



Engineering at Tinker AFB



For:

The Society of American Military Engineers



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Director of Engineering,
Oklahoma City Air Logistics
Center

Date: 22 Oct 09



Integrity - Service - Excellence



Tinker Air Force Base



- **Oklahoma City Air Logistics Center**
- **552nd Air Control Wing (AWACS)**
- **507th Air Refueling Wing (Tankers)**
- **Navy Strategic Communications Wing ONE (TACAMO)**
- **3rd Combat Communications Group**
- **38th Cyberspace Engineering Group**
- **Defense Information Systems Agency**
- **Defense Logistics Agency**
- **448th Supply Chain Management Wing**



Tinker's Economic Impact

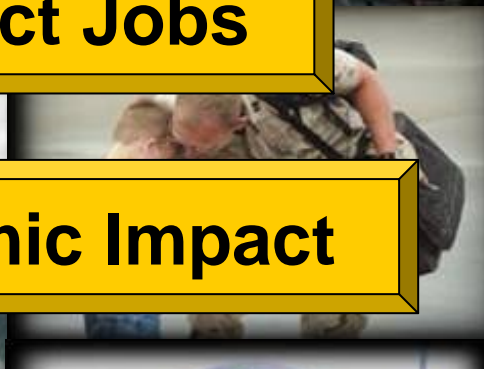
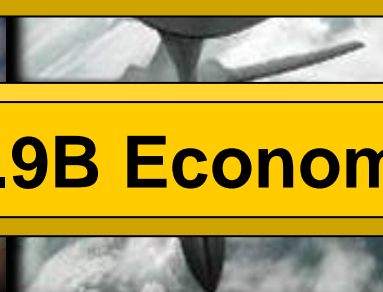
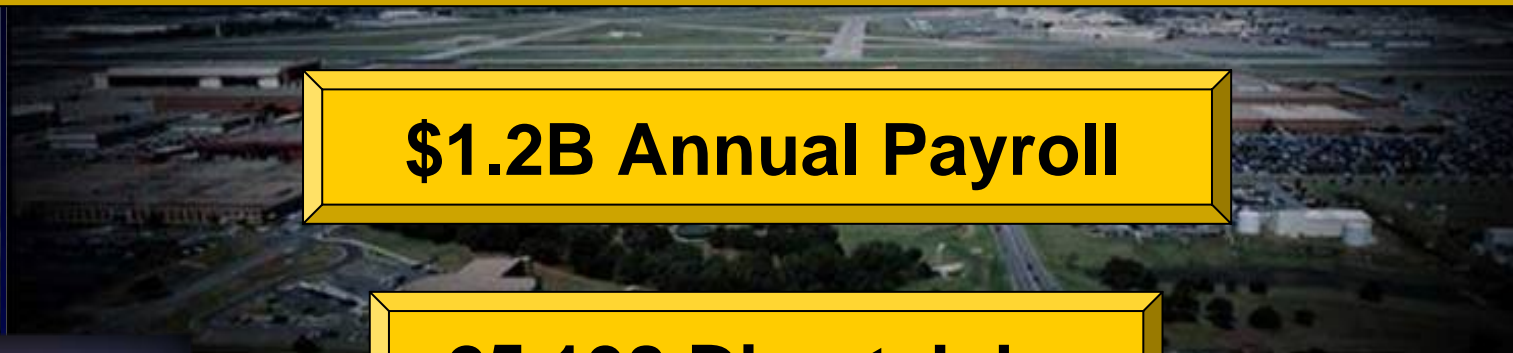
Oklahoma's Largest Single-Site Employer

\$1.2B Annual Payroll

25,198 Direct Jobs

\$2.9B Economic Impact

30,510 Indirect Jobs Valued at \$1.17B





Total Workforce

	OC-ALC	Tinker
Officer	274	1698
Enlisted	801	7,476
Civilian	12,109	15,111
Contractors	2,252	2,652
Total	15,436	26,937



Delivered: FY 08

**Produced
179 Software Programs**

**Produced
188 Aircraft**

**Produced
260 Engines**



**Produced 69,000
Component Parts**

Integrity - Service - Excellence



The Tinker Way



“As a quality focused team, we need to rapidly deliver warfighter capability. Our critical mission can only be fulfilled through teamwork and an engaged workforce.”

– Maj Gen P. David Gillett, Jr.



ALC Strategic Goals



- **Meet Customer Aircraft Availability Requirements**
 - *Achieve Aircraft Availability (AA) Projections for Managed Weapon Systems*
 - *Achieve Mission Capable (MC) Goal for Managed Weapon Systems*
 - *Achieve War Readiness Engines Allocation*
 - *Improve Air Traffic Control and Landing Systems (ATCALS) Operational Availability*
 - *Achieve High Frequency (HF) Global Communication Operational Availability*
- **Develop and Care for Our People to Enable Success**
 - *Develop, educate, equip and train the workforce*
 - *Safe and healthy work environment*
 - *Support our people and their families*
- **Improve Depot Maintenance Productivity to Maximize Opportunities**
 - *Guaranteed first pass performance*
 - *Improve cycle times*
- **Improve Mission Readiness and Support**
 - *Maximize Tinker Aerospace Complex*
 - *Improve AF nuclear enterprise*
 - *Improve expeditionary operations*



Oklahoma City Air Logistics Center Engineering Directorate (OC-ALC/EN)



EN Mission:

- Lead Team Tinker in sustaining war winning capabilities through engineering and technical (E&T) policies, processes, tools and workforce management

EN Vision:

- Engineering and technical excellence in aerospace logistics





OC-ALC/EN Goals



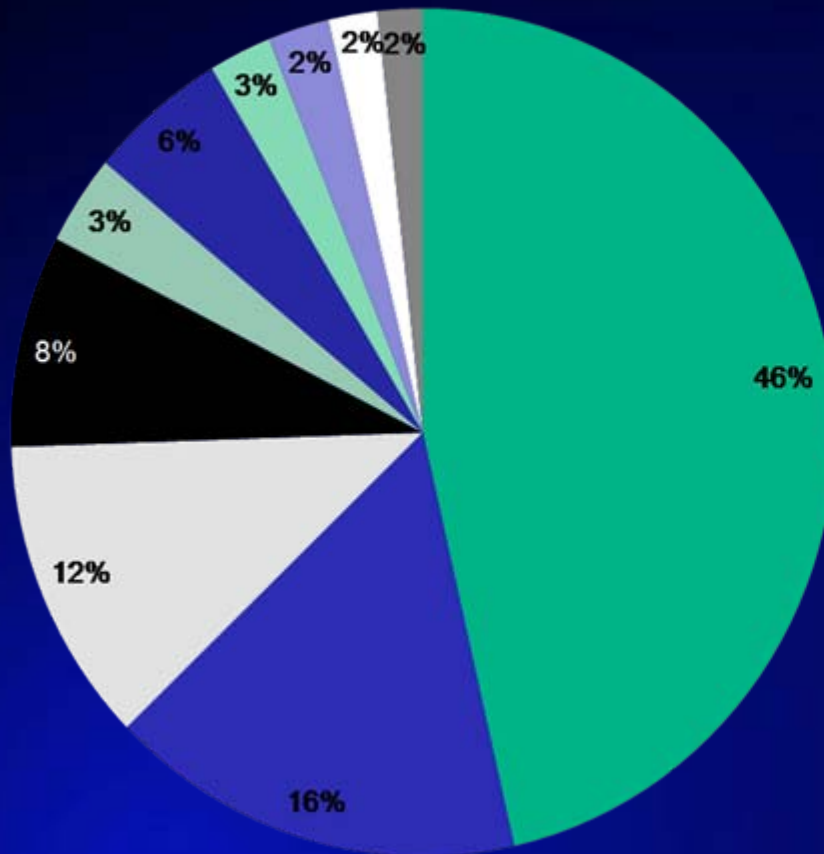
- **EN Goal 1** – Equip the Center with engineering and technical policies, processes and enabling tools to achieve Center strategic goals
- **EN Goal 2** – Develop and maintain a competent Scientist and Engineer (S&E) workforce to meet current and future challenges
- **EN Goal 3** – Promote enterprise technology and cross-cutting technical solutions
- **EN Goal 4** – Sustain and enhance enterprise capabilities to meet evolving war-fighter requirements
- **EN Goal 5** – Act as the Center's test and evaluation (T&E) authority on T&E policy, procedures and test program execution
- **EN Goal 6** – Ensure effective and efficient management of Directorate resources



Tinker AFB S&E Workforce

EN is a Customer Service Organization for a Diverse Workforce of Over 1200 Scientists and Engineers at Tinker

% of Total ALC S&Es by Specialty



- Electronics Engineer (563 civ/17 mil)
- Aeronautical Engineer (192 civ/12 mil)
- Mechanical Engineer (129 civ/17 mil)
- General Engineer (95 civ/6 mil)
- Other (43)
- Computer Sci/Engr (68)
- Industrial Engineer (31)
- Chemist (30)
- Materials Engineer (24)
- Environmental Engineer (22)



ALC Scientist and Engineer Demographics

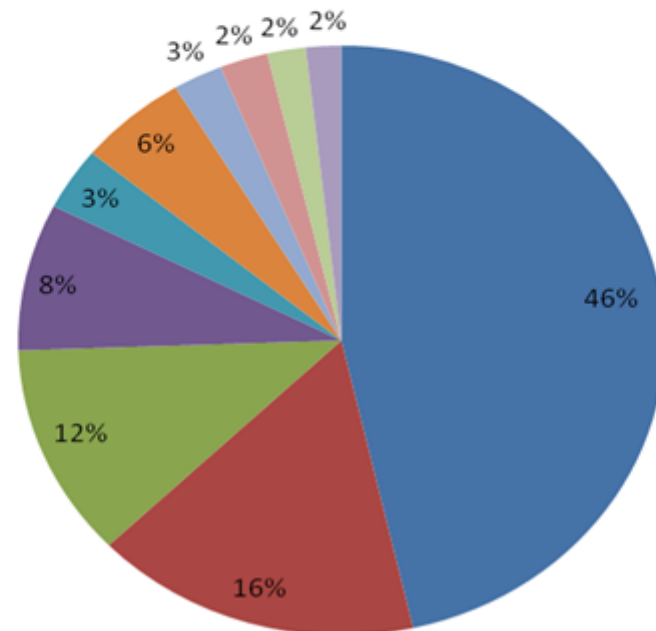
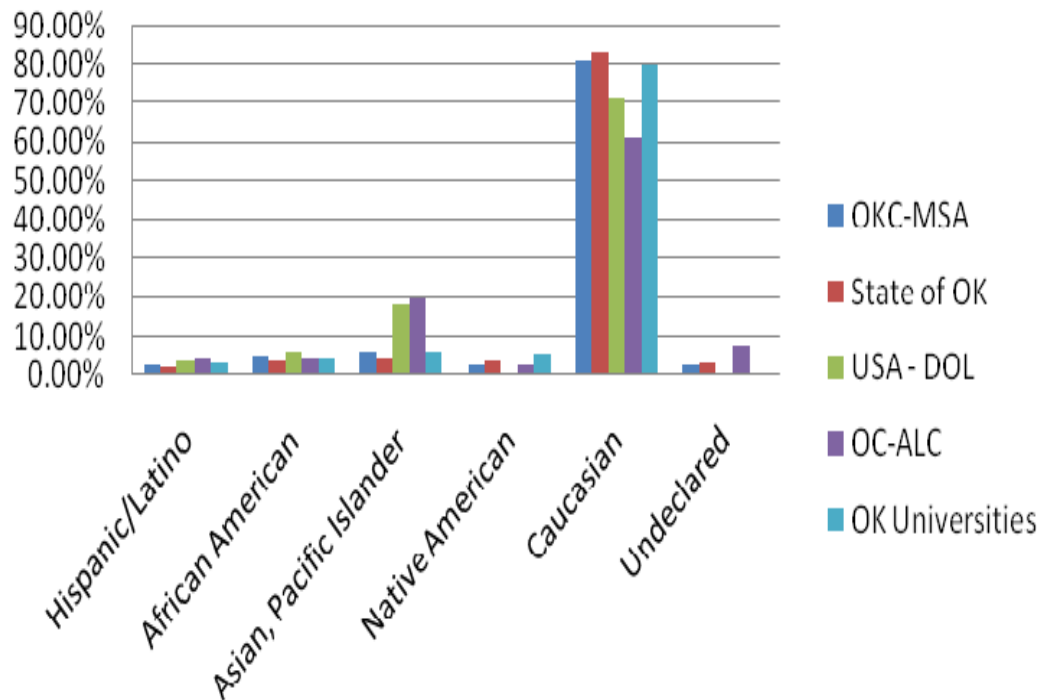


- The big three:
 - Electronics Engineer
 - Aeronautical Engineer
 - Mechanical Engineer

% ALC Engineers By Series

- Electronics Engineer (563 civ/17 mil)
- Mechanical Engineer (129 civ/17 mil)
- Other (43)
- Industrial Engineer (31)
- Materials Engineer (24)
- Aeronautical Engineer (192 civ/12 mil)
- General Engineer (95 civ/6 mil)
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ALC S&E Ethnic Diversity By %



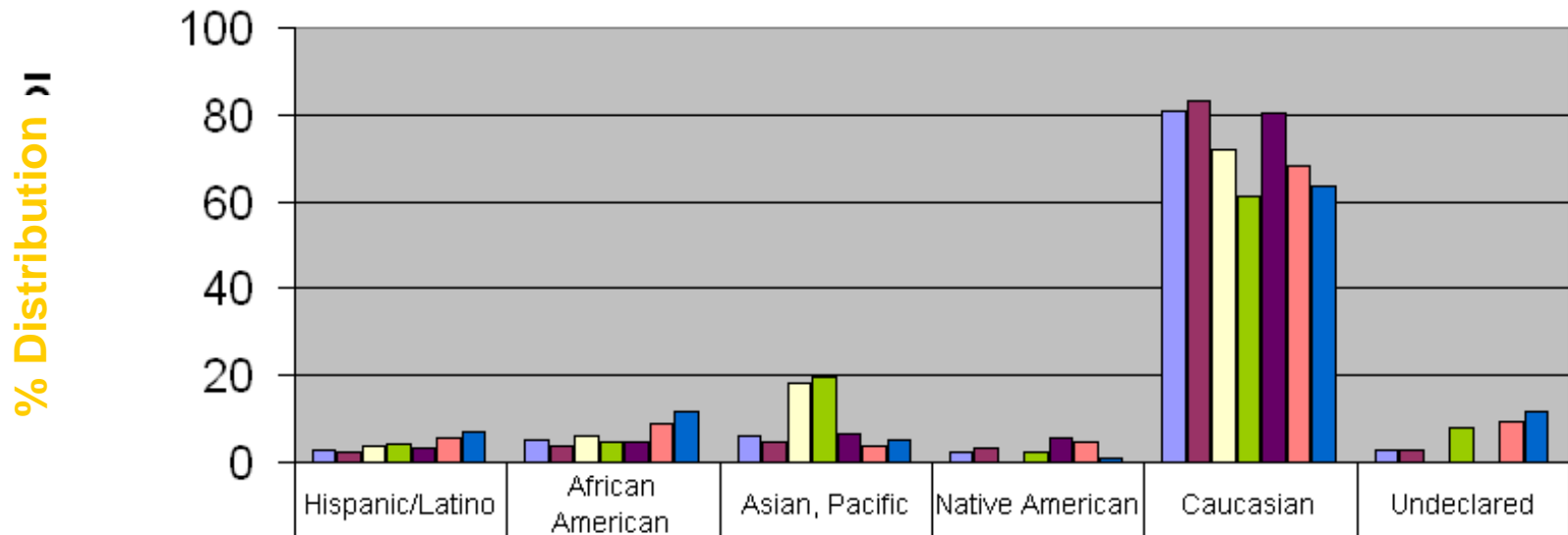
- ALC S&E diversity comparable to local area



S&E Ethnic Group Demographics



Overall Ethnic Group Distribution Comparison



	Hispanic/Latino	African American	Asian, Pacific	Native American	Caucasian	Undeclared
OKC - MSA (19,295)	2.6	5.0	6.1	2.5	80.9	2.8
State of OK (47,680)	2.3	3.6	4.6	3.4	83.1	2.9
USA - DOL (N/A)	3.9	6.0	18.3	N/A	71.8	N/A
OC-ALC (1180)	4.2	4.6	19.6	2.5	61.3	7.8
OK Universities (879)	3.1	4.7	6.4	5.7	80.2	N/A
OC-ALC- All (13,181)	5.4	8.8	3.6	4.7	68.3	9.1
USAF- Civ All (N/A)	7.1	11.7	5.0	1.1	63.5	11.6

Ethnic Group

Note: DOL – US Department of Labor, MSA -- Metropolitan Statistical Area: 6 surrounding counties, N/A – Not Available

S&E

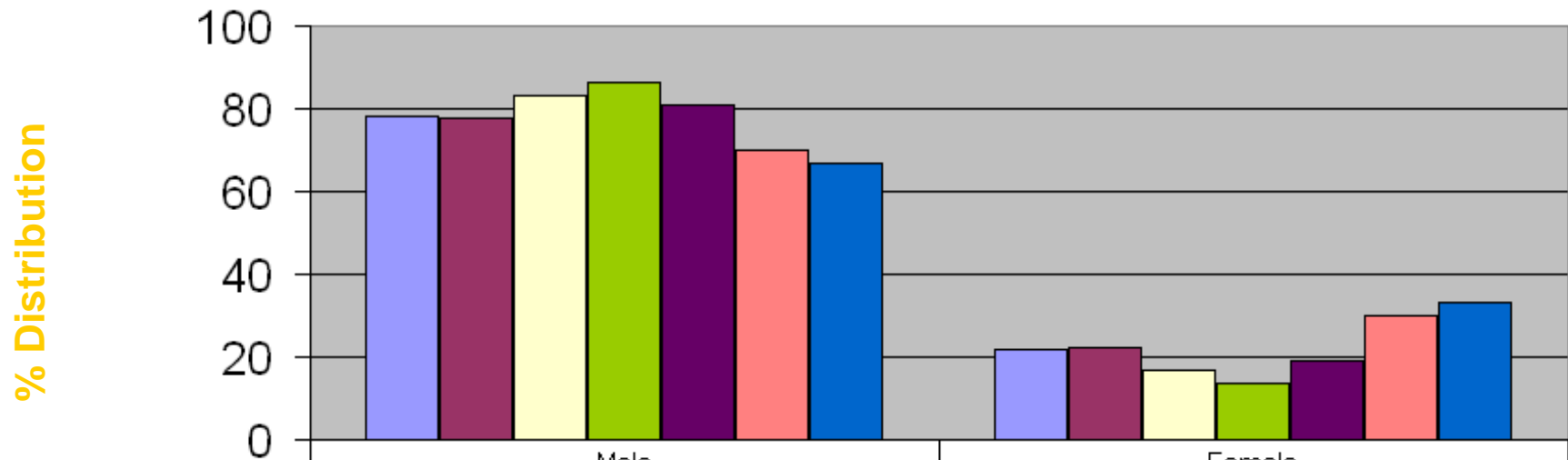
All Series



S&E Gender Demographics



Overall Gender Distribution Comparison



	Male	Female
OKC - MSA (19,295)	78.4	21.6
State of OK (47,680)	77.8	22.2
USA - DOL (N/A)	83.3	16.7
OC-ALC (1180)	86.2	13.8
OK Universities (879)	80.9	19.1
OC-ALC- All (13,181)	70.1	29.9
USAF- Civ All (N/A)	66.6	33.4

GENDER

Note: DOL – US Department of Labor; MSA -- Metropolitan Statistical Area: 6 surrounding counties; N/A – Not Available

S&E

All Series



Recruiting



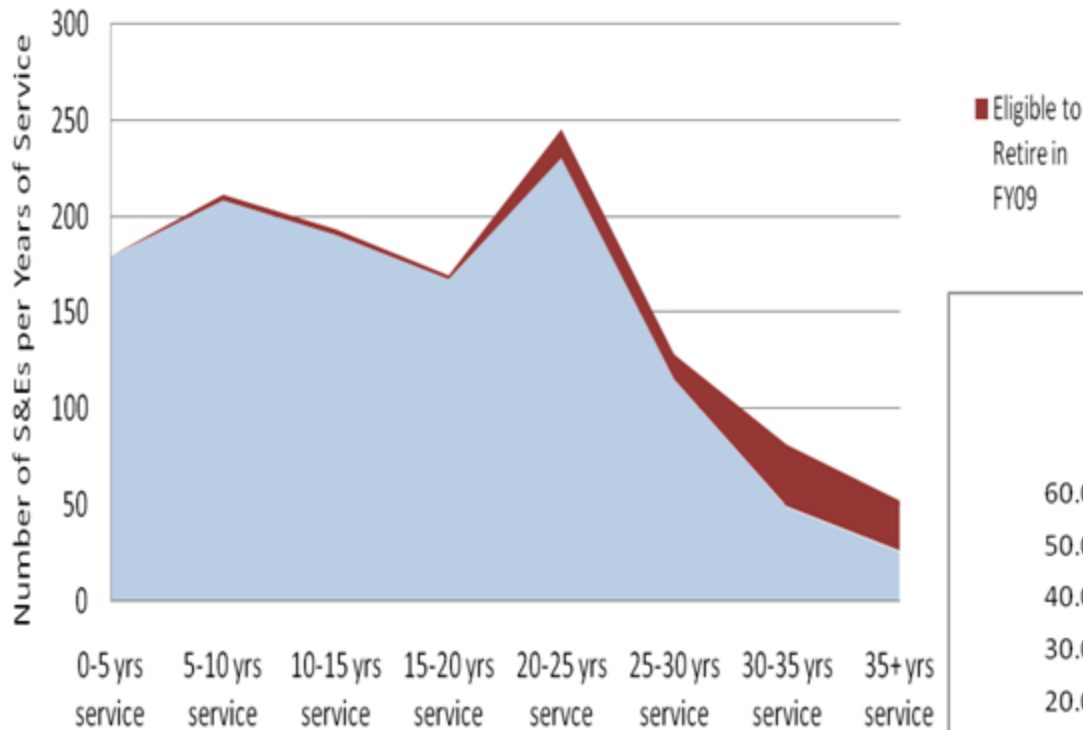
- **Oklahoma environment**
 - Aerospace Industry Engineer Workforce Bill
 - Robust local area university engineering programs
- **Entry level recruiting**
 - Hired average of 56 S&Es/year for last 3 years
 - Aggressive career fair participation
 - Execute 100%+ of PAQ, SCEP, and SMART allocations
- **Marketing for journeyman recruiting**
- **S&E pipeline development**
 - Partnerships with local universities
 - Building relationships with pre-engineering academies and high schools



ALC S&E Retirement Statistics

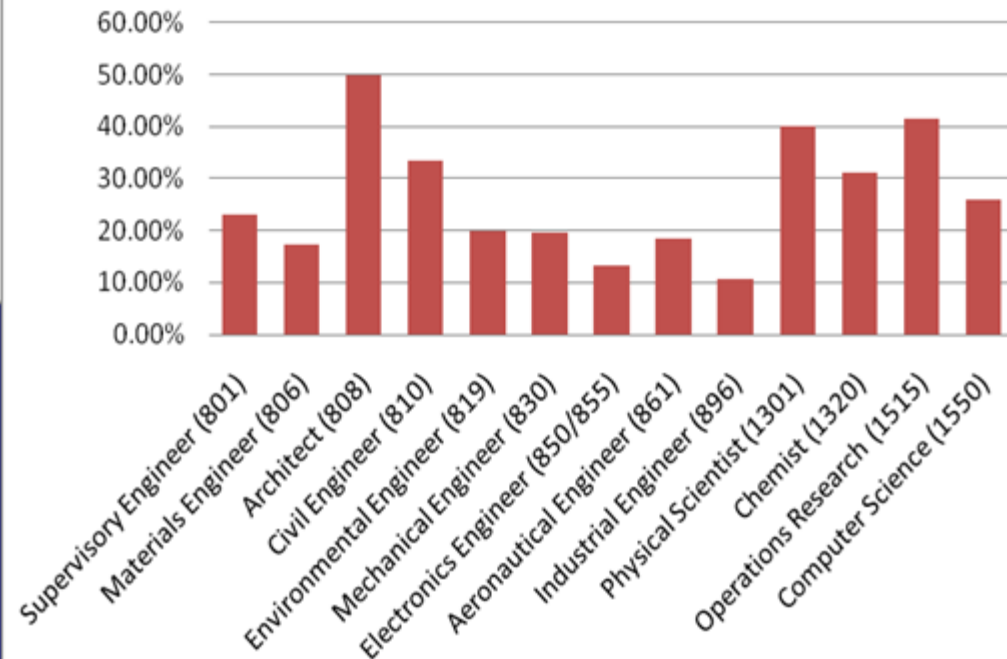


Number of ALC S&Es by Years of Service



- Overall retirement eligible numbers are manageable
 - 8.1% in FY09
 - 19.5% over next 5 yrs

% ALC S&Es Eligible to Retire in the Next 5 Years by Series



- Certain low density career fields may require attention
 - Architect (2/1)
 - Physical Scientist (10/4)
 - Ops Research (12/5)



Current Efforts

- **Technology Insertion**
 - Cooperative Research & Development Agreement (CRADA)
 - Shape Engineering & Advanced Manufacturing (SE & AM)
 - Small Business Innovative Research (SBIR)
- **Workforce Development**
 - University/Pre - Engineering Advisory Boards
 - Engineering Internships/Senior Design Projects
 - Career Broadening
 - Training: Functional/Full Time - Long Term Training
- **Systems Engineering/Industrial Engineering**
 - Systems Engineering Assessment Model (SEAM) ASW
 - Industrial Systems Engineering (ISEN) MXW/GLSC
 - Reliability , standardization, enterprise optimization
 - Standard/additional work tools to aide engineers



Technology Insertion



- **Wing Technology Council (ENS)**
 - Technical challenges discussions with each wing
- **CRADA Initiated in FY08 (ENS)**
 - Collaborative public-private partnerships to support technology related scientific research
- **SE & AM Initiated in FY09 (ENS)**
 - Oklahoma, Oklahoma State, & Tulsa University Commercial/Academic manufacturing partnership
 - First project to conduct advanced mfg on GLSC commodity parts → next is to mfg parts
 - EN contract to initiate studies for follow on actions



Technology Insertion (CRADA)



Project	Government Sponsor	Industry Sponsor	Project Status
Multi Use Robotics System (MURS)	327 ASW (B-52)	Battelle, Small Business, University	Team Agreement Pending
Reverse Engineering Technology	OC-ALC/EN	OU, Small Business	Team Agreement Pending
X-Ray Diffraction (XRD) Residual Stress Measurement Equipment	76 MXW	Keystone, University	Team Agreement Pending
Direct Metal Deposition Technology	OC-ALC/EN OC-ALC/XP	POM Group, Small Business, University	Team Agreement Pending



Technology Insertion (SBIR)



- **10 Current Phase One Projects ~ \$1 M**
 - AF083-225 Physical Optics Corrosion and Fatigue Degradation Analysis and Forecasting system
 - AF083-225 Positron Corrosion and Fatigue Degradation Analysis and Forecasting system
 - AF083-226 Metalast Replacement for Hexavalent Chromium Conversion Coatings
 - AF083-226 Ecosil Replacement for Hexavalent Chromium Conversion Coatings
 - AF083-228 Proto Manufacturing Residual Stress Measurement Forecasting System
 - AF083-228 APES Residual Stress Measurement Forecasting System
 - AF083-229 cognition LLC Decision Support System Based on Collaborative-Orientated System
 - AF083-229 Airtronics Decision Support System Based on Collaborative-Orientated System
 - AF083-230 Aspire Inspection Process Management



Technology Insertion (SBIR)



- **SBIR FY09 Phase II Projects (5 Projects ~ \$4M)**
 - **AF073-105** Just in Time (JIT) Component presentation (AMXG)
 - **AF073-105** (MRO) Physics and Principles of Operation (MP20) (EN) ISEN
 - **AF073-106** Penetrant Material Waste Reduction & Process (PMXG)
 - **AF073-107** Sulfur Hexafluoride (SF6) Replacement or reduction in high voltage
 - **AF073-108** Distributed, Multi-Echelon logistic management (CMXG)
 - **AF073-109** Airframe Structural Remote Detection for Stress & Corrosion cracking (AMXG)



Workforce Development (Future)



- **University Engineering Advisory Board participation**
- **EN participation on 5 University Advisory Boards**
 - Curriculum reviews for TAFB technical requirements
 - OU, OSU, TU, UCO (Physics), OC
- **Engineering Student Internship**
 - 18 Student Career Experience (SCEP)
 - 6 Science, Math & Research Transformation (SMART)
- **Senior Design Projects FY09**
 - 4 projects (CMXG, PMXG, DLA, 72 ABW/CE)
 - » 72 ABW/CE: New TAC gate
 - » 76 CMXG: TAC End item flow
 - » DLA:TAC Material Handling (used in current DLA TAC plan)
 - » PMXG: Engine Test Application



Workforce Development



- **EN Training Program**
 - **Functional and Professional Training (1147 S&Es)**
 - Total Budget: ~\$500k
 - 80 + Classes & 15K hours
 - **Long Term Training (LTT)**
 - 13 engineers currently enrolled
 - Promotes professional currency
- **Career Broadening (FY07- FY09)**
 - 140 Engineers (~12%)
 - Leadership Development and Technical Breadth
 - Revamping current process for improvement
 - Focused on increasing pool of candidates



Science Technology Engineering Math (STEM)



- **Advisory Board participation**
 - Promotion of STEM/Long term workforce shaping
 - Local Schools (Elementary–High School)
 - Pre Engineering Academies
 - Pursuing Federal Funding
- **Local Events/Community Engagement**
 - Engineer for a Day
 - First Robotics Competition
 - Real World Design Challenge
 - Career Day
 - Pre Engineering Academies Project Reviews
 - Job Shadowing & Tours



Tinker Aerospace Complex (TAC)



- **Main assembly plant 2.55M sq ft**
 - Industrial/admin/storage area & Paint facility 700K sq ft
 - Additional facilities (450K sq ft)
- **Space will be utilized specifically for:**
 - Posturing OC-ALC for future workloads
 - New technology insertion
 - Improving efficiency of existing workloads
- **Bottom line:**
 - Better support the Warfighter
- **Huge Process Improvement Opportunities**
- **Industrial/Systems Engineering Focus To Provide**
 - Overarching Integrated Planning
 - Lean Manufacturing
 - Process Modeling
 - Supply Chain Alignment
 - Capacity Planning



TAC Milestones



Past



TF33 Today



DLA Today

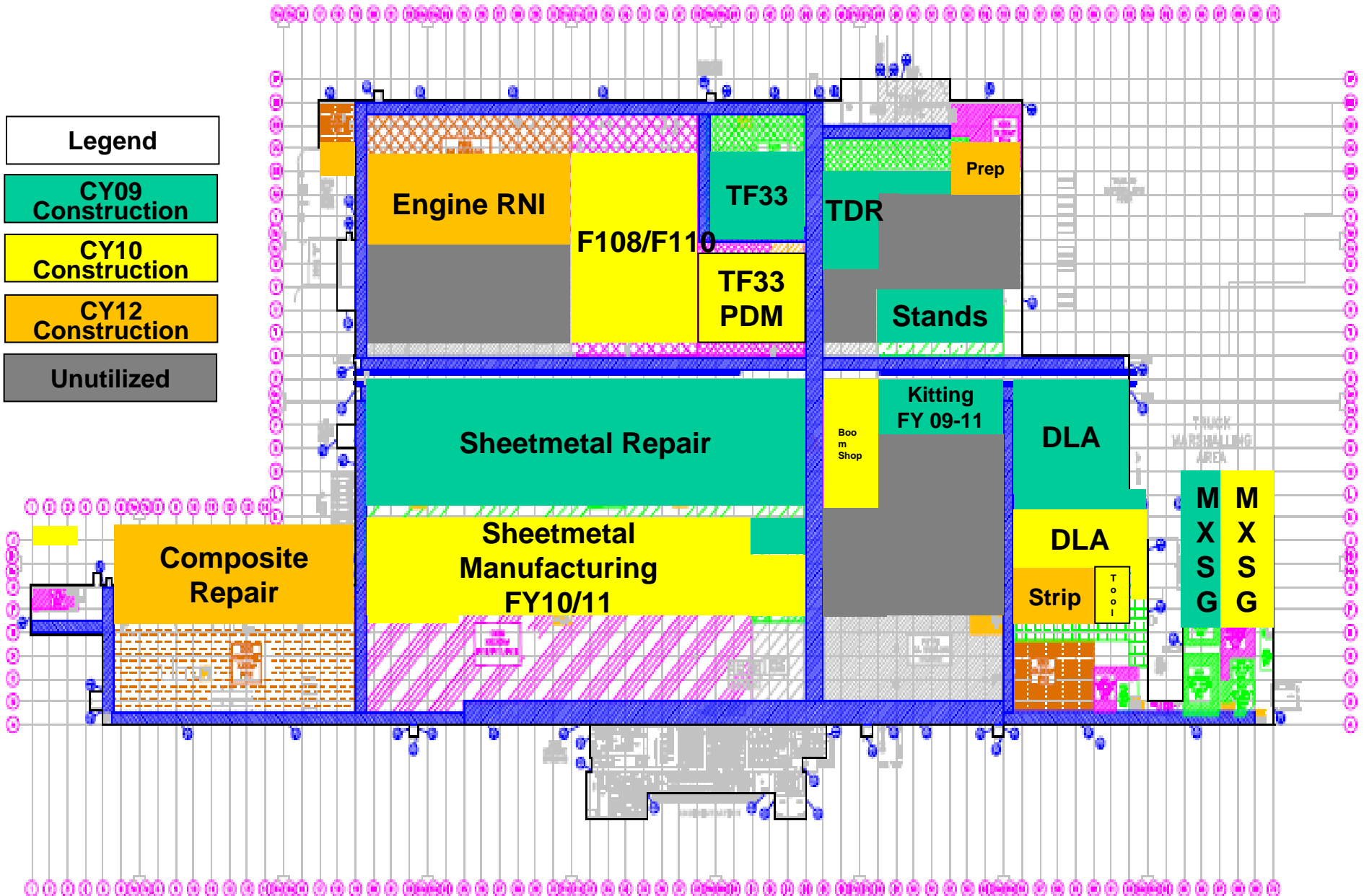


Sheetmetal Today



B9001 (TAC) Planned Occupancy

Legend	
	CY09 Construction
	CY10 Construction
	CY12 Construction
	Unutilized





Tinker Aerospace Complex



- **Explore every TAC/Tinker industrial space opportunity**
 - Inquiries given fair and equitable evaluation
- **16 inquires have been received interested in TAC**
- **Base Support Agreements**
 - 2 Currently in work





Public-Private Partnering (PPP)



- **Governed by Title 10 USC 2474**
- **Arrangement in which government acts as seller and private party contractor acts as buyer**
 - Depot level touch labor
 - Facility lease space
- **“Direct Sales”, “Facilities Use” or “Workshare” Partnering Agreement**
- **Focus on win-win cooperative relationship between private industry and government**



U.S. AIR FORCE

