
    - 16 made RAP (achieved required training status)
    - 16 of 18 pilots dropped three heavy weights each (some dropped 4)

- 16 of 18 pilots executed high angle strafe with the new directed high angle strafe procedures
- 13 of 18 pilots high angle strafed the moving target on Range 3/Enlisted Terminal Area Controller"[liii].

In summary, Operation Snowbird's current mission, according to [redacted], OSB Commander, is to:

a. Manage a quality Air National Guard flying facility for units, other US services and International allies for Wartime Spin Up and Operational Readiness Inspections preparation
b. Provide access to a multiple realistic live and inert targets arrays on the Barry Goldwater Ranges
c. Allow access to the Link 16 and Gateway DATA link architecture in the Southwest US
d. Support US Military exercises and conferences by providing a quality facility

PART II – Reporting and Analysis of all known OSB Operational Data.

The purpose of this section is to:

1) Collect and analyze all known Operation Snowbird (OSB) operational data from as early as 1975 to current, and

2) Document changes that might affect perceived quality of life concerns due to excessive noise and safety concerns from OSB operations (Wyle SOW, 2009). This section is divided into the following sub-sections:

a. Introduction to the OSB Environmental Assessment (EA) of 1978.

b. Operations data for noise.

Specific years of OSB operations data are a mix of fiscal and calendar year timelines and are used interchangeably. Likewise, there are many disparate metrics and definitions used to define the operational data, thus there is often no "apples-to-apples" comparisons.

Introduction to OSB EA of 1978

The Formal Environmental Assessment (EA) for Air National Guard (ANG) Operation Snowbird was prepared for Davis-Monthan Air Force Base (DMAFB) 9 August 1978 (DMAFB, 1978). At the time of preparation, OSB was an "ongoing activity", but there is no date given at which OSB was actually initiated. Documentation from 162 CES/CEE, 15 Sep 95, states that OSB began in 1975.

In reality, the large majority of the impact assessment that was contained in the EA (e.g., air quality, water quality, noise, adverse environmental effects which cannot be avoided, relationship of local, short term use of man's environment and maintenance, enhancement of long term productivity, irreversible and irretrievable commitments of resources involved in the proposed action should it be implemented, considerations offsetting the adverse environmental effects and unresolved issues) dealt with existing OSB flight operations within the Military Training Routes and Military Operating Areas in the local flying area. Very little of the EA dealt with assessing the flight operations of the OSB aircraft flying within the DMAFB airspace, that is conducting arrival, departure and/or pattern operations.

The EA's Project Description section states that during the inclement winter months in the northeastern portions of the United States, ANG units flying tactical aircraft are not able to conduct

Tactical Air Command required training, jeopardizing operational readiness. Therefore, OSB was developed to enable northeastern ANG units to deploy to DMAFB with sufficient equipment and personnel to conduct deployed tactical training/operational readiness inspections for two week periods basically between the months of January thru April. Typically these units were planned to arrive on a weekend and be ready to fly the following Monday.

OSB units were envisioned to fly an average of twenty sorties a day during weekdays in both the A-7 and F-100 aircraft. It was projected that after FY79 the A-10 would replace the F-100. It was also envisioned that for eight weeks of the year, OSB would be supported by ANG O-2 observation aircraft operations, in addition to the fighter aircraft operations. The OSB aircraft were to make standard takeoffs and landings at DMAFB with no low approaches. Flying operations were to be conducted during normal duty hours from 0800-1700 local. Weekend flying was to consist of deployment and re-deployment of both fighter and support aircraft. Support aircraft were defined as C-130s, C-131s, and C-141s. The same Federal Aviation Administration (FAA) Air Traffic Control procedures were to govern the operations of OSB aircraft as they do aircraft assigned to DMAFB.

The EA anticipated an 18 percent increase in the Visual Flight Rule (VFR) traffic pattern operations by OSB aircraft on and in the vicinity of DMAFB. It was also anticipated that the increase would not include any low approaches or instrument flight practice nor transition training, and further that OSB aircraft would only insignificantly add to the overhead traffic pattern.

Operations Data – Noise

Any and all sources of documenting flight operations information were compiled into a spread sheet of relatively comparable data. As mentioned previously, while there are few examples of the same metrics used to describe the flight operations data from 1978 to the present, an attempt was made to categorize the data found. The absence of any information for specific years is indicative of the absence of available data. All the data made available to Wyle is contained in a table at the end of this section. The data spread sheet was used to develop the below word pictures, described by year.

1975

A 1995 document is quoted as saying that Snowbird has been ongoing since 1975, that 15 units deployed that year and that the types of aircraft used were the F-100 and A-7 which were later converted to F-16s.

1977

The 1978 EA states that OSB was developed to enable northeastern Air National Guard units to deploy to DMAFB to conduct deployed tactical training/operational readiness inspections for two weeks periodically basically between the months of January thru April. OSB units were projected to fly an average of 20 sorties a day during weekdays in A-7 and F-100 aircraft. The deployed aircraft were to make standard takeoffs and landings at DM with no low approaches planned. Those operations were projected to occur between 0800 and 1700 hours with weekend flying to consist of deployment/re-deployment of both fighters and support aircraft. An increase in air traffic of about 18% was projected to occur in the VFR traffic pattern and that increase did not include any low approaches or instrument flight practice or transition training.

1982

As reported on an Air Installation Compatible Use Zone (AICUZ) worksheet, 2 Apr 1982, A-7 assumed to be OSB aircraft, flew 537 sorties during February and March and included approximately one pattern per sortie, with half of the patterns being a closed pattern and the other half being radar patterns.

1990

As reported on an AICUZ worksheet, 4 Nov 1989, F-16s were added to the A-7 and A-10 mix of OSB aircraft, and each type of aircraft continued to fly closed patterns. There is no indication of how many total OSB operations were conducted that year; however, the "daily operations" data for A-10s showed a total of 2.962 operations, A-7 aircraft showed a total of 21.252 operations and F-16 aircraft showed a total of 6.322 daily operations.

1990

After contacting AFCEE/TDBS and requesting any AICUZ related information/data for DMAFB, [redacted] provided "some old NOISEMAP data files for Davis Monthan in our Bernoulli achieves. Most appear to be circa Nov 1989."

The OSB operations numbers reflect the very same aircraft and number of operations down to the decimal as the AICUZ worksheet, 4 Nov 1989. No additional information was gleaned from the AFCEE files.

1991

A revised AICUZ Report was approved 10 Jan 92. Contained in this report were OSB operations numbers from FY91; however, while it is stated that OSB conducted 34 average daily operations during the period 0600-2230 hours, the number of average busy days over which the data is calculated is not provided. Total OSB operations would be 34 average daily operations for 260 average busy days for a total of 8,840 OSB operations for the year. The report does confirm that OSB aircraft consisted of A-10s, F-16s, and A-7s.

1994

During the AICUZ revalidation process, 162 FG/SNOWBIRD provided actual and extrapolated data for FY94 OSB operations. In FY94 F-16 and A-10 aircraft flew 1780 sorties over a five month period which included only 90 flying days. No pattern operations were reportedly flown.

1995

In 1995 an EA and associated FONSI approved construction of additional facilities to supplement the existing compound in support of OSB operations. In the FONSI it is stated that "no additional aircraft or flying hours are associated with the proposed action." The EA acknowledges that while OSB aircraft have changed from F-100s and A-7s to F-16s, it proposes that the "…numbers of aircraft, sorties and flying time has remained virtually constant since the program's inception" although other documentation shows this to be incorrect.

1998

An EA and FONSI for construction of buildings to support the 162 FW, 15 Jun 99, states that "the addition of the facilities will allow 120 Air National Guard members to temporarily reside in the immediate area of their duty stations. These personnel will operate only during the period October through May under the Snowbird program."

This statement shows that by 1998 OSB is no longer a January through April operation but has expanded to eight months of operations annually from October through May.

2000

By FY00 OSB operations have expanded the mix of aircraft involved, now including the HH-60, F/A-18 and C-130, and also the expanded time period of the year when they would be deployed to DMAFB, now through the month of June. No information is available describing the number of sorties flown during 2000.

2001

During 2001 the F-15 is added to the mix of aircraft flying within the OSB program, and the time period expands to include July. The number of sorties flown is approximately 2077, and this is the first time the number of sorties is reasonably documented.

2002

Sources of data for 2002 are the OSB report and the 162FW/LNG FY02-FY05 OSB Master Schedule. While the original purpose statement for OSB was to deploy for two-week periods at a time during January through April, FY 2002 was the first year where OSB operations are documented in the OSB report to have occurred during all 12 calendar months of the year, beginning 9 Sep 01 and ending 30 Sep 02. OSB operations during 2002 also included two new types of aircraft to the OSB mix, the Royal Air Force GR-4 Tornado and the F-3. The number of sorties was not included in the data sheet, but a reasonable guess, based on a similar number of OSB aircraft participating over the year, would be 1600+ sorties.

The 162FW/LNG FY02-FY05 OSB Master Schedule reports the same number of deployments (16) as does the OSB report, but only one of the deployments is duplicated exactly as contained in the OSB report. Similar numbers of sorties and flight hours are reported by each.

As stated previously, the purpose and need statement for OSB has changed over the intervening years since 1978. Although no unbiased/independent source was located documenting such a change, a 25 Mar 2009 letter from [redacted] to the Honorable Jon Kyl states that in 2002 the type of training provided was changed from maintaining proficiency of winter-bound ANG units to pre-deployment combat training.

2003

Three sources provided data for 2003; the OSB report, the 162FW/LNG FY02-FY05 OSB Master Schedule and the Joint Land Use study. The OSB report included the number of foreign units flying OSB operations expanded to six, including the Royal Air Force (same as 2002), Royal Thai Air Force, German Air Force, and Italian Air Force. Operations were spread over 307 days, which are assumed to include all 12 months of the year, flying 2,135 sorties. No other useful details are provided.

The 162FW/LNG FY02-FY05 OSB Master Schedule includes the dates of deployments, aircraft types, sorties and hours flown and squadron identification. Deployment periods ranged from 3 to 36 days. Sortie counts were 2,198 accounting for 2,825 flight hours.

The Joint Land Use Study (JLUS) document contained NO DATA and continued to state "…OSB deploys six to twelve squadrons for two weeks of training each between the months of November and April each year." The JLUS also states that "in addition to missions flown by Davis-Monthan aircraft, Air National Guard unit, other active duty units and many foreign nations deploy to Davis-Monthan to accomplish their annual live-ordnance training requirements. Davis-Monthan's Operation Snowbird supports this needed training for the Air National Guard, nationwide."

Although the JLUS states that the most recent adopted AICUZ study was prepared in 2002, no such document was found.

2004

Two sources of data are available for 2004, the first being the OSB report and secondly 162FW/LNG FY02-FY05 OSB Master Schedule. The OSB report includes aircraft from the Royal Netherlands Air Force for the first time, in addition to the Royal Air Force aircraft from previous years. Also, for the first time, the P-3 Orion flew in the OSB mix of aircraft. The number of OSB days by units was 261 with an additional 58 days for logistics movement. This brings the total number of days of OSB operations to 319 consisting of 2,070 sorties. A large variety of transport aircraft types were documented in FY 2004 for OSB operations, to include C-130, KC-135, VC-10, DC-9, C-17, A310, B707, and B757.

The 162FW/LNG FY02-FY05 OSB Master Schedule provided similar data, but added details for the 13 documented deployments with beginning and ending dates of each deployment, unit names, type and number of aircraft and generally number of sorties and flight hours. Total sorties were 2,290 consisting of 3,187 flight hours.

2005

There are two sources of 2005 data; the first is the OSB report and the second is from 162FW/LNG FY02-FY05 OSB Master Schedule. The OSB report adds two new aircraft types to the OSB mix in 2005, the GR-7 Harrier and the GR-3 Jaguar of the Royal Air Force and continues to include the F/A-18 and HH-60. The actual sorties flown was down to 1,583 with 2,213 flight hours, and while the number of days OSB occupied the facilities was up to 327 days, the number of flying days was down to 120. Three new transport aircraft were added to the list of those utilized for carrying associated cargo, the L1011, C-5 and B-737.

The second source (162FW/LNG FY02-FY05 OSB Master Schedule) reported a different aircraft mix from the OSB report, omitting the F/A-18 and HH-60, but contained a similar of sorties of 1,626 and flight hours of 2,186.

2006

The only data available for 2006, which obviously is incomplete, comes from 162FW/LNG FY02-FY05 OSB Master Schedule reporting for the period of 2-15 Oct the 111 FW from ANGB Willow Grove, PA, flying 12 A-10s, conducted 127 sorties for 211 flight hours.

2007

There are three sources of 2007 OSB operations data with the first being an AF Form 813, the second source is an OSB aircraft report and the third is data from a 2007 draft AICUZ document dated Nov 2008. The AF Form 813 summarized the data with an accounting of 81 individual F-16s, A-10s and GR-4s flying a reported 1242 sorties and 1810 flight hours.

The OSB aircraft reports the F-16, A-10, RAF GR-4 Tornado and UH-1, and HH-60 aircraft continued to operate over 12 months of FY07. They flew a record number of sorties (3411) with a total of 4439 flying hours. Deployment periods were reported to have lasted from two weeks to 30 days.

In the 2007 AICUZ data collection document for the DRAFT 2009 AICUZ, total ops reported by DM amounted to 270.27 average busy day operations for 230 flying days a year. OSB conducted 3403 sorties with 287 by the A-10, 24 by the F-15, 2912 by the F-16 and 180 by the GR-4. OSB was flown year round with an average busy day of 18.66 departure and arrival operations; no closed patterns and no operations were reported between 2200 and 0700 hours. Aircraft engine run-up operations associated with OSB were documented for the first time including those of the F-16, A-10, F-15, GR-7, GR-4 and AV-8. Most engine runs were conducted on the Snowbird Ramp and Live Load Area. Their engine powers were limited to 85% with over 85% of the aircraft utilizing the Trim Pad 2 and amounting to 2-3 % of annual DMAFB engine maintenance operations. Maintenance engine operations occurred three times a week for three weeks for a total of nine OSB events. There were no engine maintenance operations reported between 2200 and 0700 hours.

2008

OSB operations were conducted for 11 months of FY08 with the F-16, F-15, Tornado, Typhoon, A-10, HH-60, Puma, GR-7 and GR-9 aircraft. They flew less than half the sorties and flight hours of FY07 with a total of 1,233 sorties and 1,911 flight hours.

In a 10 April 2008 ANG web site news article by Capt Gabe Johnson, 162nd Fighter Wing Public Affairs, [redacted], OSB Commander is quoted as saying "since 9/11, Snowbird and Davis-Monthan have worked together to provide realistic pre-deployment training to Air National Guard, active duty and international flying units…" The article includes statements by individuals from the Royal Air Force's 230 Tiger Squadron discussing the value of pre-deployment training in conditions of high temperatures and soft sand being invaluable to successful operations in Iraq. AF Form 813, 14 Nov 2008, likewise documents the "Purpose for the Action…The purpose of Operation Snowbird is to provide support for visiting flying units from Air National Guard units and other units from around the world looking to train in the optimal weather conditions and ample ranges of Southern Arizona."

2009

OSB was conducted from Oct 08 to Aug 09 of FY09 for deployment periods ranging from two days to 28 days. Puma, Harrier, Tornado and F-16 aircraft from both Great Britain and Belgium were included in

the total OSB mix, along with F-16s, HH-60s, and A-10s from the United States. Combined, they flew a total of 1,190 sorties over 1,757 flight hours.

2010

Similar operations were conducted and estimated for 2010 including foreign services of Great Britain, and, for the first time, U.S. Army AH-64 helos. Operations are projected for 187 days from Oct to July of FY10.

YEAR	MONTH	UNIT	MDS	SORTIES	HOURS	TOTAL DAYS	COMMENTS
FY10	15 Oct - 31 Oct	121 FS (D.C.)	F-16	119	447.3	16	
	4 Jan - 15 Jan	119 FS (N.J.)	F-16			11	
	9 Jan - 23 Jan	134 FS (VT.)	F-16			14	
	24 Jan - 6 Feb	112 FS (OH.)	F-16			13	
	6 Feb - 8 Mar	2 SQ	GR-4 RAF			30	
	1 Feb - 28 Feb	162 FW (AZ.)	F-16			27	
	10 Apr - 25 Apr	DMAFB				15	EX Angel Thunder
	1 May - 1 Jul	UK Army	AH-64			61	EX Crimson Eagle
	Total					187	
FY09	2 Oct - 20 Oct	RAF 230 SQD	Puma	48	96.3	18	
	23 Oct - 21 Nov	Belgium AF	F-16	252	426.5	29	
	1 Dec - 12 Dec	Angel Thunder	HH-60	40	44.8	11	
	3 Jan - 10 Jan	127 FW	F-16	26	38.3	7	
	10 Jan - 31 Jan	178 FW	F-16	331	362.9	21	
	16 Feb - 2 Mar	RAF 1 Sqn	Harriers	67	87.1	15	
	12 Apr - 1 May	149 FW	F-16	157	237.5	19	
	6 Jun - 7 Jun	RAF 9 Sqn	F-16	17	20.4	31	
	11 Jun - 7 Jul	104 TH	Tornado	121	229.3	26	
	25 Jul - 7 Aug	188 FW	A-10	131	214.6	13	
	Total			1190	1757.7	190	
FY08	4 Nov - 17 Nov	115 FW	F-16	114	161.1	13	WI ANG Madison
	1 Dec - 15 Dec	120 FW	F-16	120	185.5	14	Montana ANG Great Falls
	31 Mar - 11 Apr	131 FW	F-15	111	136.4	12	Missouri ANG St Louis
	13 Apr - 25 Apr	149 FW	F-16	144	227.4	12	TX ANG
	26 Apr - 30 May	RAF	Tornado	173	240.3	34	
	26 Apr - 16 May	RAF	Typhoon	173	252.4	20	
	9 Jun - 20 Jun	104th	A-10C	122	241.3	11	Baltimore Mass ANG
	15 Jun - 25 Jun	101 RQS	HH-60	30	60	40	
	1 Aug - 5 Sep	230 SQN	Puma	124	248	35	
	8 Sep - 29 Sep	4 SQN	GR7/9	122	158.6	21	
	Total			1233	1911	212	

YEAR	MONTH	UNIT	MDS	SORTIES	HOURS	TOTAL DAYS	COMMENTS
CY07			F-16	832	1165		
			A-10	287	486.8		
			GR-4	123	158.5		
	Total			1242	1810.3		
FY07	15 Sep - 15 Oct	162 FW	F-16	1400	1625	30	AZ ANG
	5 Nov - 18 Nov	178 FW	F-16	142	213	13	OH ANG Springfield
	3 Dec - 15 Dec	180 FW	F-16	160	242.5	12	OH ANG Toledo
	7 Jan - 20 Jan	181 FW	F-16	136	170.5	13	IND ANG Ind
	19 Jan - 4 Feb	158 FW	F-16	152	182.1	15	VT ANG
	5 Feb - 16 Feb	183 FW	F-16	90	137.4	11	ILL ANG Springfield
	18 Feb - 2 Mar	303 FS	A-10	166	305.3	12	Whiteman RES MO
	3 Mar - 15 Mar	172 FW	A-10	121	181.5	12	MI ANG Battlecreek
	15 Apr - 28 Apr	149 FW	F-16	156	239.4	13	TX ANG RTU
	5 Jun - 8 Jun	162 FW	F-16	12	15.2	3	AATC Live Fire
	7 Jun - 20 Jun	Angel Thunder	UH1/HH-60	25	50	13	
	25 Jul - 20 Aug	RAF	Tornado	123	158.5	25	14/12 SQDN's
	21 Aug - 31 Aug	162 AATC	F-16	52	73.8	30	
	4 Sep - 1 Oct	162 FW	F-16	676	845	27	
	Total			3411	4439.2	229	
FY07			A-10	287			30 annual flying days
			F-15	24			20 annual flying days
			F-16	2912			100 annual flying days
			GR-4	180			15 annual flying days
	Total			3403			no closed ops
FY06	2 Oct - 15 Oct	111 FW	A-10	127	211		Willow Grove PA ANG
	Total			127	211		
FY05			GR-7 Harrier				
			GR-4 Tornado				
			GR-3 Jaguar				
			F-16				
			F-18				
			HH-60				
	Total			1583	2213.9	242	

YEAR	MONTH	UNIT	MDS	SORTIES	HOURS	TOTAL DAYS	COMMENTS
FY05	22 Oct - 7 Nov	1 SQ	GR-7	91	146		RAF UK
	9 Jan - 22 Jan	127 FW	F-16	168	203		Selfridge MI ANG VMFA225
	23 Jan - 5 Feb	148FW	F-16	135	229		Duluth MN ANG 179 FS
	6 Feb - 19 Feb	180 FW	F-16	153	174		TOLEDO OH ANG
	20 Feb - 5 Mar	183 FW	F-16	128	150		Springfield IL ANG
	11 Mar - 26 Mar	158 FW	F-16	158	235		Burlington VT ANG
	4 Apr - 16 Apr	182 FS	F-16	171	241		Kelly AFB TX ANG
	20 Apr - 7 May	RAF	GR-3	115	131		RAF
	11 Jul - 5 Aug	RAF	GR-7	274	352		RAF 3, 1, IV SQ
	27 Aug - 30 Sep	RAF	GR-4	233	325		RAF
	Total			1626	2186		
FY04			GR-7 Harrier				
			GR-4 Tornado				
			F-16				
			F-18				
			A-10				
			P3				
			AH-1W				
	Total			2070	2986.4	261	
FY04	13 Sep - 31 Oct	6 SQ	GR-4	340	427		RAF UK 2/9 SQ
	26 Oct - 12 Dec	RNAF	F-16	697	937		Royal Netherlands Air Force 3 lines combined
	17 Nov - 19 Nov	AATC	F-16				Tucson AZ ANG
	5 Dec - 7 Dec	MAG11	F-18				USMC Miramar CA
	10 Jan - 24 Jan	148 FW	F-16	135	171		Duluth MN ANG 179 FS
	25 Jan - 7 Feb	114 FW	f-16	209	260		Sioux Falls SD ANG
	8 Feb - 21 Feb	183 FW	F-16	146	191		Springfield IL ANG
	7 Mar - 20 Mar	110 FW	A-10	75	124		Battle Creek MI ANG 172 FS
	17 Apr - 22 May	RAF 12/14 SQ	GR-4	285	374		RAF UK 617/15 SQ
	13 Jun - 27 Jun	175 FW	A-10	19	34		Baltimore MD ANG 104 FS
	24 Jun - 12 Jul	RAF 1 SQ	GR-7	110	136		RAF UK
	31 Jul - 15 Aug	Texas	AH-1W	41	211		HMLA773
	4 Aug - 8 Aug	162 FW	F-16	26	41		Tucson AZ ANG 195 FS
	1 Sep - 1 Oct	RAF	GR-4	207	281		RAF UK
	Total			2290	3187		

YEAR	MONTH	UNIT	MDS	SORTIES	HOURS	TOTAL DAYS	COMMENTS
FY03	Total			2135	3586	307	174 flying days
							6 foreign units included
FY03	9 Sep - 5 Oct	13 SQ	GR-4	140	186		RAF UK 31 SQ
	5 Oct - 30 Oct	2 SQ	GR-4	137	167		RAF UK 9 SQ
	2 Nov - 16 Nov	VFMA533	F-18	145	191		USMC Beaufort SC
	1 Dec - 13 Dec	192 FW	F-16	87	113		VA 149 FS
	5 Jan - 18 Jan	180 FW	F-16	205	246		Toledo OH ANG 112 FS
	2 Feb - 15 Feb	122 FW	F-16	140	168		Ft Wayne IN ANG 163 FS
	21 Feb - 14 Mar	RTAF	F-16	68	96		Royal Thailand Air Force
	15 Mar - 27 Mar	132 FW	F-16	104	127		Des Moines IA ANG 124 FS
	31 Mar - 12 Apr	GAF	GR-1	18	18		German Air Force
	13 Apr - 25 Apr	VFA125	F-18	280	365		NAS Lemoore CA
	29 Apr - 23 May	AATC	F-15	32	86		Tucson AZ ANG
	29 Apr - 23 May	AATC	A-10				Tucson AZ ANG
	2 Jun - 13 Jun	162 FW	F-16	44	51		Tucson AZ ANG 152 FS
	16 Jun - 20 Jun	AATC	F-16	12	16		Tucson AZ ANG
	25 Jun - 1 Aug	IAF	F-16	550	686		Israel Air Force next three lines combined
	28 Jun - 13 Jul	154 WG	F-15				Hawaii ANG 199 FS
	12 Jul - 26 Jul	144 FW	F-16				Fresno CA ANG 194 FS
	1 Aug - 3 Aug	162 FW	F-16	19	27		Tucson AZ ANG
	17 Aug - 29 Aug	VFA125	F-18	217	282		NAS Lemoore CA
	Total			2198	2825		
FY02	9 Sep - 3 Oct	9 SQ	GR-4			24	RAF
	1 Dec - 15 Dec	120 FS	F-16			14	Montana ANG Great Falls 186 FS
	16 Dec - 20 Dec	388 FW	F-16			4	Hill AFB UT 34 FS
	2 Jan - 19 Jan	183 FW	F-16			17	Illinois ANG Springfield 170 FS
	7 Jan - 11 Jan	388 FW	F-16			4	Hill AFB UT 34 FS
	19 Jan - 2 Feb	114 FW	F-16			13	South Dakota ANG Sioux Falls 175 FS
	2 Feb - 16 Feb	110 FW	A-10			14	Michigan ANG Battle Creek 172 FS
	16 Feb - 2 Mar	119 FW	F-16			15	North Dakota ANG Fargo 178 FS
	19 Feb - 23 Feb	388 FW	F-16			4	Hill AFB UT 34 FS
	2 Mar - 16 Mar	148 FW	F-16			14	MN ANG Duluth 179 FS
	16 Mar - 30 Mar	121 WG	A-10			14	ID ANG Boise 190 RS
	31 Mar - 13 Apr	140 WG	F-16			14	CO ANG Buckley 120 FS
	13 Apr - 27 Apr	127 WG	F-16			14	MI ANG Selfridge 107 FS

YEAR	MONTH	UNIT	MDS	SORTIES	HOURS	TOTAL DAYS	COMMENTS
FY02	10 Apr - 24 Apr	9 SQ	F3			14	RAF
	28 Jul - 29 Aug	9 SQ	GR-4			30	RAF
	1 Sep - 30 Sep	VMFA 533	F-18			30	MCAS Beaufort SC
	Total			1666.430233		239	
FY02	5 Jan -19 Jan	183FW	F-16	165	275		Illinois ANG Springfield 170 FS
	12 Jan - 19 Jan	115FW	F-16				Madison WI ANG 115FW
	19 Jan - 2 Feb	104 FW	A-10	138	262		Barnes MA AND 131 FS
	2 Feb - 16 Feb	110 FW	A-10	146	251		Battle Creek MI, ANG 172 FS
	16Feb - 2 Mar	114 FW	F-16	185	223		Sioux Falls SD, ANG 175 FS
	8 Mar - 16 Mar	162 FW	F-16	42	55		Tucson AZ 195 FS
	16 Mar - 30 Mar	124 WG	A-10	138	248		Boise ID ANG 190 FS
	17 Mar - 22 Mar	129 RQW	HH-60	4	12		Moffett CA
	26 Mar - 4 Apr	1 GROUP	GR-4	78	105		RAF UK 617 SQ
	4 Apr - 22 Apr	1GROUP	GR-4	102	126		RAF UK 14 SQ
	17 Jun - 28 Jun	HMM268	CH-46	54	131		USMC
	11 Jul - 30 Aug	8 FW	F-15C	513	572		IAF 106 FS all sortie/hours lumped for 4 lines
	21 Jul - 26 Jul	175 FW	A-10				Baltimore MD ANG 104 FS
	27 Jul - 10 Aug	144 FW	F-16				Fresno CA ANG 194 FS
	6 Aug - 9 Aug	162 FW	F-16				Tucson AZ 152 FS
	8 Sep - 20 Sep	VFA146	F-18	36	48		NAS Lemoore CA
	Total			1601	2308		
FY01	Oct	VMFA 533		212			
	Nov	122 FW		131			
	Jan	110 FW		146			
	Jan	180 FW		115			
	Feb	114 FW		131			
	Feb	148 FW		118			
	Mar	111 FW		108			
	Mar	175 FW		128			
	Mar	129 RQW		41			
	Apr	47 FS		41			
	20 Apr - 27 Apr	162 FW	F-16	34		7	Tucson AZ 162 FS
	20 Apr - 27 Apr	125 FW	F-15	?		7	
	30 Apr - 5 May	303 FS	A-10	17		6	Whiteman AFB
	27 May - 10 Jun	706 FS	A-10	73		13	AFR, New Orleans, LA 926 FW
	1 Jun - 8 Jun	162 FW	F-16	55		7	Tucson 148 FS
	11 Jun - 25 Jun	RS	F-16	675		14	Roving Sands

YEAR	MONTH	UNIT	MDS	SORTIES	HOURS	TOTAL DAYS	COMMENTS
FY01	11 Jun - 25 Jun	RS	F-15			14	Roving Sands
	26 Jun - 26 Jul	162 FW	F-16			30	Tucson 162 FS
	26 Jun - 26 Jul	162 FW	A-10	52		30	Tucson 162 FS
	26 Jun - 26 Jul	162 FW	C-130			30	Tucson 162 FS
	Total			2077		158	
FY00	6 Nov - 20 Nov	124 WG	A-10			14	Idaho ANG
	4 Dec - 18 Dec	114 FW	F-16			14	South Dakota ANG
	8 Jan - 22 Jan	177 FW	F-16			14	New Jersey ANG Atlantic City
	10 Jan - 14 Jan	114 FW	F-16			4	South Dakota ANG, Sioux Falls
	23 jan - 5 Feb	180 FW	F-16			13	Ohio ANG, Toledo
	6 Feb - 19 Feb	120 FW	F-16			13	Montana ANG Great Falls
	7 Feb - 11 Feb	114 FW	F-16			4	South Dakota ANG, Sioux Falls
	12 Feb - 19 Feb	185 FW	F-16			7	Iowa ANG Sioux City
	18 Feb - 21 Feb	122 FW	F-16			3	Indiana ANG Ft Wayne
	20 Feb - 4 Mar	185 FW	F-16			14	Iowa ANG Sioux City
	5 Mar - 18 Mar	110 FW	A-10			14	Michigan ANG Battle Creek
	5 Mar - 18 Mar	102 RQS	HH-60			14	NY ANG Suffolk
	5 Mar - 18 Mar	129 FQW	HH-60			14	CA ANG Moffett
	11 Mar - 25 Mar	410 Sq	F-18			15	Cold Lake Canada
	6 Apr - 9 Apr	118 AW	C-130			3	Tennessee ANG, Nashville
	15 May - 31 May	VMFA 232	F-18			15	NAS Miramar CA
	2 Jun - 17 Jun	VMFA 232	F-18			15	NAS Miramar CA
	Total					190	
15-Jun-99	Oct - May "ONLY"						
4-Oct-95							"no additional flying hours"
							"number of aircraft, sorties and flying time has remained virtually constant since programs inception"
							"no indication from NGB that number of units would change in next three years"
FY94	5 months		A10	196		150	no patterns
	5 months		F-16	1584		150	90 flying days
	Total			1780			

YEAR	MONTH	UNIT	MDS	SORTIES	HOURS	TOTAL DAYS	COMMENTS
FY90		Snowbirds	A-10				
			F-16				
			A-7				
	Total						260 flying days per year
FY90	30-Jul-90		A-10				
			F-16				
			A-7				
	Total						
FY90			A-10				
			A-7				
			F-16				
	Total						
CY82	Feb and Mar		A-7D	537		41	includes closed and radar patterns
							ASSUMED TO BE OSB OPS
							7.5 closed pattern ops
							7.5 radar pattern ops
FY77			A-7				
			A-10				
FY 77?	Jan - Apr		A-7				no low approaches planned
			F-100				normal duty hours 0800-1700
				20/weekday			
	eight weeks		O-2	1600?	1940?		
FY 75		15 units deployed	F-100				
			A-7				

PART III – Safety Precautions Implemented for OSB.

Operation Snowbird's historical safety record is superb. In its 35 year history, the unit has never experienced a Class A mishap. Operation Snowbird has a flight safety program to mitigate risks and prevent future mishaps. The unit also embraces Operational Risk Management processes to mitigate risks. The following was posted in clear site at the unit for all to see and follow:

Operational Risk Management – Operation Snowbird, 6 Step Process

1. Identify Hazards
2. Assess Risk
3. Analyze Controls
4. Make Control Decisions
5. Implement Risk Control
6. Supervise & Review

At Davis-Monthan AFB the following noise abatement and safety practices are undertaken for all air operations:

1. Airfield departures and arrivals, to the maximum extent possible and consistent with established safety procedures, use the airspace southeast of the base.
2. Traffic patterns are flown to minimize overflights of populated areas.
3. Efforts are continually made to schedule missions to keep noise levels at an absolute minimum during evening hours.
4. Operational areas for aircraft are over very sparsely populated areas.
5. Quiet hours for aircraft operations are normally from 10:30 P.M. to 6:00 A.M. (2230 to 0600) unless a high priority mission or an emergency situation occurs.[liv]"

In addition, Snowbird Operations has implemented the following flight safety measures:

a. All aircraft carrying live ordnance utilize the southeast corridor

b. Aircraft unable to expend live ordnance due to any system malfunction are diverted to an alternate base to preclude recovery over the Tucson metro area.

c. Aircraft experiencing malfunctions recover to Davis-Monthan from the southeast, preventing over flight of densely populated areas.

PART IV – Analysis of General United States Air Force (USAF) mishap data from as early as 1975 and a comparison to DMAFB-specific pertinent mishap data.

Department of Defense mishaps (or accidents) are classified into three categories. An aircraft experiences a Class A, B, or C mishap as described below:

A. Class A Mishap: Occurs when at least one of the following applies:

1. Total mishap cost is $1,000,000 or more;

2. A fatality or permanent total disability occurs; and/or

3. An Air Force aircraft is destroyed.

B. Class B Mishap: Occurs when at least one of the following applies:

1. Total mishap cost is $200,000 or more and less than $1,000,000; and/or

2. A permanent partial disability occurs and/or 3 or more people are hospitalized;

C. Class C Mishap: Occurs when at least one of the following applies:

1. Cost of reported damage is between $20,000 and $200,000;

2. An injury causes a lost workday (i.e., duration of absence is at least 8 hours beyond the day or shift during which mishap occurred); and/or 3 an occupational illness causing absence from work at any time.

Note: in 2009, the Department of Defense changed the mishap categories to the below. The changes did not impact this study.

A. Class A Mishap: Occurs when at least one of the following applies:

1. Total mishap cost is $2,000,000 or more;

2. A fatality or permanent total disability occurs; and/or

3. An Air Force aircraft is destroyed.

B. Class B Mishap: Occurs when at least one of the following applies:

1. Total mishap cost is $50,000 or more and less than $2,000,000; and/or

2. A permanent partial disability occurs and/or 3 or more people are hospitalized;

C. Class C Mishap: Occurs when at least one of the following applies:

1. Cost of reported damage is between $50,000 and $500,000;

2. An injury causes a lost workday (i.e., duration of absence is at least 8 hours beyond the day or shift during which mishap occurred); and/or 3 an occupational illness causing absence from work at any time

Analysis

The purpose of this study is to mitigate on-going public concern over Snowbird operations, as expressed in numerous letters written to national leaders by concerned citizens of Tucson, Arizona. The citizens were primarily concerned about their "increased safety risks and noise concerns" related to the Operation Snowbird program. This section will analyze safety risks.

The safety records for Davis-Monthan AFB are excellent. Davis-Monthan AFB permanently assigned units have not experienced a Class A mishap since 2002. The base has experienced three Class A mishaps in the previous 20 years, none of which were within 30 miles of Tucson. Operation Snowbird has been in operation since 1975. In its 35 year history, the unit has never had a Class A mishap; Operation Snowbird's safety record is flawless. While zero mishaps in 35 years is a superior safety record and reflects a strong safety program, it does not guarantee there will not be a mishap in the future. There are, and will continue to be, risks to the citizens of Tucson. Below, in this section, safety risks will be analyzed.

In Table 1 below, safety statistics have been organized so the reader is able to compare general United States Air Force mishap data with DMAFB mishap data. Table 1 contains U.S. Air Force and Davis-Monthan AFB mishaps and mishap rates for the time period 1975 to 2009. Table 2 compares mishap rates for U.S. Air Force aircraft participating in Operation Snowbird. Table 3 displays mishap rates for Royal Air Force aircraft participating in Operation Snowbird. The Air Force did not provide Wyle with safety mishap rates for U.S. Navy, U.S. Marine Corps or U.S. Army aircraft participating in Operation Snowbird. Therefore, joint aircraft are not analyzed in this report. The next part of this section will analyze the historical safety mishap rates in the Tables in an effort to objectively quantify the safety risk to the citizens of Tucson.

To analyze safety risks, Wyle set out to find a method of using historical safety mishap rates and presenting it an objective, tailored and meaningful way to describe "safety risk" at Davis-Monthan AFB. The analysis began with a basic comparison of mishap rates amongst Davis-Monthan AFB permanently assigned aircraft as well as Operation Snowbird aircraft mishap rates. As stated earlier, Class A Mishap rates are the number of Class A mishaps per 100,000 flying hours. The rate is determined by dividing the total number of mishaps in a time period by the total flying hours in the same time period. For example, in 2009, the U.S. Air Force had 17 Class A mishaps and, in 2009, the U.S. Air Force flew a total of 2,125,000 hours.

17 mishaps divided by 2,125,000 hours = 0.000008 mishaps per flying hour

To restate, in 2009, the Air Force suffered 0.000008 mishaps per flying hour. To make the rate meaningful, it is reported per 100,000 flying hours, simply by multiplying the rate by 100,000 to obtain the mishap rate per 100,000 flying hours: The result is:

0.000008 X 100,000 = 0.8 Class A Mishap Rate

The Class A Mishap rates are excellent statistical tools for determining safety performance in the macro sense, e.g., comparing the safety mishaps amongst aircraft in the U.S. Air Force using an equal number of flying hours and a common period of time, e.g., 100,000 flying hours during a one year, five years, ten years or life time period. The Class A mishap tables reveal the F-16's lifetime mishap rate (3.68) is higher than that of the A-10 (2.14). Does this inform us the F-16 has 1.7 times more risk than the A-10 when flying out of Davis-Monthan AFB? It does not. The rate is a calculated ratio of mishaps to hours. Looking at the rate alone cannot inform us whether or not there is more safety risk from the F-16 vice the A-10 flying at Davis-Monthan AFB. The reason is, at Davis-Monthan AFB, the A-10s and F-16s do not fly the same number of hours in a year. As such, the mishap rates (ratios) cannot be used to compare safety risks between two aircraft because the amount of flying hours, or exposure to the general public, is different, unless one factors in actual flying time.

To make the Class A mishap rates relevant for the study's purpose of establishing an objective measure of safety risk at Davis-Monthan AFB, Wyle developed a risk calculus. Wyle's analysis, or risk calculus, begins with the historical Class A mishap rates. Wyle chose to use aircraft lifetime mishap rates.

To keep the units consistent in the calculation, Wyle chose not to use the rate per 100,000 flying hours. Instead, Wyle used the number of mishaps per flying hour. For example, In the Air Force during 2007, the A-10 had one Class A mishap and flew a total of 92,593 hours.

1 mishap divided by 92,593 hours = 0.0000018 mishap per flying hour

Beginning with historical safety rates, the first part of the calculation determines the mishap potential per flying hour. (Note: Wyle acknowledges safety mishap rates are historical statistics. Wyle understands past performance does not guarantee future results. Regardless, lacking knowledge of the future, we have chosen to use past safety performance as a metric for current and future risk.) After determining the mishap potential per flying hour, Wyle then factored in the actual flying hours of an individual aircraft type at a specific location, e.g., A-10s at Davis-Monthan AFB. The purpose is to give proper weight to the mishap potential by factoring in the actual flying time for each aircraft type. For the citizens of Tucson, the actual flying time is the "Exposure Time" to the risk. The risk factor, then, is calculated as follows:

Class A Mishap rate per flying hour multiplied by flying time (exposure time) = Risk Factor

1. Aircraft Class A Mishap Rates per 100,000 hours are found in Tables 1, 2 & 3

   To calculate Class A Mishap rate per flying hour, divide by 100,000

2. Exposure Time is the number of hours flown by an aircraft type, e.g., A-10s at DMAFB for one year.

To illustrate, the 2007 Davis-Monthan AFB, A-10, Risk Factor is calculated as follows:

- The A-10 has a life time Class A Mishap Rate of 2.14 per 100.000 flying hours
- 2.14 divided by 100,000 = 0.0000214 mishaps per flying hour
- At DMAFB in 2007, the A-10 Flew 11,247 sorties for 19,722.7 hours
- 0.0000214 potential mishaps per hour multiplied by 19,722.7 hours = 0.422 Risk Factor

To further the example, the 2007 Operation Snowbird F-16 Risk Factor is calculated as follows:

- The F-16 has a life time Class A Mishap Rate of 3.68 per 100,000 flying hours
- 3.68 divided by 100,000 = 0.0000368 mishaps per flying hour
- At Operation Snowbird in 2007, the F-16 flew 2,300 sorties for 2,685.9 hours
- 0.0000368 multiplied by 2,685.9 = 0.099 Risk Factor

The above analysis reveals that while the public is exposed to the higher mishap potential of the F-16, the exposure time is far less (the A-10 flew more than seven times as many hours as the F-16). Thus, the resulting safety risk to the public from exposure to the F-16 is lower. When viewed through the lens of the risk factor analysis, one sees the 2007 safety risk of the F-16s (.099 risk factor) operating out of Operation Snowbird is four times less as compared to the A-10s operating out of Davis-Monthan AFB (.422 risk factor). Note: Operation Snowbird's 2007 F-16 sorties included 1,400 sorties and 1,625 hours flown by the 162d Fighter Wing when the wing deployed from Tucson International Airport (TIA) to Davis-Monthan AFB to conduct flying operations while the TIA's runway was under construction.

In contrast to 2007, in 2009, F-16s operating out of Operation Snowbird flew a total of 1,065.2 hours.

The 2009 Operation Snowbird F-16 Risk Factor is:

- 0.0000368 multiplied by 1,065.2 hours = 0.039 Risk Factor

The 2009 355th Wing A-10 Risk Factor is:

- 0.0000214 multiplied by 18,369.5 hours = 0.393 Risk Factor

In 2009, the A-10 flew 17 times as many hours and the A-10's risk factor was 10 times greater than the F-16.

When one looks at risk in terms of a combination of mishap potential (as defined by historical mishap rates) and actual exposure (as defined by actual flying time), the safety risk amongst aircraft can be fairly and objectively compared. The Risk Factor is a meaningful tool with which one can objectively and fairly compare safety risks amongst different aircraft at Davis-Monthan AFB, or any other location. Wyle believes this tool offers base officials and citizens of Tucson a common vocabulary and fair method (apples-to-apples comparison) for discussing safety risks at Davis-Monthan AFB.

The table below compares cumulative risk factors for all aircraft that operated at Operation Snowbird* with all aircraft operated by the 355th Wing during FY04 – FY09.

Fiscal Year (FY)	**Operation Snowbird Cumulative Risk Factor**	**355th Wing Cumulative Risk Factor**
FY04	**0.087**	**0.523**
FY05	**0.075**	**0.737**
FY06	**0.048**	**0.656**
FY07	**0.116**	**0.538**
FY08	**0.037**	**0.578**
FY09	**0.063**	**0.556**

*Data does not include U.S. Navy, U.S. Army or U.S. Marine Corps aircraft

Operation Snowbird Risk Factors by Aircraft Type:

The F-16 has a potential mishap rate of 0.0000368 mishaps per flight hour. The following are Risk Factor calculations for F-16s operating at Operation Snowbird from 2002 to 2010:

FY 2002

SQN/WING	**FROM**	***TO***	**MDS**	**SORTIES**	**HOURS**	**RISK FACTOR**
183FW	5-Jan	19-Jan	10F-16	135	225	
115FW	12-Jan	19-Jan	4XF16	30	50	
114FW	16-Feb	2-Mar	12XF16	185	223.2	
162FW	8-Mar	16-Mar	10-F-16	42	55.7	
144FW	27-Jul	10-Aug	6XF16	64	72	
				456	**625.9**	**0.023**

FY2003

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
162FW	6-Aug	9-Aug	3XF16	6	8.7	
192 FW	1-Dec	13-Dec	6xF-16	87	113.8	
180FW	5-Jan	18-Jan	12xF-16	205	246.4	
122FW	2-Feb	15-Feb	10xF16	140	168.2	
RTAF	21-Feb	14-Mar	6XF16	68	96.5	
132FW	15-Mar	27-Mar	12XF16	104	127	
162FW	2-Jun	13-Jun	12XF16	44	51.9	
AATC	16-Jun	20-Jun	4XF16	12	16	
IAF	25-Jun	1-Aug	10xF-16	400	504	
144FW	12-Jul	26-Jul	6xF-16	80	100.8	
162FW	1-Aug	3-Aug	8XF16	19	27.5	
				1165	**1460.8**	**0.054**

FY2004

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
RNLAF	26-Oct	12-Dec	10xF-16	665	864.5	
AATC	17-Nov	19-Nov	4xF-16	16	20.8	
148FW	10-Jan	24-Jan	10xF-16	135	171.9	
114FW	25-Jan	7-Feb	13xF-16	209	260.2	
183FW	8-Feb	21-Feb	12xF-16	146	191.4	
162 FW	4-Aug	8-Aug	5xF16	26	41.2	
				1197	**1550**	**0.057**

FY 2005

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
127 FW	9-Jan	22-Jan	10xF-16	168	203.6	
148FW	23-Jan	5-Feb	10xF-16	135	229.6	
180FW	6-Feb	19-Feb	11xF-16	153	174.7	
183FW	20-Feb	5-Mar	12xF-16	128	150.4	
158FW	11-Mar	26-Mar	12xF-16	158	235.4	
182FS	4-Apr	16-Apr	12xF-16	171	241.1	
				913	**1234.8**	**0.045**

FY 2006

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
178 FW	21-Oct	5-Nov	12xF-16	180	220.1	
180 FW	8-Jan	21-Jan	11xF-16	114	134.5	
181 FW	19-Feb	4-Mar	12xF-16	155	192.2	
115 FW	5-Mar	17-Mar	?xF-16	120	176.4	
149 FW	15-Apr	28-Apr	12xF-16	122	154.3	
				691	**877.5**	**0.032**

FY 2007

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
162FW	15-Sep	15-Oct	F-16	1400	1625	
178FW	5-Nov	18-Nov	F-16	142	184.6	
180FW	3-Dec	15-Dec	F-16	160	242.5	
181 FW	7-Jan	20-Jan	F-16	136	170.5	
158FW	19-Jan	4-Feb	F-16	152	182.1	
183 FW	5-Feb	16-Feb	F-16	90	137.4	
149FW	15-Apr	28-Apr	F-16	156	239.4	
162FW	5-Jun	8-Jun	F-16	12	15.2	
162 AATC	21-Aug	31-Aug	F-16	52	73.8	
162FW	4-Sep	1-Oct	F-16	0	0	
				2300	**2685.9**	**0.099**

FY 2008

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
162	21-Oct	3-Nov	F-16			
115FW	4-Nov	17-Nov	F-16	114	161.1	
120FW	1-Dec	15-Dec	F-16	120	185.5	
149FW	13-Apr	25-Apr	F-16	144	227.4	
				378	**574**	**0.021**

FY 2009

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
Belgium AF	23-Oct	21-Nov	F-16	252	426.5	
127FW	3-Jan	10-Jan	F-16	26	38.3	
178 FW	10-Jan	31-Jan	F-16	331	362.9	
149FW	12-Apr	1-May	F-16	157	237.5	
				766	**1065.2**	**0.039**

FY 2010

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
121th FS (D.C)	15-Oct	31-Oct	(10) F-16	119	447.3	
119th FS (NJ.)	4-Jan	15-Jan	(10) F-16	110	202.9	
134th FS (VT.)	9-Jan	23-Jan	(11) F-16	135	225.6	
112th FS (OH.)	24-Jan	6-Feb	(10) F-16	144	196.1	
				508	**1071.9**	**0.039**

The A-10 has a potential mishap rate of 0.0000214 mishaps per flight hour. The following are Risk Factor calculations for A-10s operating at Operation Snowbird from 2002 to 2010:

FY 2002

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR

104FW	19-Jan-02	2-Feb-02	A-10	138	262.4	
110FW	2-Feb-02	16-Feb-02	A-10	146	251.8	
124WG	16-Mar-02	30-Mar-02	A-10	138	248.8	
175WG	21-Jul-02	26-Jul-02	A-10	17	42	
				439	**805**	**0.017**

FY 2003

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
AATC	29-Apr-03	23-May-03	A-10	18	48.4	
				18	**48.4**	**0.001**

FY 2004

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
110FW	7-Mar-04	20-Mar-04	A-10	75	124.3	
175WG	13-Jun-04	27-Jun-04	A-10	19	34.1	
				94	**158.4**	**0.003**

FY 2006

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
111 FW	2-Oct-05	15-Oct-05	A-10	127	211	
175 FW	6-Nov-05	19-Nov-05	A-10	145	246.8	
110 FW	28-Jan-06	18-Feb-06	A-10	193	294.7	
				465	**752.5**	**0.016**

FY 2007

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
303 FS	18-Feb	2-Mar	A-10	166	305.3	
172FW	3-Mar	15-Mar	A-10	121	181.5	
				287	**486.8**	**0.010**

FY 2009

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
104TH	11-Jun	7-Jul	A-10	121	229.3	
188FW	25-Jul	7-Aug	A-10	131	214.6	
				252	**443.9**	**0.010**

The F-15 has a potential mishap rate of 0.0000242 mishaps per flight hour. The following are Risk Factor calculations for F-15s operating at Operation Snowbird from 2002 to 2010:

FY 2002

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
8FW	11-Jul-02	30-Aug-02	F-15C	360	424.3	
				360	**424.3**	**0.010**

FY 2003

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
AATC	29-Apr-03	23-May-03	F-15	32	86.3	
154WG	28-Jun-03	13-Jul-03	F-15	80	100.8	
				112	**187.1**	**0.005**

FY 2008

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
131FW	31-Mar	11-Apr	F-15	111	136.4	
				111	**136.4**	**0.003**

The H-60 has a potential mishap rate of 0.0000414 mishaps per flight hour. The following are Risk Factor calculations for H-60s operating at Operation Snowbird from 2002 to 2010:

FY 2002

SQN/WING	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR
129 RQW	17-Mar-02	22-Mar-02	HH-60	**4**	**12.8**	
				4	**12.8**	**0.001**

FY 2007

SQN/WING	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR
Ang Thndr	7-Jun	20-Jun	HH-60	**25**	**70.0**	**0.003**

FY 2008

SQN/WING	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR
101RQS	15-Jun	25-Jun	HH-60	**30**	**84.0**	**0.003**

FY 2009

SQN/WING	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR
Ang Thndr	1-Dec	12-Dec	HH-60	40	44.8	
				40	**44.8**	**0.002**

The Tornado (GR-4) has a potential mishap rate of 0.0000221 mishaps per flight hour. The following are Risk Factor calculations for GR-4s operating at Operation Snowbird from 2002 to 2010.

FY2002

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR

617SQ	26-Mar-02	4-Apr-02	GR4	78	105.7	
14SQ	4-Apr-02	22-Apr-02	GR4	102	126.2	
31SQ	9-Sep-02	5-Oct-02	GR4	140	186	
				320	**417.9**	**0.009**

FY2 2003

SQN/WING	**FROM**	***TO***	**MDS**	**SORTIES**	**HOURS**	**RISK FACTOR**
2/9SQ	5-Oct-02	30-Oct-02	GR4	137	167.6	
6/2/9SQ	13-Sep-03	31-Oct-03	GR4	340	427.4	
				477	**595**	**0.013**

FY 2004

SQN/WING	**FROM**	***TO***	**MDS**	**SORTIES**	**HOURS**	**RISK FACTOR**
12/14/15/617 SQ	17-Apr-04	22-May-04	GR4	285	374.7	
1 SQ	24-Jun-04	12-Jul-04	GR7	110	136.6	
RAF	1-Sep-04	1-Oct-04	GR4	207	281.4	
				602	**792.7**	**0.018**

FY 2005

SQN/WING	**FROM**	***TO***	**MDS**	**SORTIES**	**HOURS**	**RISK FACTOR**
RAF	27-Aug-05	30-Sep-05	GR4	233	325.9	
				233	**325.9**	**0.007**

FY 2007

SQN/WING	**FROM**	***TO***	**MDS**	**SORTIES**	**HOURS**	**RISK FACTOR**
14/12 SQDN's	25-Jul	20-Aug	GR4	123	158.5	
				123	**158.5**	**0.004**

FY 2009

SQN/WING	**FROM**	***TO***	**MDS**	**SORTIES**	**HOURS**	**RISK FACTOR**
RAF	26-Apr	30-May	GR4	173	240.3	
				173	**240.3**	**0.005**

FY2010

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
2 Sqn.	02/06/10	02/20/10	GR-4	61	97.2	
14 Sqn.	02/21/10	03/09/10	GR-4	71	107.2	
				132	**204.4**	**0.005**

The Harrier (GR-7) has a potential mishap rate of 0.0000646 mishaps per flight hour. The following are Risk Factor calculations for GR-7s operating at Operation Snowbird from 2002 to 2010.

FY 2004

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
1 SQN	22-Oct	7-Nov	GR7	91	146.1	
				91	**146.1**	**0.009**

FY 2005

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
3, 1, 4 SQN	11-Jul	5-Aug	GR7	274	352.9	
				274	**352.9**	**0.023**

FY 2008

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
4SQN	8-Sep	29-Sep	GR7/9	122	158.6	
				122	**158.6**	**0.010**

FY 2009

SQN/WING	FROM	*TO*	MDS	SORTIES	HOURS	RISK FACTOR
RAF	16-Feb	2-Mar	GR-7	67	87.1	
RAF 9 SQN	6-Jun	7-Jul	GR-7	17	20.4	
				84	**107.5**	**0.007**

355th Wing Risk Factors by Aircraft Type:

The A-10 has a potential mishap rate of 0.0000214 mishaps flight hour. The following are Risk Factor calculations for A-10s operating in the 355th WG from 2004 to 2009:

FY 2004

SQN/WING	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR
355th WG	FY04	FY04	A-10	**9,328**	**18,472.7**	
				9,328	**18,472.7**	**0.395**

FY 2005

SQN/WING	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR

355th WG	FY05	FY05	A-10	**14,183**	**27,672.8**	
				14,183	**27,672.8**	**0.592**

FY 2006

SQN/WING	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR
355th WG	FY06	FY06	A-10	**12,607**	**24,635.8**	
				12,607	**24,635.8**	**0.527**

FY 2007

SQN/WING	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR
355th WG	FY07	FY07	A-10	**11,247**	**19,722.7**	
				11,247	**19,722.7**	**0.422**

FY 2008

SQN/WING	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR
355th WG	FY08	FY08	A-10	**11,341**	**22,271.1**	
				11,341	**22,271.1**	**0.477**

FY 2009

SQN/WING	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR
355th WG	FY09	FY09	A-10	**9,659**	**18,369.5**	
				9,659	**18,369.5**	**0.393**

The H-60 has a potential mishap rate of 0.0000414 mishaps per flight hour. The following are Risk Factor calculations for H-60s operating in the 355th WG from 2004 to 2009:

FY 2004

SQN/WING	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR
55 RQS	FY04	FY04	HH-60	**Unknown**	**2,740.0**	
				Unknown	**2,740.0**	**0.113**

FY 2005	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR

SQN/WING

55 RQS	FY05	FY05	HH-60	**Unknown**	**3,099.9**	
				Unknown	**3,099.9**	**0.128**

FY 2006

SQN/WING	**FROM**	**TO**	**MDS**	**SORTIES**	**HOURS**	**RISK FACTOR**
55 RQS	FY06	FY06	HH-60	**Unknown**	**2,711.0**	
				Unknown	**2,711.0**	**0.112**

FY 2007

SQN/WING	**FROM**	**TO**	**MDS**	**SORTIES**	**HOURS**	**RISK FACTOR**
55 RQS	FY07	FY07	HH-60	**Unknown**	**1,708.9**	
				Unknown	**1,708.9**	**0.071**

FY 2008

SQN/WING	**FROM**	**TO**	**MDS**	**SORTIES**	**HOURS**	**RISK FACTOR**
55 RQS	FY08	FY08	HH-60	**Unknown**	**1,394.2**	
				Unknown	**1,394.2**	**0.058**

FY 2009

SQN/WING	**FROM**	**TO**	**MDS**	**SORTIES**	**HOURS**	**RISK FACTOR**
55 RQS	FY09	FY09	HH-60	**Unknown**	**1,425.8**	
				Unknown	**1,425.8**	**0.059**

The C-130 has a potential mishap rate of 0.0000085 mishaps per flight hour. The following are Risk Factor calculations for HC-130Ps operating in the 355th WG from 2007 to 2009:

FY 2004

SQN/WING	**FROM**	**TO**	**MDS**	**SORTIES**	**HOURS**	**RISK FACTOR**
79 RQS	FY04	FY04	HC-130P	**Unknown**	**1,731.8**	
				Unknown	**1,731.8**	**0.015**

FY 2005

SQN/WING	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR
79 RQS	FY05	FY05	HC-130P	**Unknown**	**1,969.7**	
				Unknown	**1,969.7**	**0.017**

FY 2006

SQN/WING	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR
79 RQS	FY06	FY06	HC-130P	**Unknown**	**1,942.1**	
				Unknown	**1,942.1**	**0.017**

FY 2007

SQN/WING	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR
79 RQS	FY07	FY07	HC-130P	**Unknown**	**1,768.0**	
				Unknown	**1,768.0**	**0.015**

FY 2008

SQN/WING	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR
79 RQS	FY08	FY08	HC-130P	**Unknown**	**1,552.0**	
				Unknown	**1,552.0**	**0.013**

FY 2009

SQN/WING	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR
79 RQS	FY09	FY09	HC-130P	**Unknown**	**1,591.9**	
				Unknown	**1,591.9**	**0.014**

The C-130 has a potential mishap rate of 0.0000085 mishaps per flight hour. The following are Risk Factor calculations for EC-130s operating in the 355th WG from 2007 to 2009:

FY 2007

SQN/WING	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR
355th WG	FY07	FY07	EC-130	**654**	**3,504.2**	
				654	**3,504.2**	**0.030**

FY 2008

SQN/WING	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR
355th WG	FY08	FY08	EC-130	**1808**	**10,460.1**	
				1808	**10,460.1**	**0.089**

FY 2009

SQN/WING	FROM	TO	MDS	SORTIES	HOURS	RISK FACTOR
355th WG	FY09	FY09	EC-130	**1,887**	**10,556.2**	
				1,887	**10,556.2**	**0.090**

Table 1 - USAF mishap data and DMAFB mishap data, 1975 - 2009

Year	Total Class A Mishaps - **Air Force**	Annual Mishap Rate - **Air Force**	Total Class A Mishaps - **DMAFB**	Annual Class A Mishap Rate - **A-10**	Annual Class A Mishap Rate - **C-130**	Annual Class A Mishap Rate - **H-60**
1975	93	2.77	4	0.00	0.82	N/A
1976	87	2.81	1	0.00	0.00	N/A
1977	88	2.78	1	11.96	0.30	N/A
1978	98	3.15	1	15.72	2.01	N/A
1979	94	2.94	4	9.24	0.00	N/A
1980	81	2.56	1	3.84	0.56	N/A
1981	80	2.44	1	2.86	1.09	N/A
1982	78	2.33	0	1.82	0.53	0.00
1983	59	1.73	0	3.10	0.27	0.00
1984	62	1.77	1	2.68	0.80	0.00
1985	53	1.49	0	1.78	0.79	0.00
1986	62	1.79	0	1.37	0.54	0.00
1987	40	1.51	0	2.92	0.36	44.42
1988	55	1.64	1	1.37	0.58	0.00
1989	56	1.59	1	3.03	0.29	0.00
1990	51	1.49	0	1.35	0.00	0.00
1991	41	1.11	0	0.88	0.00	6.85
1992	48	1.69	0	1.79	0.63	5.15
1993	34	1.35	0	1.74	0.33	4.37
1994	35	1.55	0	3.35	0.36	8.26
1995	34	1.53	0	1.69	0.35	3.75
1996	27	1.24	0	1.63	0.34	0.00
1997	30	1.42	1	2.40	0.70	0.00
1998	24	1.14	1	0.81	0.00	3.84
1999	34	1.60	0	1.63	0.00	0.00
2000	23	1.13	0	1.80	0.37	3.90
2001	24	1.16	0	1.78	0.73	0.00
2002	35	1.47	1	1.74	0.94	11.73
2003	31	1.29	0	0.81	0.00	4.20
2004	27	1.18	0	2.53	0.31	0.00
2005	32	1.49	0	0.00	0.66	18.29
2006	19	0.90	0	0.00	0.00	0.00
2007	27	1.32	0	0.00	0.00	0.00
2008	26	1.32	0	1.00	0.39	7.87
2009	17	0.80	0	1.08	0.00	4.03
Life Time				2.14	0.85	4.14

Note: Class A Mishap Rate = number of Class A mishaps per 100,000 flying hours

Table 2 – USAF Aircraft Participating in OSB, Mishap Rates, 1975 – 2009

	Annual Class A Mishap Rate – **Air Force**	Annual Class A Mishap Rate – **F-100**	Annual Class A Mishap Rate – **O-2**	Annual Class A Mishap Rate – **A-7**	Annual Class A Mishap Rate – **F-15**	Annual Class A Mishap Rate – **F-16**	Annual Class A Mishap Rate – **A-10**
1975	2.77	6.88	1.41	13.41	22.02	621.12	0.00
1976	2.81	3.78	1.36	7.05	0.00	442.48	0.00
1977	2.78	7.94	2.79	6.44	14.16	0.00	11.96
1978	3.15	10.51	3.88	8.92	11.59	0.00	15.72
1979	2.94	14.87	0.00	8.66	5.16	30.64	9.24
1980	2.56	0.00	3.32	3.28	4.57	18.65	3.84
1981	2.44	0.00	5.83	4.95	3.78	8.86	2.86
1982	2.33	0.00	2.62	2.37	1.96	15.83	1.82
1983	1.73	0.00	0.00	2.38	2.36	7.30	3.10
1984	1.77	0.00	3.71	7.01	1.71	5.01	2.68
1985	1.49	1724.1	7.48	5.99	2.70	4.55	1.78
1986	1.79	0.00	0.00	1.22	3.53	4.32	1.37
1987	1.51	0.00	0.00	1.56	1.94	3.43	2.92
1988	1.64	0.00	0.00	6.04	0.50	6.80	1.37
1989	1.59	0.00	N/A	3.93	2.33	3.63	3.03
1990	1.49	0.00	N/A	1.40	3.08	3.19	1.35
1991	1.11	N/A	N/A	1.47	1.09	4.55	0.88
1992	1.69	N/A	N/A	9.72	2.26	4.04	1.79
1993	1.35	N/A	N/A	0.00	1.38	4.38	1.74
1994	1.55	N/A	N/A	N/A	1.90	4.00	3.35
1995	1.53	N/A	N/A	N/A	1.94	2.59	1.69
1996	1.24	N/A	N/A	N/A	2.49	2.40	1.63
1997	1.42	N/A	N/A	N/A	1.56	3.00	2.40
1998	1.14	N/A	N/A	N/A	1.59	3.89	0.81
1999	1.60	N/A	N/A	N/A	4.23	5.11	1.63
2000	1.13	N/A	N/A	N/A	2.23	2.62	1.80
2001	1.16	N/A	N/A	N/A	1.09	3.85	1.78
2002	1.47	N/A	N/A	N/A	2.57	1.90	1.74
2003	1.29	N/A	N/A	N/A	2.07	3.09	0.81
2004	1.18	N/A	N/A	N/A	1.58	0.58	2.53
2005	1.49	N/A	N/A	N/A	1.77	1.54	0.00
2006	0.90	N/A	N/A	N/A	0.59	2.74	0.00
2007	1.32	N/A	N/A	N/A	3.76	3.29	0.00
2008	1.32	N/A	N/A	N/A	2.78	1.05	1.00
2009	0.80	N/A	N/A	N/A	1.39	1.17	1.08
Life Time	9.42	21.22	2.82	5.71	2.42	3.68	2.14
Last 10 Years					1.97	2.22	1.08
Last 5 Years					2.04	2.00	0.38

Note: Class A Mishap Rate = number of Class A mishaps per 100,000 flying hours

Table 3 – RAF Aircraft Participating in OSB, Mishap Rates

	Tornado	Typhoon	Harrier
Total Fg Hrs	180700	36500	61900
Total **Cat 1** Occurrances	429	60	121
Rate of **Cat 1** Occurances per 10000 Fg Hrs	23.74	16.44	19.55
Total **Cat 2** Occurances	19	4	10
Rate of **Cat 2** Occurances per 10000 Fg Hrs	1.05	1.10	1.62
Total **Cat 3** Occurances	6	0	5
Rate of **Cat 3** Occurances per 10000 Fg Hrs	0.33	0.00	0.81
Total **Cat 4** Occurances	0	1	0
Rate of **Cat 4** Occurances per 10000 Fg Hrs	0.00	0.27	0.00
Total **Cat 5** Occurances	4	0	4
Rate of **Cat 5** Occurances per 10000 Fg Hrs	0.22	0.00	0.65

The above table is for Royal Air Force aircraft; it uses the mishap rate per 10,000 flying hours.

Repair Category	Definition
1	The aircraft is repairable within the aircraft custodian's capabilities.
2	The aircraft is repairable within the aircraft custodian's Forward maintenance organization capabilities, or the maintenance capabilities of any Forward organization to which it may be allotted.
3	The aircraft is repairable on site but the work is considered by the aircraft custodian to be beyond their Forward maintenance organization capability and must be repaired by a Depth maintenance organization or other Repair Organization on site.
4	The aircraft is repairable but it is considered to need special facilities or equipment not available on site. The repair will be carried out by an RO at an MOD facility or contractor's works.
5	The aircraft is considered beyond economic repair or has been totally destroyed.

For the purposes of this report, Cat 5 Occurrences were considered Class A Mishaps. When adjusted to 100,000 flight hours, the Class A rates for RAF aircraft are as follows:

- Tornado = 2.21;
- Typhoon = 0.00; and
- Harrier = 6.46.

PART V – Based on available data, recommendations to mitigate perceived quality of life concerns of excessive noise from operations and safety concerns related to perceptions that pilots who temporarily train at DMAFB are properly following specific safety precautions.

SUMMARY

Part I of this report revealed the mission, the number of operations, and the types of aircraft in Operation Snowbird have changed substantially since development of the EA in 1978. It was also demonstrated the training has evolved from winter deployment training for the Cold War era to year-round pre-deployment training exercises for Operations IRAQI FREEDOM and ENDURING FREEDOM. Other significant changes include: none of the original aircraft in the EA are currently involved in OSB; the number of days OSB aircraft are projected to be at DM has risen from two weeks to one month or longer; the number of operations has, in some years, doubled; night time operations have been added; the limitation of flight operations to one arrival and departure with no pattern operations conducted has been inconsistently accomplished or documented since 1978; and on-base aircraft maintenance run-up operations have likewise been accomplished and documented. In short, there have been significant changes in the OSB's mission, training and aircraft operations since the 1978 EA was released.

Part II reported of all known Operational Snowbird operations data from 1975 to the present. From a noise perspective, there are two areas for discussion. The first is data availability/consistency and the second is the resulting OSB aircraft noise compared to noise resulting from all aircraft operations at DMAFB.

As shown in the noise data spread sheet, there has been little to no consistency in collecting operations data each year (i.e., complete data gaps for 1978, 1979, 1980, 1981, 1983, 1984, 1985, 1986, 1987 1988, 1989, 1992, 1993, 1996, 1997, and 1999). What operations data is recorded (e.g., some years only have total sorties by all aircraft whereas other years have sorties by aircraft), or what metrics were used to record the data from 1977 to 2000, it has only been since 2000 that operations data has been available each year to the present time.

The second discussion area is the evidence collected shows a reasonable doubling of OSB operations from 1978 to 2004 and then a slight reduction in 2009 from 2004 conditions. From a noise perspective, this approximate doubling of operations would probably be indistinguishable to the average individual in the context of overall DMAFB operations. Using engineering judgment, it is our opinion that should a noise analysis be accomplished using the Department of Defense approved NOISEMAP program, it is doubtful that the noise contours would increase by more than one dB, if even that, and that such a small difference in noise of all operations versus OSB operations would again be indistinguishable.

Part III reviewed safety precautions at Operations Snowbird. The study found no evidence affirming the perception that pilots who fly in Operation Snowbird do not follow safety procedures. The study did find Operations Snowbird has an exceptional flight safety record, zero Class A mishaps in 35 years of operations. The study concluded the perception that pilots who temporarily train at DMAFB are not properly following specific safety precautions is a misperception. Regardless, as the 1992 AICUZ stated,

"...despite the best training and maintenance, history makes it clear that accidents unfortunately do occur.[lv]" Because there remains a potential for future mishaps, the study recognizes the importance of identifying and mitigating risks.

Part IV was an analysis of flight safety mishap data for Operations Snowbird and Davis-Monthan AFB. In addition to a comparison of mishaps and mishap rates, Wyle developed a Risk Factor analysis. The risk factor analysis offers base officials and citizens of Tucson a common vocabulary and fair method for comparing aircraft safety risks by objectively expressing the level of risk for aircraft operating out of Davis-Monthan. With the risk objectively and fairly expressed via the risk analysis, the two parties can engage in dialogue to accept or mitigate the future level of risk.

Part V, includes the above summary, plus the below findings and recommendations.

Findings

1. Since 1978, there have been significant changes in Operations Snowbird's mission and operations. As stated in the 1978 EA, the original purpose for OSB was to enable ANG units in the northeast to conduct tactical training for two week periods between January and April. The purpose today, according to the National Guard Bureau, is to:

    a. Facilitate leading edge world class aviation training for US and allied forces for irregular warfare, deployment spin-up, and military exercises/inspections through continuous improvement of training opportunities based on the lessons learned from current military conflicts.
    b. Become the Irregular Warfare Center of Excellence for the Air National Guard
    c. Provide access to a multiple realistic live and inert targets arrays on the Barry Goldwater Ranges
    d. Allow access to the Link 16 and Gateway DATA link architecture in the Southwest US
    e. Support US Military exercises and conferences by providing a quality facility

    In addition to its mission change, the following changes have occurred at Operation Snowbird:

        i. None of the aircraft analyzed in the 1978 EA are participating in OSB today. Likewise, helicopters have been added to the mix of aircraft.
        ii. The timeframe for deployment has changed from two-week periods during January through April to deployments sometimes longer than 30 days during all twelve months of the year.
        iii. There were no foreign or joint aircraft analyzed in the 1978 EA.
        iv. In 2007, flight operations peaked, more than doubling from an estimated maximum of 1,600 per year to over 3,400 per year, and the flight hours correspondingly doubled from an estimated 1,940 per year to over 4,440 flight hours. As noted earlier, 1,400 of the 2007 F-16 sorties were 162d Fighter Wing sorties flown when TIA's runway was closed for repair. In 2008 and 2009, the number of Operations Snowbird operations declined to 938 sorties, 1,453.4 hours and 1,057 sorties, 1,908.4 hours respectively.
        v. Traffic pattern operations were not authorized in 1978. Since 1978, radar and instrument patterns have sometimes been conducted.
        vi. The daily flying window has expanded. The 1978 EA states, "Flying operations will be conducted during normal duty hours at Davis-Monthan AFB, 0800 – 1700." Today's OSB flying window is much expanded, to include Night Vision Goggle Training, a night time flying operation.

Finally, very little of the 1978 EA dealt with assessing the flight operations of the OSB aircraft flying within the DMAFB airspace, i.e., conducting arrival, departure and/or pattern operations. These flight operations are the primary concern for the people of Tucson.

2. One of the most comprehensive aspects of the National Environmental Policy Act (NEPA) is that it is applicable to all major federal actions significantly affecting the quality of our human environment. To be specific, the word 'major' means 'of consequence', the word 'federal' means under the control and/or of the responsibility of the federal government, and the word 'actions' means partially or completely federally funded, regulated, etc. . The NEPA protocol requires that an Environmental Impact Statements (EIS), containing a detailed and plainly written statement of need, alternatives, and environmental consequences, be completed before any action is taken. Further, the EIS will document the analysis of proposed "major' federal actions that significantly affect our human environment. The EIS must result in a Record of Decision which is prepared as a concise public document stating a decision, identifying all alternatives considered, listing specific environmentally preferable alternatives and stating the possible mitigation to avoid/minimize harm to the environment.

   In August of 1978, the Council on Environmental Quality (CEQ) developed guidelines for preparing EISs which included two aspects of documentation the use of categorical exclusions and Environmental Assessments (EA), which were not originally contained in the National Environmental Policy Act of 1969. Categorical exclusions (CATEX) are applicable to actions which do not individually or cumulatively have a significant effect on the human environment, have been previously approved by CEQ or which have been found to have no significant effect. Because there is no approved CATEX to address OSB, use of an EA is the most benign methodology for addressing the potential impacts of OSB.

   An EA is not an analysis, but is a concise public document which provides an assessment of an action for which the scope is limited to either completing a Finding of No Significant Impact (FONSI) or proceeding with an EIS. An EA cannot, by definition, document significant impacts.

   14 November 2008, Davis-Monthan AFB officials signed and submitted an AF Form 813, Request for Environmental Impact Analysis," to Headquarters Air Combat Command. The AF Form 813 stated, "Proposed action does not qualify for a CATEX; further environmental analysis is required." It recommended: "an EA be prepared by a private consulting contractor." The Request for Environmental Impact Analysis was not approved.

3. November 2009, a Draft Air Installation Compatible Use Zone (AICUZ) Report was completed for Davis-Monthan AFB; it was based on data collected in 2007. The Draft AICUZ Study was an update initiated because of changes in aircraft operations since the last AICUZ Study in 1992. For its part, the Air Force perceives its AICUZ responsibilities as falling with the areas of flying safety, noise abatement, and participation in the land use planning process. To that end, the 2009 AICUZ was a reevaluation of aircraft noise and accident potential related to U.S. Air Force flying operations at Davis-Monthan AFB. These are the areas of concern for the citizens of Tucson, as evidenced by letters sent to public officials. Over the years, the public's interest in Operation Snowbird has waxed and waned. [redacted] November 2008 letter sent to the Secretary of Defense and courtesy copied to Senator Kyl reflects the publics' renewed interest in Operation Snowbird. Her letter was followed by several other letters from citizens concerned with aircraft noise and flight safety. There remains a need for a new AICUZ. The environment has changed: Tucson has grown. According to the 2009 Draft AICUZ, "Between 1990 and 2006, the population of the City of Tucson grew by more than 113,000, a 28 percent increase, and the population of Pima County grew by almost 280,000, a 41.9 percent increase.[lvi]" OSB's mission has change: it has

evolved and grown. The prevailing AICUZ is dated. Davis-Monthan's bi-annual data collection for revalidation has been inconsistent. In short, there is a need for a reevaluation of aircraft noise and accident potential related to U.S. Air Force flying operations at Davis-Monthan AFB.

RECOMMENDATIONS

1. Air Force prepare a written environmental assessment (EA) to determine whether or not Operation Snowbird significantly impacts the Tucson environment. The prevailing EA, dated 1978, does not reflect the current level of operations nor type of aircraft flown in Operation Snowbird. Air Force should ensure the new EA includes an assessment of OSB flight operations within the DMAFB airspace, i.e., conducting arrival, departure and/or pattern operations. A new EA would re-establish the baseline of activities and provide a more realistic view of impacts associated with Operation Snowbird operations.
2. Air Force contract for a new AICUZ. The prevailing AICUZ, dated 1992, does not reflect the current level of operations. A new AICUZ would re-evaluate aircraft noise and accident potential related to U.S. Air Force flying operations at Davis-Monthan AFB.

References

[i] E-mail from: Anderson, David P Mr. CIV NG NGB ARNG, Sent: Thursday, March 18, 2010 9:45 AM.

[ii] HISTORY of 836th Air Division, Davis-Monthan Air Force Base and the 355th Tactical Training Wing, 1 January – 31 March 1981, Volume 1, Narrative, SSgt Diego Melendez and Sgt Frank Podgorski, page 18.

[iii] El Tigre News (162d Fighter Wing base paper), March 2002, pg 9.

[iv] E-mail from NGB/XP ([redacted]) to NGB/XO ([redacted]), 25 April 2001.

[v] Snowbird DET, e-mail from [redacted], 162 FW/CC to [redacted], June 06, 2001.

[vi] "Devastation," Jim Miller, Tucson Monthly, October 1998, page 33.

[vii] Memorandum for ANG/XPME/OLTN, From [redacted], Subject Trip Report, Purpose CRTC – Snowbird (162 FW), 10 Sep 2001.

[viii] Operation Snowbird, PowerPoint Brief, Slide 2. Brief provided by [redacted], Operation Snowbird commander.

[ix] http://www.epa.gov/compliance/nepa/index.html.

[x] HISTORY of Twelfth Air Force, Bergstrom AFB, Texas 1979 by Office of History, pg 48.

[xi] A report to the UNIVERSITY OF ARIZONA FACULTY SENATE by the AIR TRAFFIC COMMITTEE, UNIVERSITY OF ARIZONA, 31 March 1979, Walter J. Fahey, Ph.D., Electrical Engineering, Chairman; Thomas E. Doran, Office of the President, Recorder; Louis J. Battan, Ph.D., Atmospheric Sciences; Jack D. Gaskill, Ph.D., Optical Sciences; Lay J. Gibson, Ph.D., Geography; James R. Glaze, Ed.D., Environmental Health & Safety; David Mouat, Ph.D., Geography; Thomas R. Rehm, Ph.D., Chemical Engineering; John S. Sumner, Ph.D.,'Geosciences.

[xii] Environmental Assessment, Expansion of the Arizona Air National Guard Facility, Davis-Montan AFB, 27 September 1995, paragraph 1.1.

[xiii] Air Installation compatible Use Zone (AICUZ) Report, 10 January 1992, page 31.

[xiv] Finding of No Significant Impact (FONSI), Environmental Assessment, Expansion of the Arizona Air National Guard Facility, Davis-Montan AFB, 27 September 1995, page 1.

[xv] Memorandum for 355 CES/DEO, ATTN: [redacted], from 162 CES/CEE, [redacted], 15 September 1995.

[xvi] Environmental Assessment, Expansion of the Arizona Air National Guard Facility, Davis-Montan AFB, 27 September 1995, paragraph 1.1.

[xvii] Finding of No Significant Impact (FONSI), Environmental Assessment, Expansion of the Arizona Air National Guard Facility, Davis-Montan AFB, 27 September 1995, page 2.

[xviii] "Devastation," Jim Miller, Tucson Monthly, October 1998, page 30.

[xix] Finding of No Significant Impact (FONSI), Environmental Assessment, Expansion of the Arizona Air National Guard Facility, Davis-Montan AFB, 21 April 1999, page 2.

[xx] Environmental Assessment, Expansion of the Arizona Air National Guard Facility, Davis-Montan AFB, 21 April 1999,, paragraphs 1.1 - 1.2

[xxi] Finding of No Significant Impact (FONSI), Environmental Assessment, Expansion of the Arizona Air National Guard Facility, Davis-Montan AFB, 19 June 1999, page 2.

[xxii] Talking Paper on GSU Status for Operation Snowbird, 5 Nov 00, [redacted], 162 FW/LNG

[xxiii] Memorandum for ANG/XPME/OLTN, From [redacted], Subject Trip Report, Purpose CRTC – Snowbird (162 FW), 10 Sep 2001.

[xxiv] Memorandum for ANG/XPME/OLTN, From [redacted], Subject Trip Report, Purpose CRTC – Snowbird (162 FW), 10 Sep 2001.

[xxv] El Tigre News (162d Fighter Wing base paper), March 2002, pg 9.

[xxvi] Operation Snowbird, PowerPoint Brief, Slide 2. Brief provided by [redacted], Operation Snowbird commander.

[xxvii] Draft DMAFB AICUZ Study, November 2009, page 1-1.

[xxviii] Letter from [redacted] to Dr. James G. Roche, Secretary of the Air Force, 26 January 2005.
[xxix] Davis-Monthan AFB Final AICUZ Study November 2009, pages 2-18 - 2-19.

[xxx] Air from IMT 813, Request for Environmental Impact Analysis, 14 November 2008.
[xxxi] Letter from [redacted] to Honorable Robert M. Gates, Secretary of Defense, November 20, 2008.
[xxxii] Letter from Sen Jon Kyl to Colonel Michael Chandler, Air Force Senate Liaison Office, 4 December 2008.
[xxxiii] Letter from Lt Gen Harry M. Wyatt III ,Director, ANG to Senator Jon Kyl, March 6, 2009.
[xxxiv] Letter from Lt Gen Harry M. Wyatt III ,Director, ANG to Senator Jon Kyl, March 6, 2009.
[xxxv] Letter from [redacted] to Senator Jon Kyl, March 25, 2009.
[xxxvi] Letter from Lt Col Marvin T. Baugh ,Office of the Secretary of the Air Force, to Senator Jon Kyl, May 7, 2009.
[xxxvii] Letter from [redacted] to Senator Jon Kyl, May 26, 2009.
[xxxviii] Letter from Michael A. Fleishman to Honorable Robert M. Gates, Secretary of Defense, September 10, 2009.
[xxxix] HISTORY of Twelfth Air Force, Bergstrom AFB, Texas 1979 by Office of History, pg 47.
[xl] Environmental Assessment, Expansion of the Arizona Air National Guard Facility, Davis-Montan AFB, 27 September 1995, paragraph 1.1.
[xli] Finding of No Significant Impact (FONSI), Environmental Assessment, Expansion of the Arizona Air National Guard Facility, Davis-Montan AFB, 21 April 1999, page 2.
[xlii] Talking Paper on GSU Status for Operation Snowbird, 5 Nov 00, [redacted], 162 FW/LNG.
[xliii] Operation Snowbird, PowerPoint Brief, Slide 3. Brief provided by [redacted], Operation Snowbird commander.
[xliv] http://www.globalsecurity.org/military/agency/usaf/162fw.htm.
[xlv] Questions and Answers for the Wyle Group Regarding Operation Snowbird (OSB), [redacted], NGB/A3XO, 26 January 2010.
[xlvi] Letter from Lt Gen Harry M. Wyatt III ,Director, ANG to Senator Jon Kyl, March 6, 2009.
[xlvii] E-mail: From: [redacted] USAF ANG 162 OSB/CC [redacted], Sent: Wednesday, April 14, 2010 10:04 AM.
[xlviii] HISTORY of Twelfth Air Force, Bergstrom AFB, Texas 1979 by Office of History, pg 47.
[xlixxlix] Memorandum for ANG/XPME/OLTN, From [redacted], Subject Trip Report, Purpose CRTC – Snowbird (162 FW), 10 Sep 2001.
[l] Operation Snowbird, PowerPoint Brief, Slides 3 & 7. Brief provided by [redacted], Operation Snowbird commander.
[li] Questions and Answers for the Wyle Group Regarding Operation Snowbird (OSB), [redacted], NGB/A3XO, 26 January 2010.
[lii] Questions and Answers for the Wyle Group Regarding Operation Snowbird (OSB), [redacted], NGB/A3XO, 26 January 2010.
[liii] Questions and Answers for the Wyle Group Regarding Operation Snowbird (OSB), [redacted], NGB/A3XO, 26 January 2010.
[liv] Air Installation compatible Use Zone (AICUZ) Report, 10 January 1992, page 31.
[lv] Air Installation compatible Use Zone (AICUZ) Report, 10 January 1992, page 31.
[lvi] Draft DMAFB AICUZ Study, November 2009, page 2-1.