

# 73rd MORSS CD Cover Page

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Presented in (input and Bold one): (**WG\_22\_\_**, CG \_\_, Special Session \_\_, Poster, Demo, or Tutorial):

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# Air Education and Training Command

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*Sustaining the Combat Capability of America's Air Force*



## FLYING TRAINING CAPACITY MODEL Initial Results MORSS 2005

**U.S. AIR FORCE**

Capt Susan Lynch

21-23 Jun 05

AETC Studies & Analysis Squadron

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*Integrity - Service - Excellence*

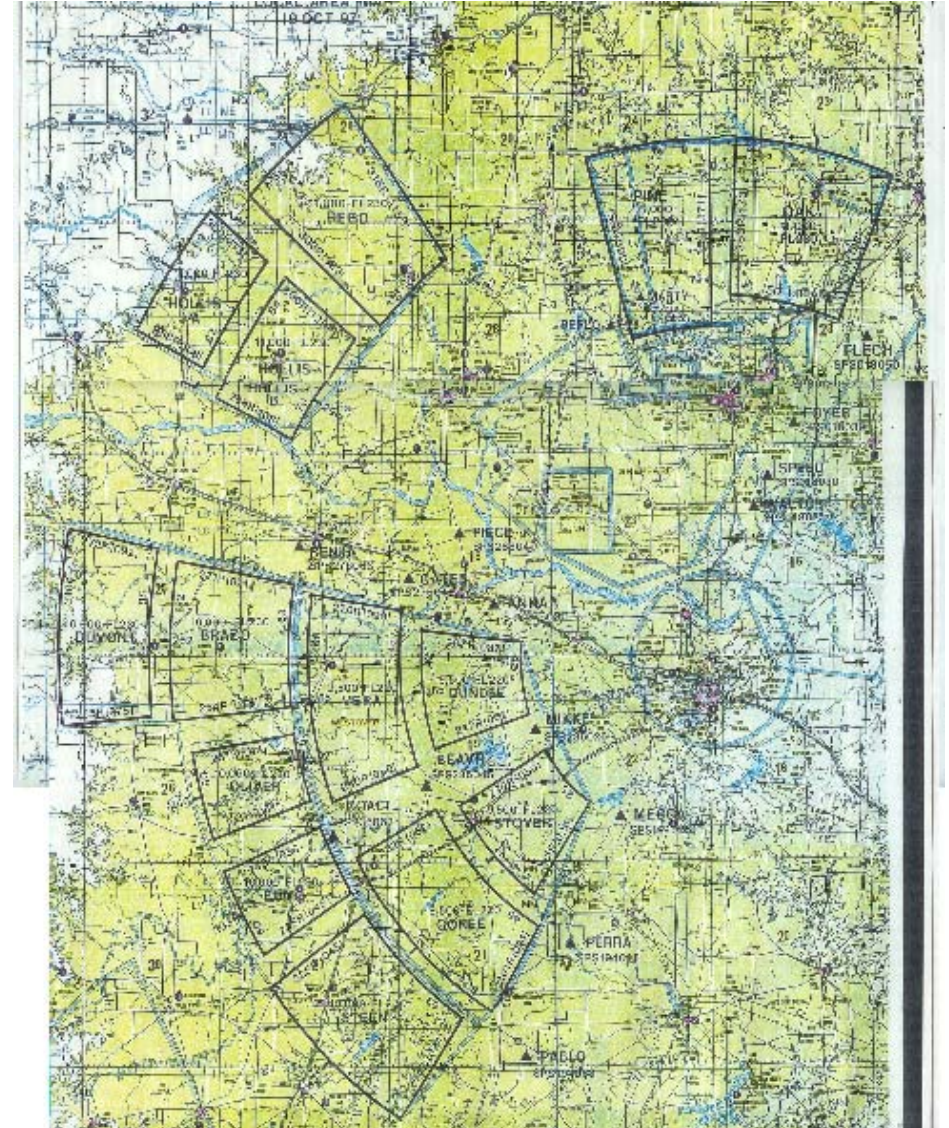


# Overview



**AETC**

- Objective
- Background
- FAA Model
- Capacity Metrics
- SAS Model
- Initial Results
- Conclusions
- Way Ahead





# Objective



- **Determine the flying training capacity for 6 bases:**
  - **Sheppard AFB**
  - **Randolph AFB**
  - **Moody AFB**
  - **Columbus AFB**
  - **Laughlin AFB**
  - **Vance AFB**
- **Develop versatile flying training capacity simulation model for AETC**
- **Reconcile metrics between FAA model and AETC operational models**



# Background



- **FAA Circular 150/5060-5: Airport Capacity and Delay** dated 9-23-83 (with changes 1 & 2) only readily available model used to calculate airfield operational capacity
- **HQ AETC/DO generates flying training capacity via Flying Training Resources Analysis and Programming (FTRAP) model**
- **Jan 05 – AETC/XP tasked SAS to generate flying training capacity**
- **Jun 05 - AETC SAS briefed AETC/XP on model results**
- **Currently - Model results being validated with HQ AETC/DOR and flying training bases**



# FAA Model



- **FAA Circular 150/5060-5: Airport Capacity and Delay, dated Sep 83**
  - No soft copies of circular exist
  - FAA has not been updating circular
- **FAA uses two models to estimate airport capacities**
  - SIMMOD
  - TAAMS (Total Airspace & Airport Modeler) by Boeing
- **Differences between FAA circular/models and AETC flying operations**
  - **FAA Advisory Circular: Airport Capacity & Delay BBP, dated 14 Feb 05**
    - Circular does not take circular pattern of small trainer aircraft into consideration
    - Circular does not concentrate on training launch intervals—primary limiting factor in AF operations
  - **FAA and AETC models use different capacity metrics**



# FTRAP Model



- **FTRAP model is proven**
  - Currently used by HQ AETC to program flying training students
  - Based on previous simulation model
  - Provides maximum sustainable student capacity numbers by base
- **FTRAP model is not versatile**
  - Excel spreadsheets based on corporate knowledge
  - Requires flying training subject matter expert (SME) inputs



# Capacity Metrics



- **FAA Capacity Metrics – Runway Operations**
  - Based on runway operations – landing and take-offs
  - Consider maximum runway IFR & VFR operations
  - Capacity given in terms of runway operations per year
- **AETC Capacity Metrics - Graduates**
  - Based on sortie generation
  - Consider traffic in training patterns required to complete sorties
  - Capacity given in terms of UPT graduates per year
- **Translating AETC capacity metrics into FAA capacity metrics**
  - Compared FAA operations / hour and AETC operations / graduate
  - Calculated runway operations / year from actual graduates



# SAS Model



- **Data and assumptions from FTRAP model & bases**
  - Weather data by base
  - Maintenance records and interviews by base
  - Daylight hours modeled based on historical data—most student sorties occur during day
- **Sorties built from flying training syllabus in coordination with Instructor Pilots (IPs) from each course**
- **Airspace capacities from base operations SMEs**
  - Runway capacities
  - Military Operating Area capacities (including aux fields)
  - Training route capacities
- **Resources are variable by base**
  - Number of aircraft
  - Daily student load
  - Student arrivals
  - Flying schedules

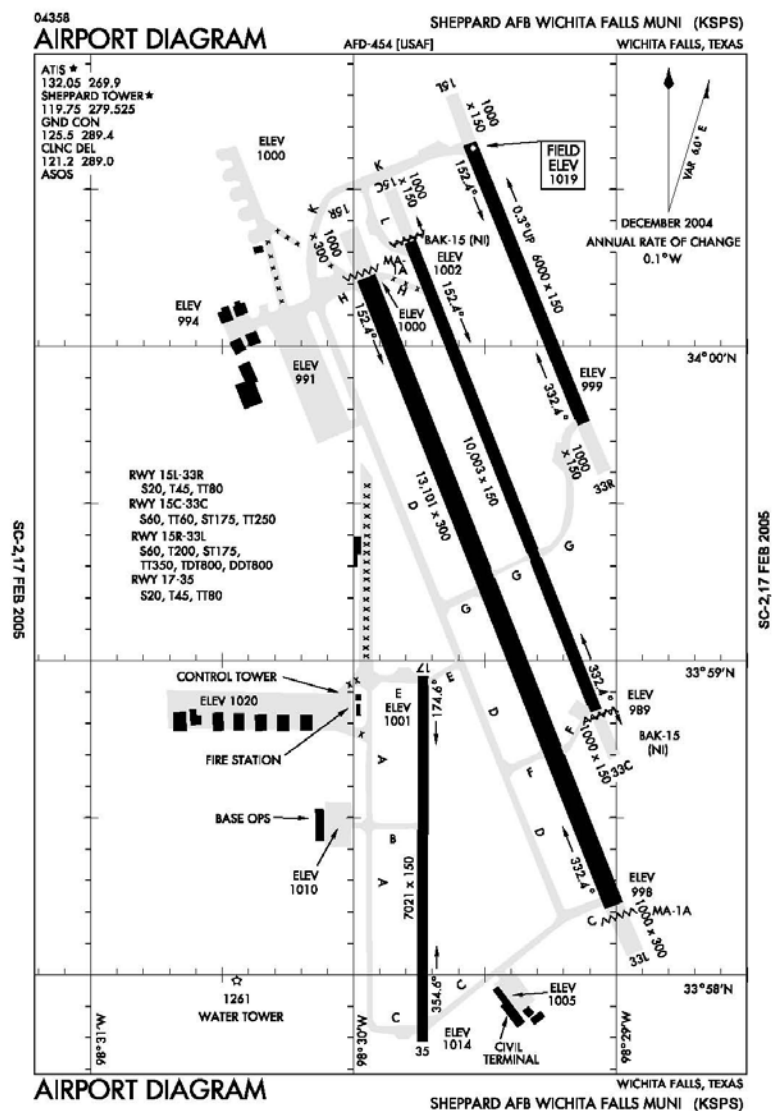


# SAS Model

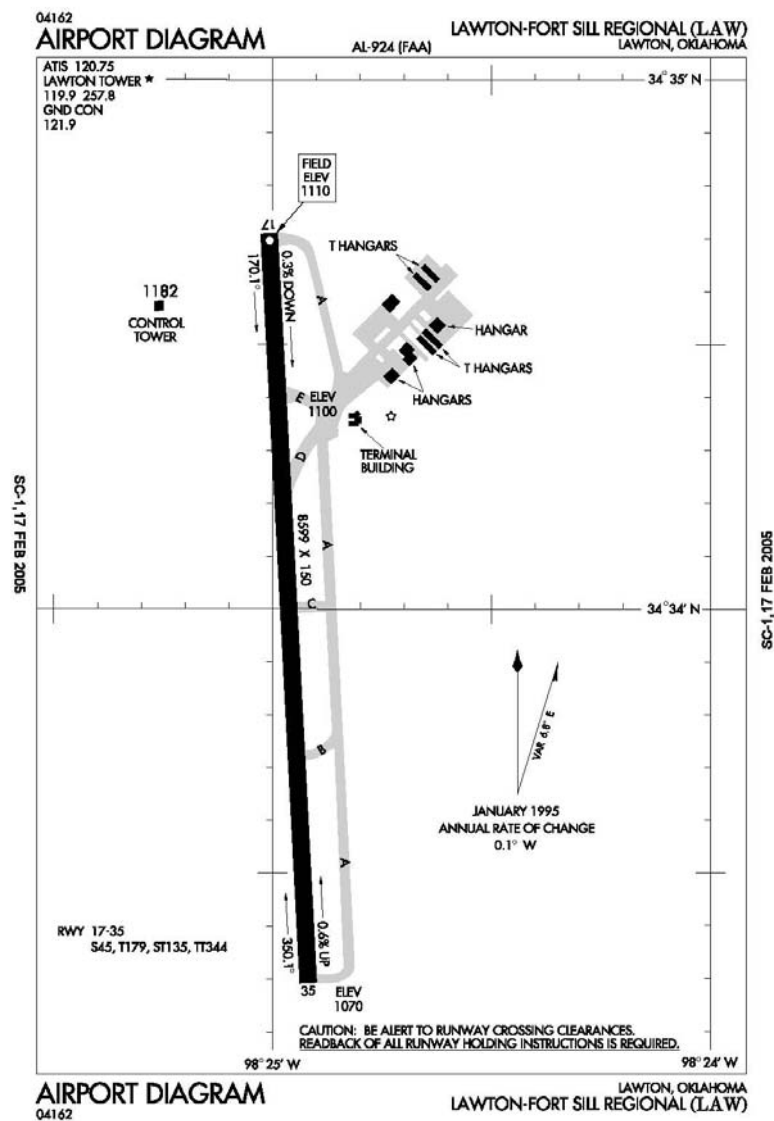


**AETC**

## Sheppard AFB



## Lawton Air Field





# SAS Model



- Courses modeled (in Arena application)**

| Sheppard AFB                                |           | Columbus AFB |           | Laughlin AFB |           | Vance AFB |           | Moody AFB             |           | Randolph AFB |           |
|---------------------------------------------|-----------|--------------|-----------|--------------|-----------|-----------|-----------|-----------------------|-----------|--------------|-----------|
| Course                                      | # Sorties | Course       | # Sorties | Course       | # Sorties | Course    | # Sorties | Course                | # Sorties | Course       | # Sorties |
| ENJJPT T37                                  | 93        | T1           | 57        | T1           | 57        | T1        | 57        | T6                    | 65        | T1 PIR       | 22        |
| ENJJPT T37 PIT                              | 71        | T37 ALP      | 126       | T6           | 65        | T37       | 68        | IFF                   | 24        | T1 PIT       | 44        |
| ENJJPT T38                                  | 100       | T37          | 68        | T38A         | 100       | T38C      | 98        |                       |           | T6 PIT       | 44        |
| ENJJPT T38 PIT                              | 71        | T38C         | 98        | T38C         | 98        |           |           |                       |           | T6 IPT       | 29        |
| ENJJPT IFF                                  | 34        |              |           |              |           |           |           |                       |           | T37 PIR      | 27        |
| ENJJPT IFF PIT                              | 29        |              |           |              |           |           |           |                       |           | T37 PIT      | 50        |
|                                             |           |              |           |              |           |           |           |                       |           | T38C PIR     | 29        |
|                                             |           |              |           |              |           |           |           | T38C PIT              | 71        |              |           |
| 398                                         |           | 349          |           | 320          |           | 223       |           | 89                    |           | 316          |           |
| ENJJPT – Euro NATO Joint Jet Pilot Training |           |              |           |              |           |           |           | Total Sorties Modeled |           | 1695         |           |

ENJJPT – Euro NATO Joint Jet Pilot Training

T37 – Primary Trainer

PIT – Pilot Instructor Training

T38 – Fighter/Bomber Trainer

IFF – Introduction to Fighter Fundamentals

T1 – Heavy Trainer

ALP – Aviation Leadership Program

IPT – Instructor Pilot Transition

PIR – Pilot Instructor Requalification



# Columbus Initial Results



## Graduates Metric

| FY04 Graduates       | Primary T-37       | T-37 ALP | T38 | T1   |
|----------------------|--------------------|----------|-----|------|
| Actuals              | 344                | 19       | 126 | 227  |
| FTRAP Projection     | 383                | 36       | 125 | 230  |
| SAS Model Projection | 366                | 33       | 139 | 206  |
| Maximum Capacity     | T-37 Primary / ALP |          | T38 | T1   |
| FTRAP Estimate       | 428                |          | 147 | 219  |
| SAS Model Projection | 454                |          | 182 | 225  |
| FY04 Operating Cap   | T-37 Primary / ALP |          | T38 | T1   |
| FTRAP Estimate       | 98%                |          | 85% | 105% |
| SAS Model Projection | 88%                |          | 76% | 92%  |

SAS Model validated within variance of FY04 actuals & FTRAP estimates



# Columbus Initial Results



## Runway Operations Metric

| FY04 Graduates       | Primary T-37       | T-37 ALP | T38    | T1     |
|----------------------|--------------------|----------|--------|--------|
| Actuals              | 213000             | 16000    | 99000  | 132000 |
| SAS Model Projection | 227000             | 22000    | 109000 | 119000 |
| Maximum Capacity     | T-37 Primary / ALP |          | T38    | T1     |
| FTRAP Estimate       | 265000             |          | 115000 | 127000 |
| SAS Model Projection | 281000             |          | 142000 | 130000 |
| FAA Estimate         | 461000             |          | 426000 | 275000 |
| FY04 Operating Cap   | T-37 Primary / ALP |          | T38    | T1     |
| FTRAP Estimate       | 98%                |          | 85%    | 105%   |
| SAS Model Projection | 89%                |          | 77%    | 92%    |
| FAA Model Estimates  | 56%                |          | 23%    | 48%    |

FAA Model overestimates current capacity at Columbus AFB



# Conclusions



- **Accurately determined the flying training capacity**
  - SAS model validated with FY04 actual grads and FTRAP historical programming estimates for all 6 bases
  - Predicts future graduate capacity within 4% of actual operational capacity
- **Developed versatile flying training capacity simulation model for AETC**
  - Projects bases ability to accept additional flying training missions
  - Projects maximum student capacity based on current weather, maintenance, aircraft and airspace availability
- **Reconciled metrics between FAA model and AETC operational models**
  - Translated student graduates into operations per hour
  - Showed the FAA model overestimates current capacity at all AETC flying training bases



# *Sustaining the Combat Capability of America's Air Force*



**AETC**



*Integrity - Service - Excellence*