Software Maintenance Group (SMXG) at Hill AFB

AMERICA'S BEST

HILL AFB

FLY, FIGHT, WIN TOGETHER

Team Hill: 23,000 Strong

■ Utah's Largest Employer

13% Private Contractor Employees

64% Federal Civilian Employees

23% Military Members
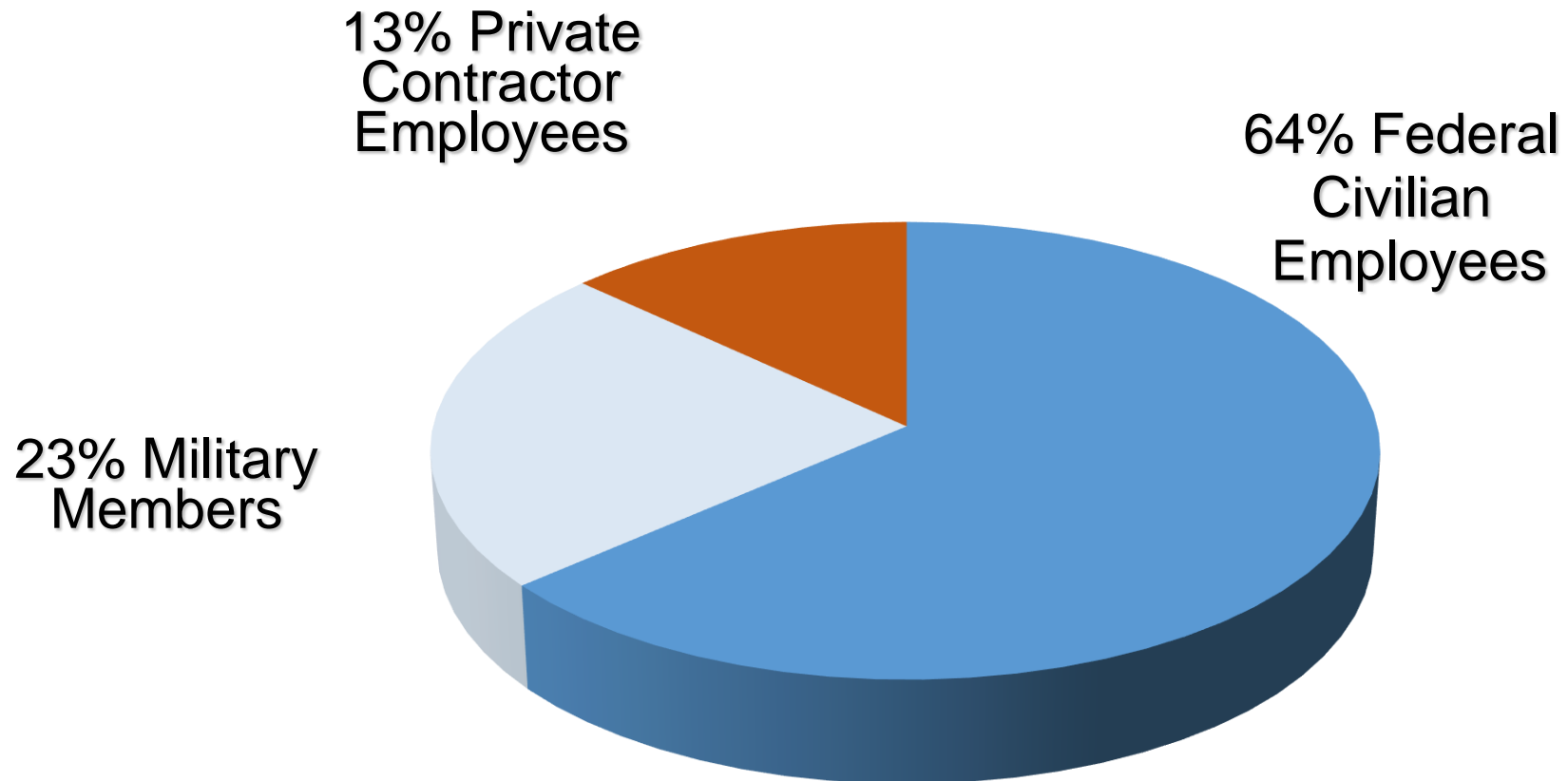
Hill AFB Economic Impact

- **Payroll**
- **Construction**
- **Services**
- **Procurement**
- **Health & Medical**
- **Education**
- **Jobs Created**

$3 Billion

Economic Impact

SMXG - World Class

The 309th Software Maintenance Group (SMXG) at Hill AFB is a recognized world leader in "cradle-to-grave" systems support that encompasses software engineering, hardware engineering, program management, data management, consulting, and more...

SMXG Workloads

CURRENT

- F-16 Operational Flight Program (OFP)

- Mission Planning Software (F-16, A-10)

- Theater Battle Management Core System

- Automatic Test Systems
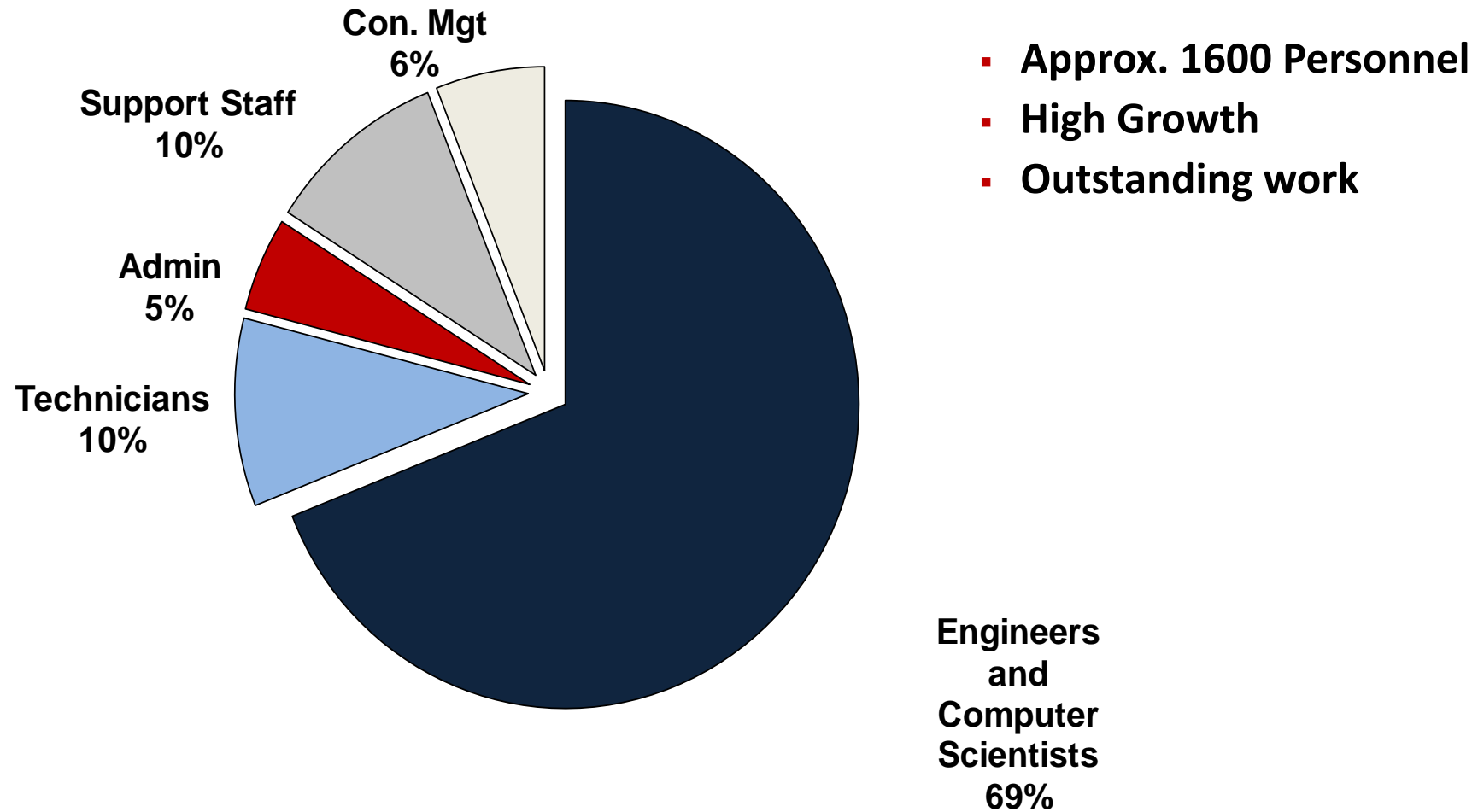
- Space and C3I Software

FUTURE

- F-35, F-22

- Unmanned Aerial Vehicles

BE AMERICA'S BEST

Needed Skill-Sets

- Programming Languages
- Virtualization
- Software Configuration Tool Set
- Database Driven Applications
- Software Architecture
- Sense and Avoidance Software
- Artificial Intelligence
- Quality Assurance and Testing
- Web Centric Application Development

- Software Assurance
- Software Security
- Certification & Accreditation
- Web Languages
- VMware
- Gaming Application Development
- Printed Circuit Board
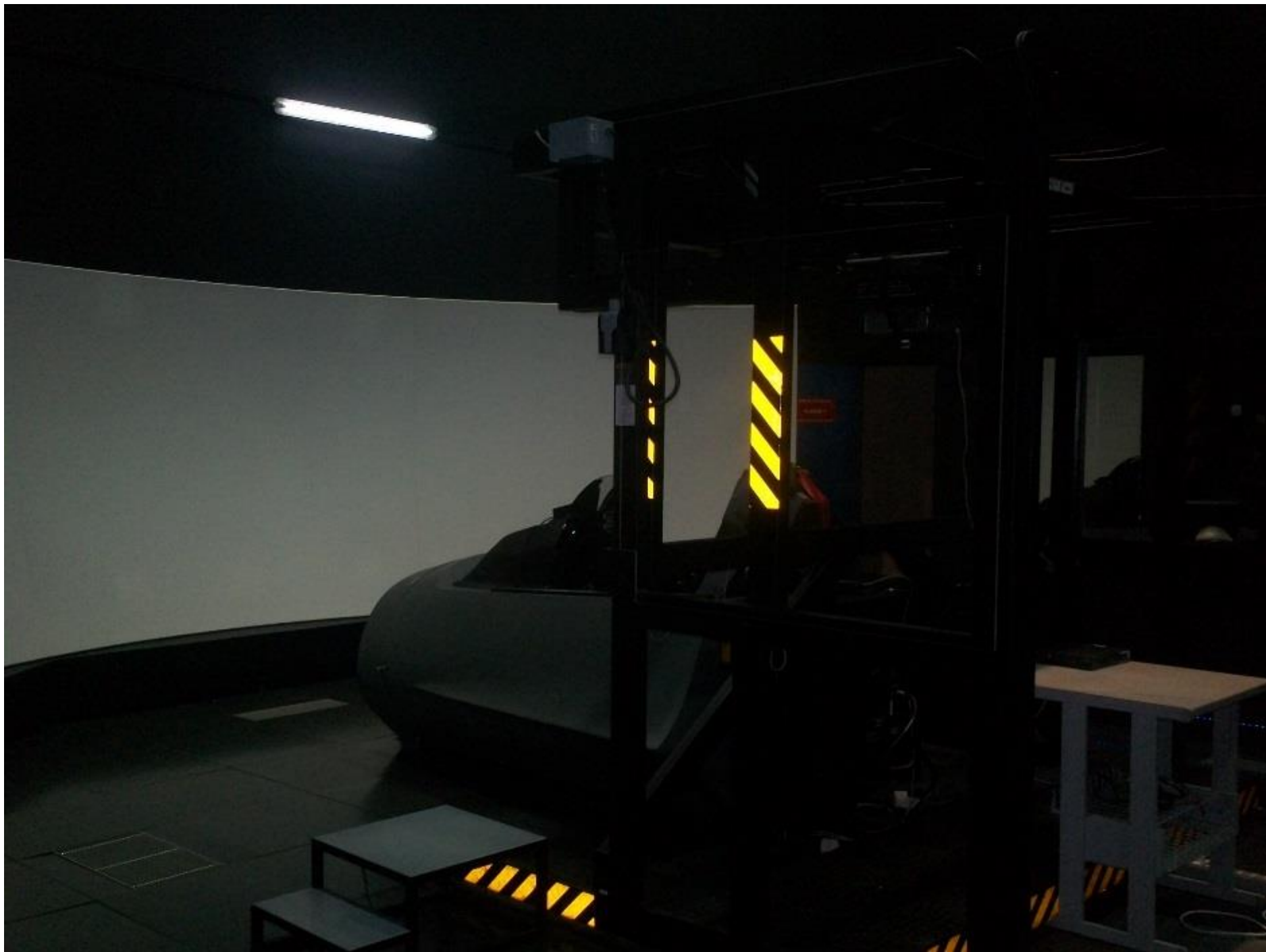- Robotics and Intelligent Systems

SMXG Staff

Con. Mgt
6%

Support Staff
10%

Admin
5%

Technicians
10%

Engineers
and
Computer
Scientists
69%

- Approx. 1600 Personnel
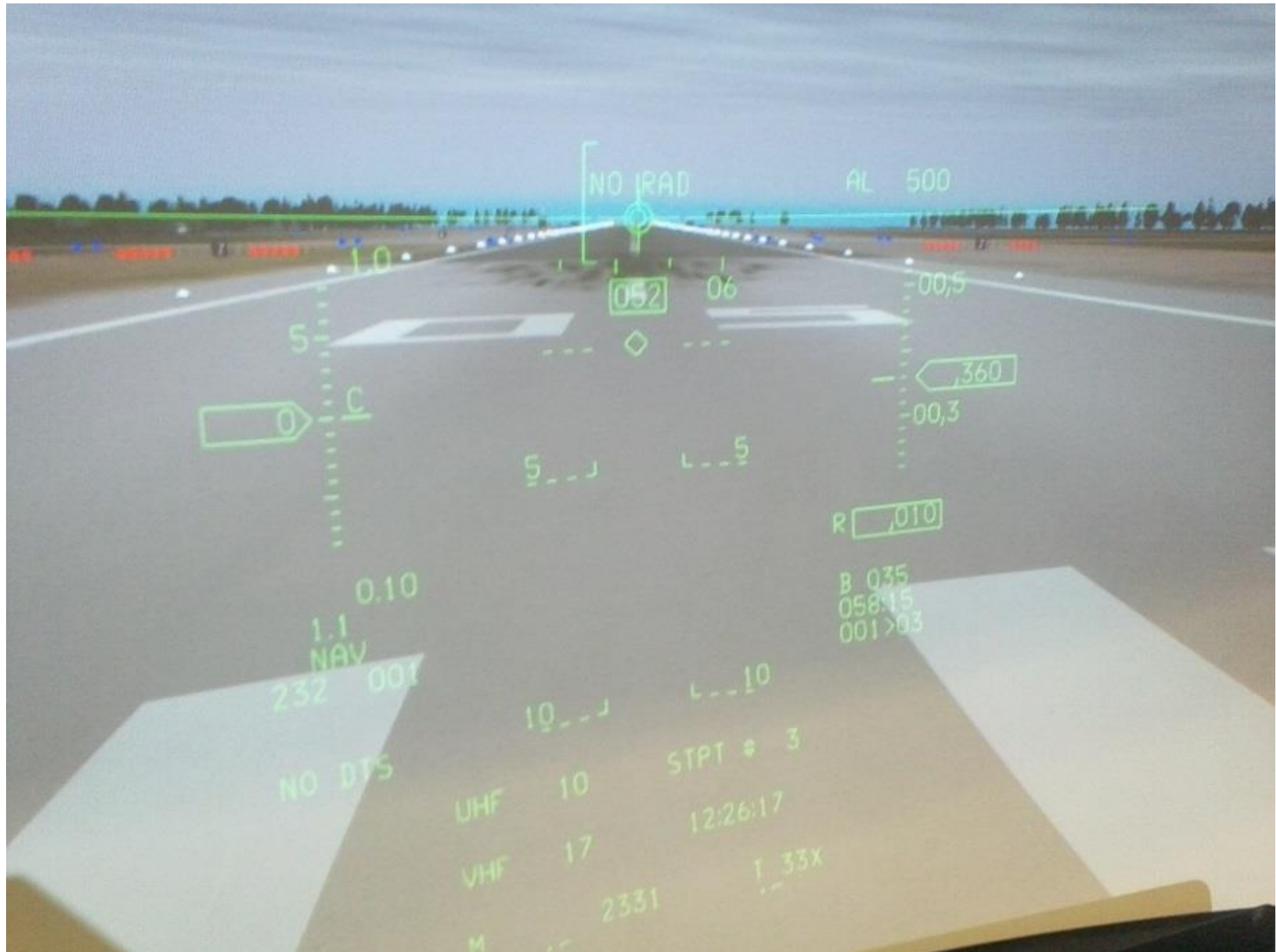- High Growth
- Outstanding work

Hill AFB

- OFP development
- Aircraft improvement
- Radar (air/ground) development
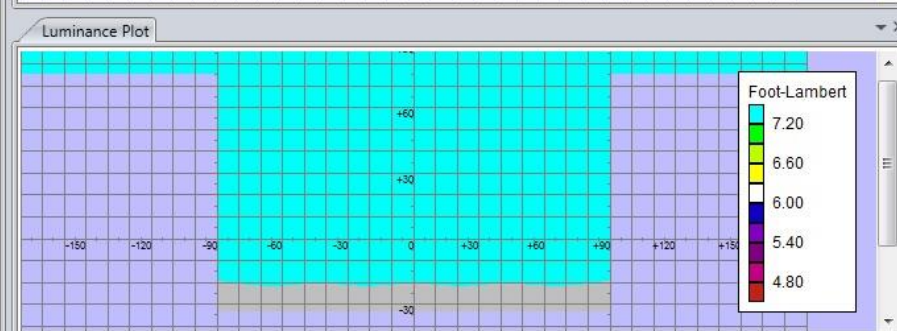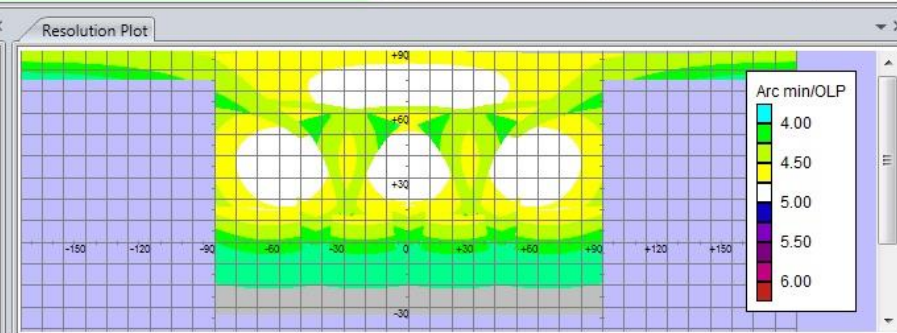- ICBM
- Aircraft Depo
- Test
- Mission planning
- Simulators
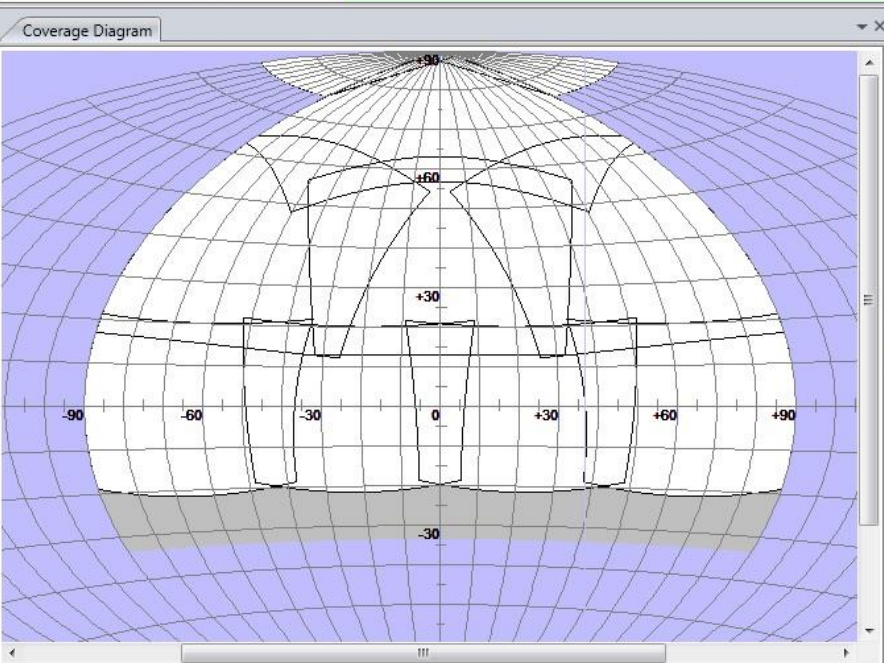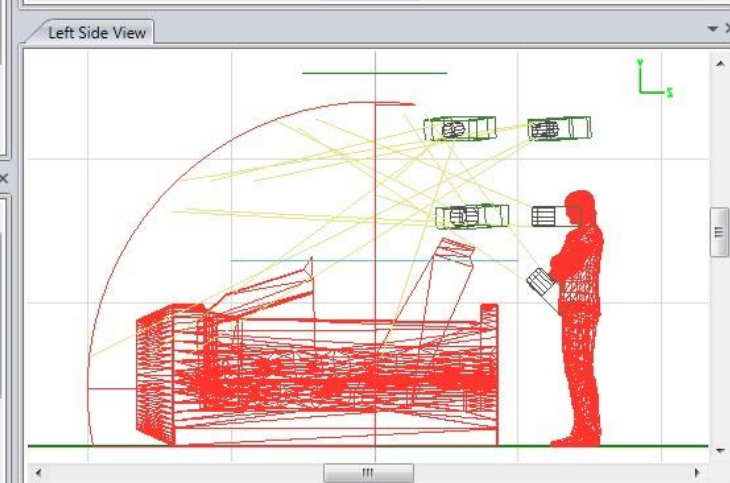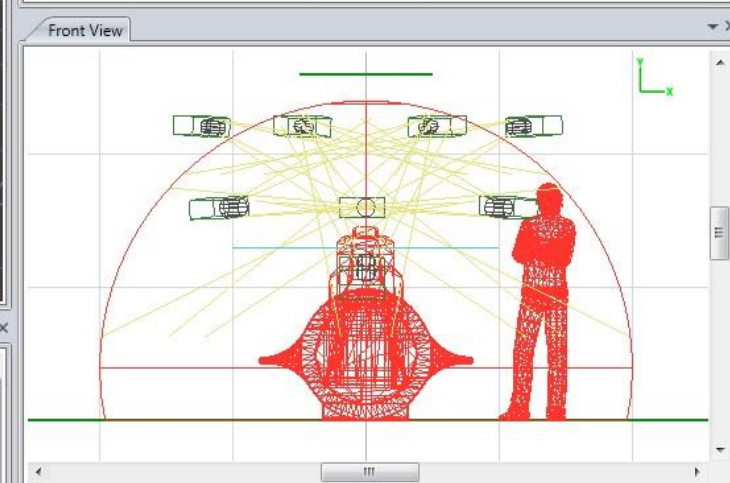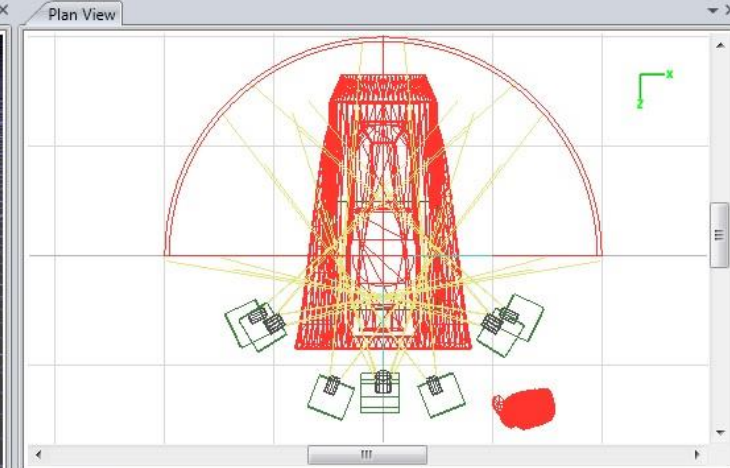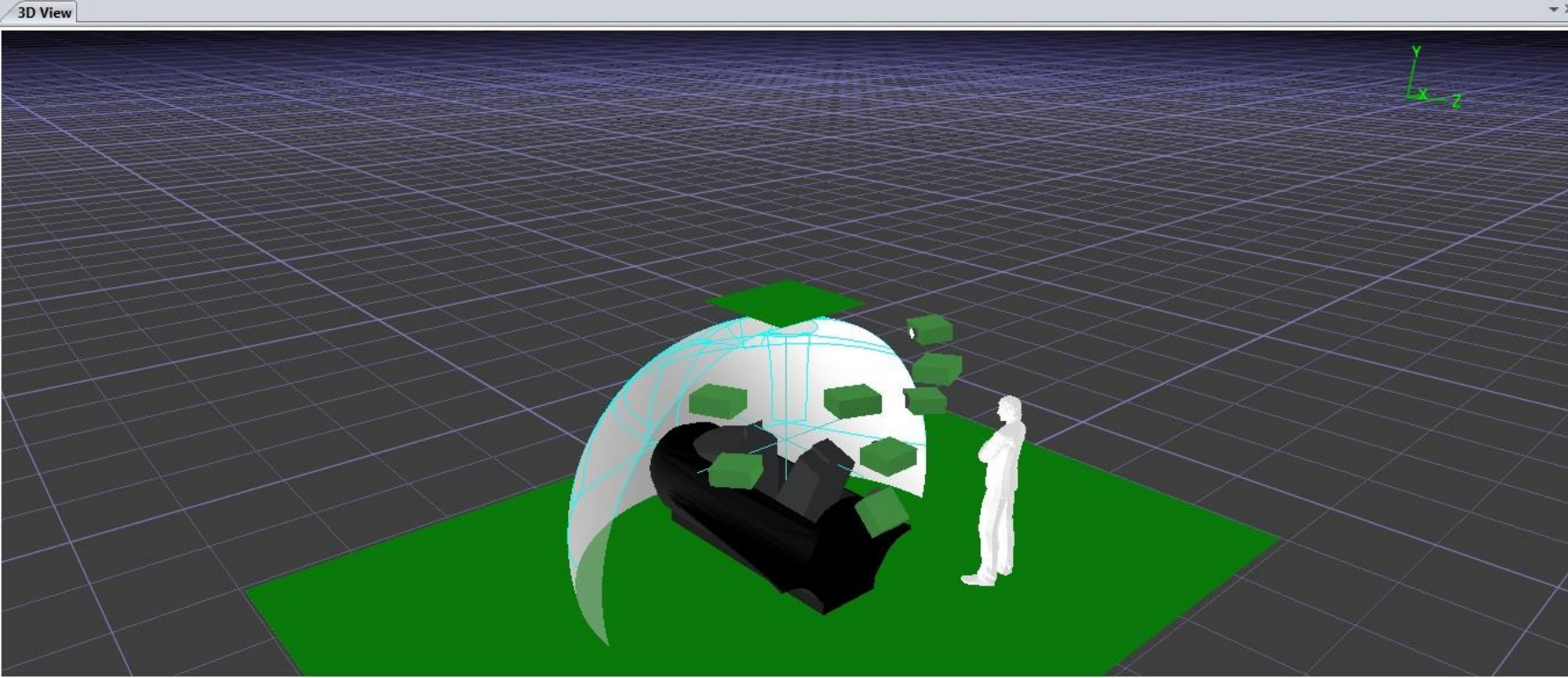
Hardware Designs
2.1 General Hardware

- Implementation Details (continued)
  - Kleine Brogel equipment layout (Release 2)
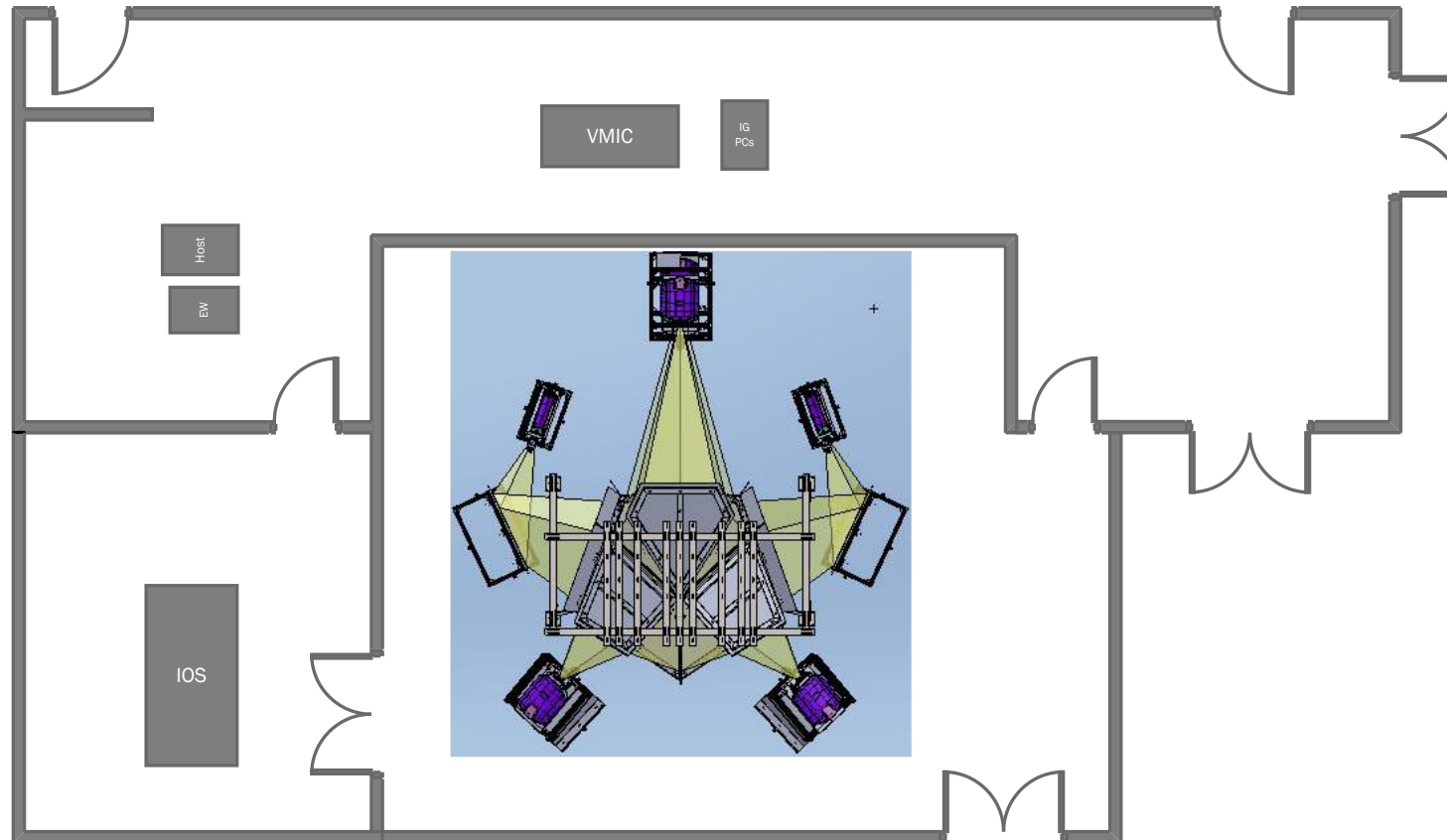
Hardware Designs
2.9 IOS Station

- Implementation Details
  - The IOS station will consist of six 32" monitors arranged as shown below.
  - Monitors will have a static contrast ratio of 1,200:1.

ATD / EHSI + LMFD	HUD + OUT THE WINDOW	RMFD | JHMCS
IOS LEFT	IOS CENTER	IOS RIGHT

AOA INDEXER
THREAT DISPLAY
MASTER CAUTION
ELECTRONIC WARFARE PRIME INDICATOR
UP FRONT INTEGRATED CONTROL PANEL
NWS/AR

WARNING LIGHTS
ECM ENBL LIGHT
OVRD (B MODEL)
FAULT ACK
IFF IDENT

WARNING LIGHTS
WARNING LIGHTS
ENG FIRE
ENGINE
HYD/OIL PRESS
FLCS
CANOPY
TO/LND CONFIG

WAC HUD

DED
SCAI

FUEL FLOW
OIL PRESS
NOZZLE POSITION
RPM
FTIT

MISC ARMAMENT PANEL
MASTER ARM
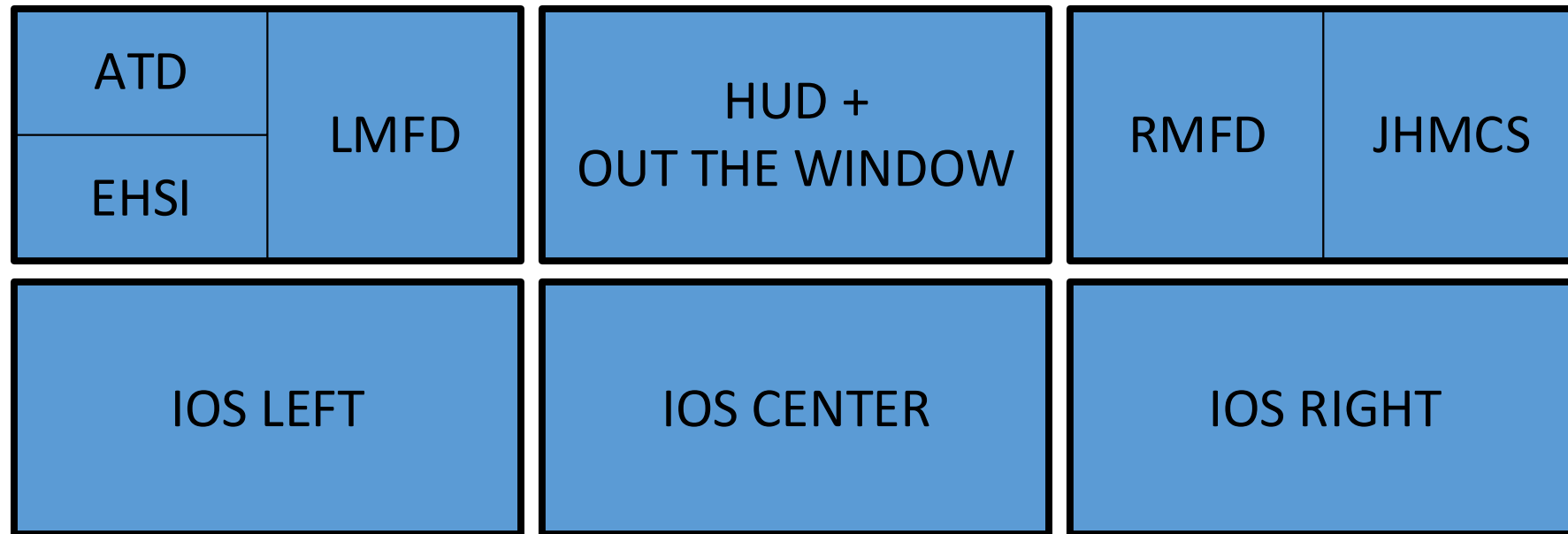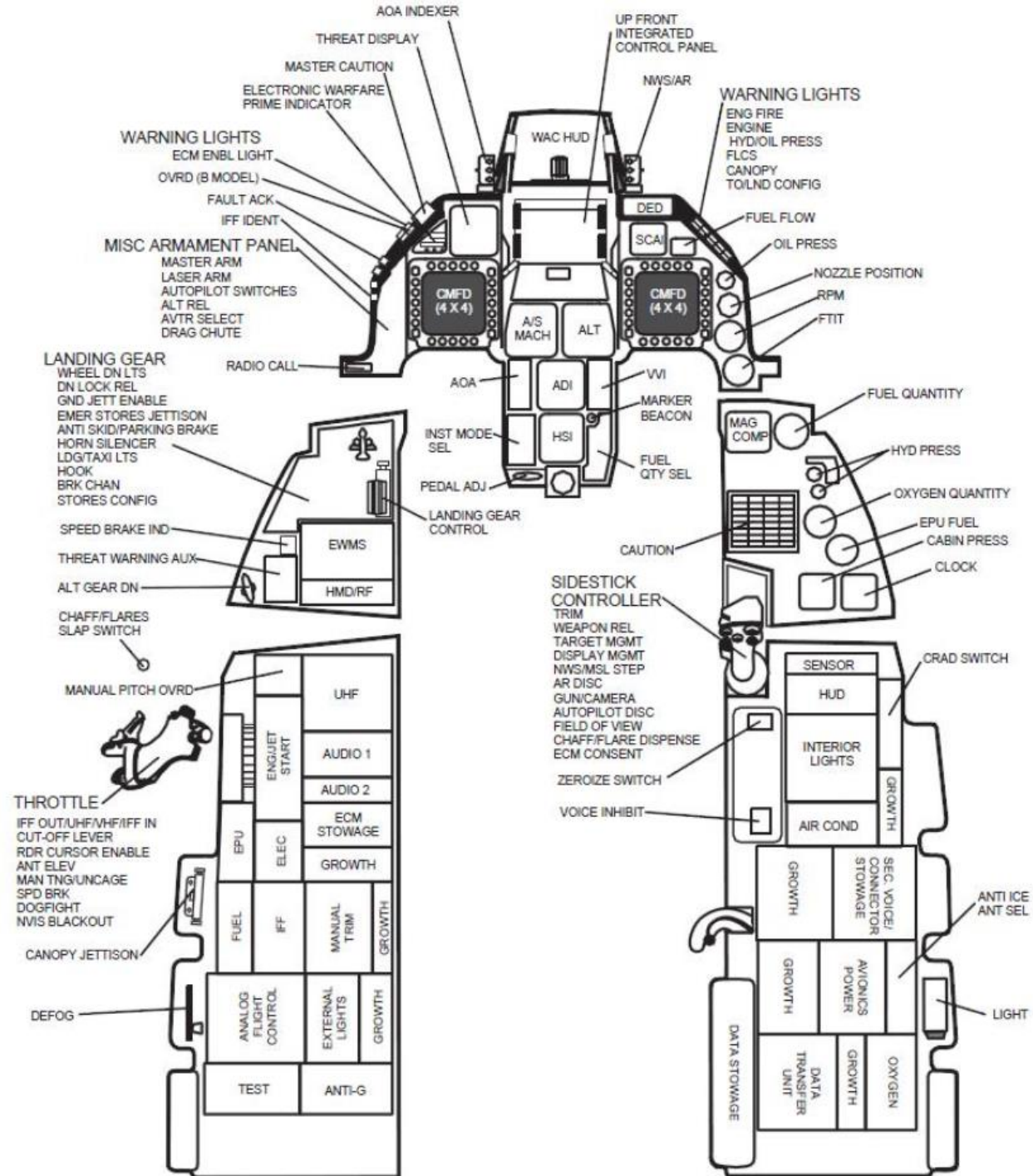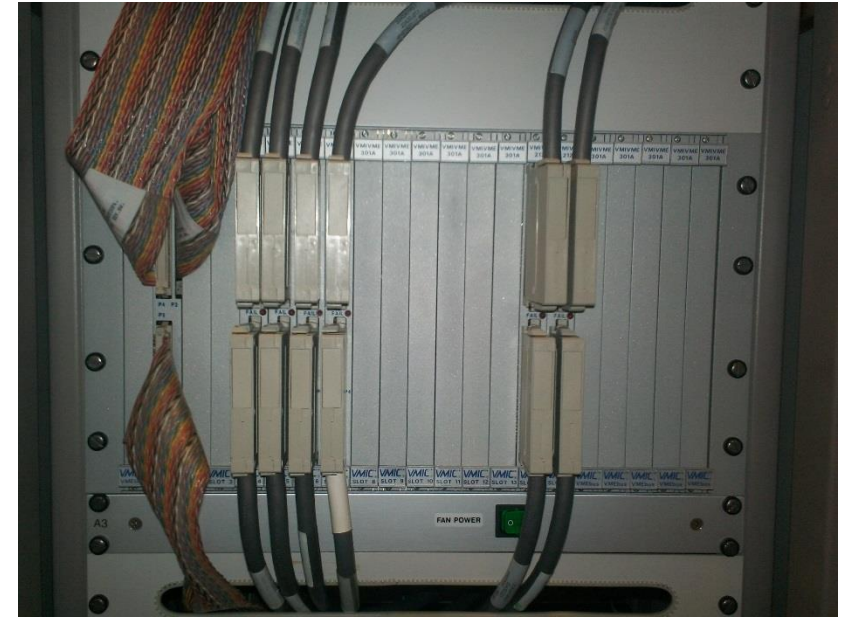LASER ARM
AUTOPILOT SWITCHES
ALT REL
AVTR SELECT
DRAG CHUTE

CMFD (4 X 4)
CMFD (4 X 4)
A/S MACH
ALT

RADIO CALL

LANDING GEAR
WHEEL DN LTS
DN LOCK REL
GND JETT ENABLE
EMER STORES JETTISON
ANTI SKID/PARKING BRAKE
HORN SILENCER
LDG/TAXI LTS
HOOK
BRK CHAN
STORES CONFIG

AOA
ADI
VVI
MARKER BEACON

INST MODE SEL
HSI

FUEL QTY SEL

MAG COMP

FUEL QUANTITY
HYD PRESS
OXYGEN QUANTITY
EPU FUEL
CABIN PRESS
CLOCK

PEDAL ADJ

CAUTION

SPEED BRAKE IND
THREAT WARNING AUX
ALT GEAR DN

LANDING GEAR CONTROL

EWMS
HMD/RF

SIDESTICK CONTROLLER
TRIM
WEAPON REL
TARGET MGMT
DISPLAY MGMT
NWS/MSL STEP
AR DISC
GUN/CAMERA
AUTOPILOT DISC
FIELD OF VIEW
CHAFF/FLARE DISPENSE
ECM CONSENT

ZEROIZE SWITCH
VOICE INHIBIT

SENSOR
HUD
INTERIOR LIGHTS
AIR COND

CRAD SWITCH
GROWTH

CHAFF/FLARES SLAP SWITCH

MANUAL PITCH OVRD

THROTTLE
IFF OUT/UHF/VHF/IFF IN
CUT-OFF LEVER
RDR CURSOR ENABLE
ANT ELEV
MAN TNG/UNCAGE
SPD BRK
DOGFIGHT
NVIS BLACKOUT

CANOPY JETTISON

DEFOG

ENG/JET START
UHF
AUDIO 1
AUDIO 2
ECM STOWAGE
GROWTH

EPU
ELEC

FUEL
IFF
MANUAL TRIM
GROWTH

ANALOG FLIGHT CONTROL
EXTERNAL LIGHTS
GROWTH

TEST
ANTI-G

GROWTH
SEC. VOICE/CONNECTOR STOWAGE
GROWTH
AVIONICS POWER

ANTI ICE ANT SEL
LIGHT

DATA STOWAGE
DATA TRANSFER UNIT
GROWTH
OXYGEN

Lots of I/O
- Digital, Analog, Serial
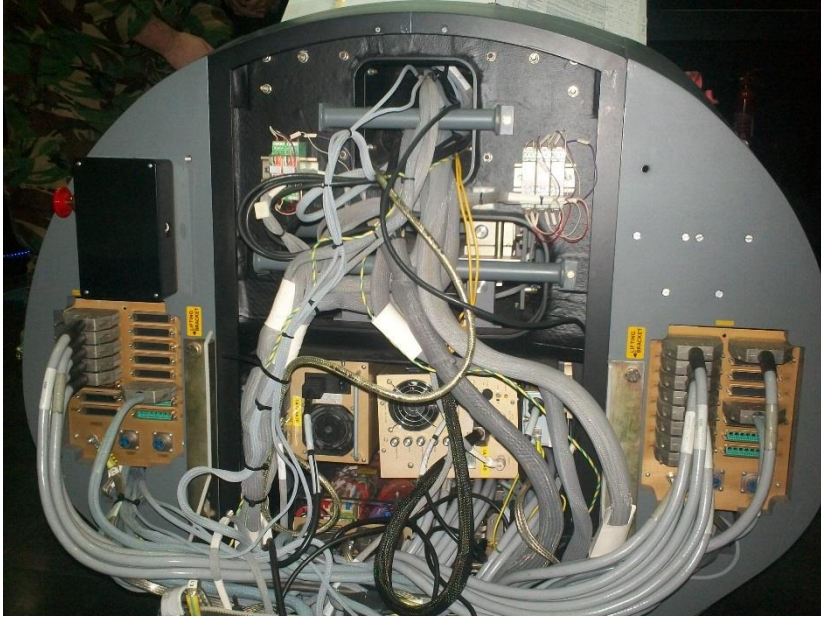
Diverse work

This week

- Facility Layouts – Planning cable lengths and equipment placement
- International industrial power cord standards… fun
- License server setup
- Temperature fault debug
- Coding Distributed Interactive Simulation (DIS) interface
- 3D printing new throttle bracket

This year

- RTOS task priority inversion debug
- Weapon modeling
- Adding radar capabilities
- Adding software model for new radio
- Video recording capabilities
- Cockpit I/O interface
- HW purchases for 4 simulators

Diverse work

- Over 1,000 Engineers in building 1515

- Support 4 aircraft – F16, F22, F35, A10

- Work with pilots to flight test the upgrades

- Work on the international level

EPAF MLU F16 Architecture

- Modular Mission Computer – Main computers
- Fire Control Radar – Controls the Radar
- Wide Angle Conventional Head Up display – Cool data display… can highlight tracked entities
- JHMCS – Even cooler helmet mounted display
- Multi-Function Displays – Now in color
- Audio/Video Recorder – Mission Debrief
- Electronic Warfare Management System – Radar warning, and chaff/flare deployment
- Digital Terrain System – Navigate without GPS
- Up-Front Controls – Pilot interface to system
- Radios – Data, communication, identification, navigation
- Flight Control
- Navigation system

- Most of the embedded systems are Line Removable Units
- Integrated test stands have all the real hardware of an F-16 strung out in 19" racks
- Other test stands simulate most of the LRUs
- Big money to make changes like getting rid of old code because of the amount of testing involved

MIL-STD-1553

- is a military standard that defines the mechanical, electrical, and functional characteristics of a serial data bus. It was originally designed as an avionic data bus for use with military avionics, but has also become commonly used in spacecraft

- It features multiple (commonly dual) redundant balanced line physical layers, a (differential) network interface, time division multiplexing, half-duplex command/response protocol, and can handle up to 30 Remote Terminals

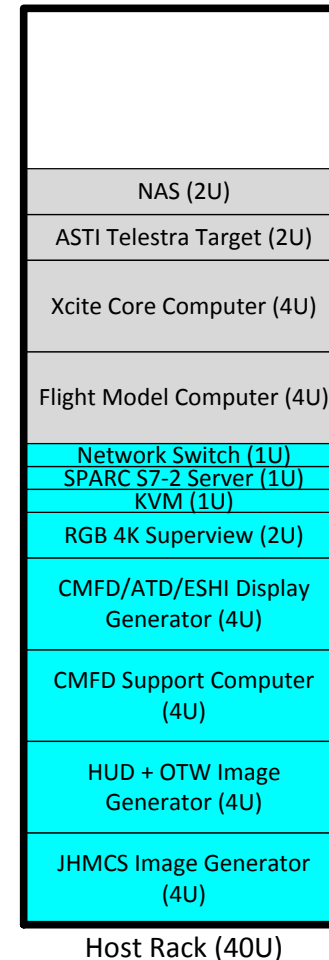**Dual-redundant MIL-STD-1553B bus**
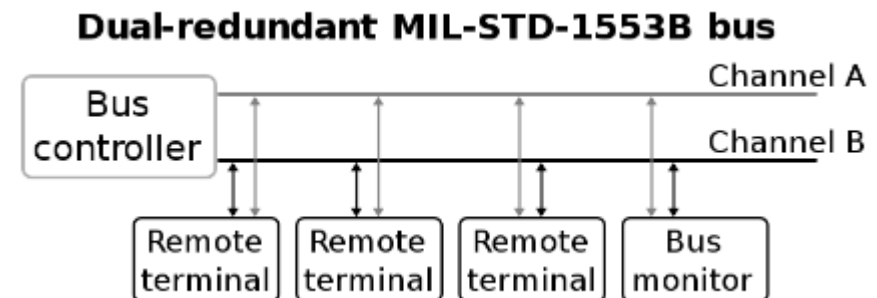
Simulator Complexities

- Run real code or simulate?

- Run real LRU hardware or x86?

- Night Vision Goggles – How would you do it?

Hardware Designs
2.7 WST Host

- Implementation Details
  - An Oracle S7-2 SPARC rackmount computer will serve as the host server.
  - A Standard Rackmount Computer will generate CMFD, EHSI, and ATD displays.
  - A second Standard Rackmount Computer will support the CMFD display generator.
  - Two Standard Rackmount Computers will generate HUD + OWT and JHMCs displays.
  - An RGB 4K Superview video mixer to combine video sources for the IOS.
  - The above hardware will be housed in the Host Rack.

NAS (2U)

ASTI Telestra Target (2U)

Xcite Core Computer (4U)

Flight Model Computer (4U)

Network Switch (1U)

SPARC S7-2 Server (1U)

KVM (1U)

RGB 4K Superview (2U)

CMFD/ATD/ESHI Display Generator (4U)

CMFD Support Computer (4U)

HUD + OTW Image Generator (4U)

JHMCS Image Generator (4U)

Host Rack (40U)

Hardware Designs
2.7 WST Host

- Implementation Details (continued)
  - CMFD, EHSI, and ATD display diagram
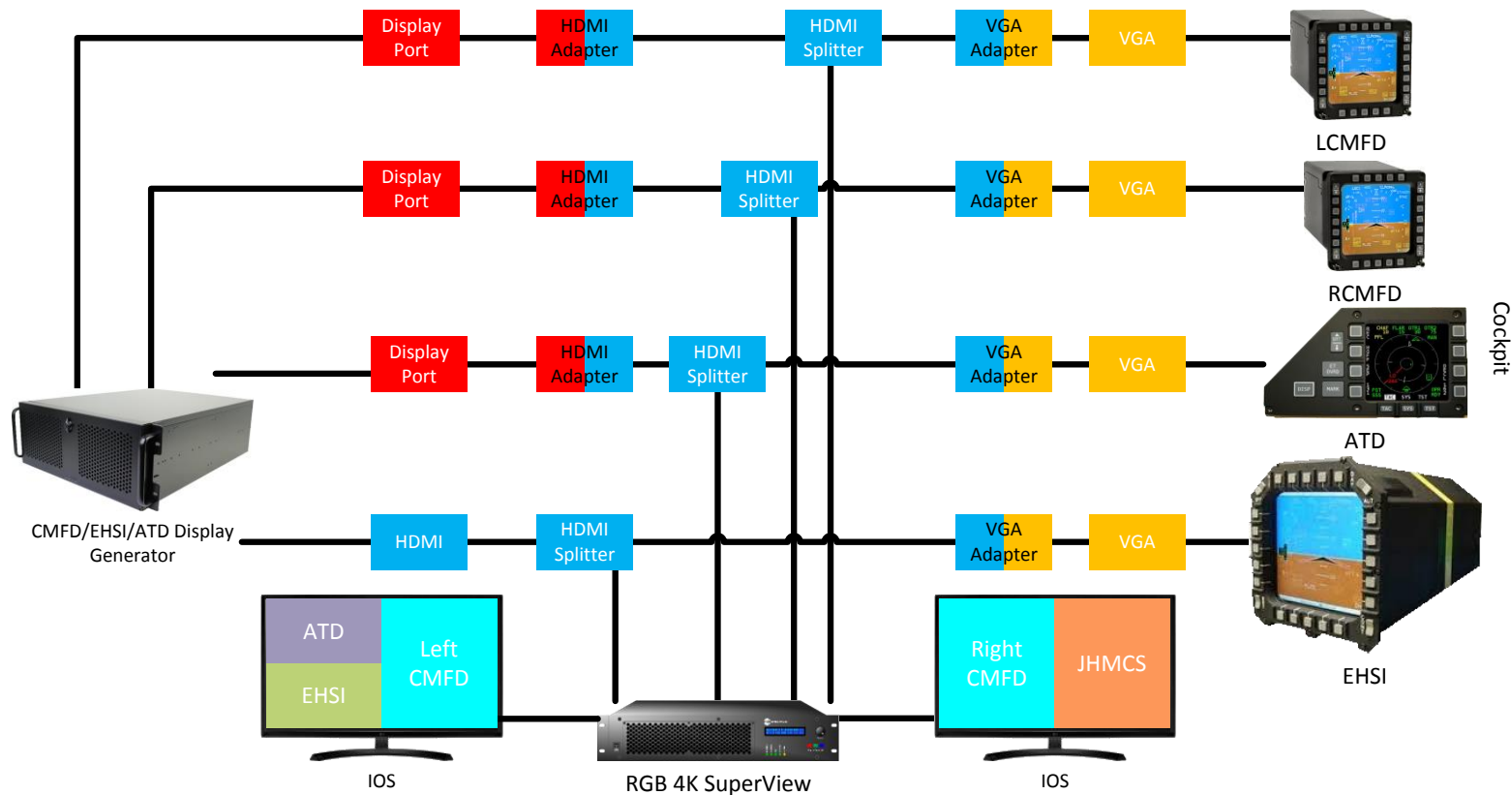
Distributed Interactive Simulation

- IEEE standard for conducting real-time platform-level wargaming across multiple host computers and is used worldwide, especially by military organizations but also by other agencies such as those involved in space exploration and medicine.

- Everything from position to appearance, sensors, radio communication, launches and detonations

- Missions can involve thousands of entities – real or constructed

- Dead reckoning algorithms used to efficiently transmit the state of battle field entities

Realistic training

Realistic Training

Other Jobs

- OFP developer
- Test
- System Engineer
- Mechanical Engineering
- Ground Based Radar
- Minute Man Missile
- Mission Planning
- UAV ground station

- Universal Simulator
- UAV simulators
- Simulation is a growing field!

Job Benefits

- **Job Stability**

- **10 paid days of holiday leave**

- **Accrued vacation/sick leave**

- **3 hours fitness leave per week**

- **Full health care benefits (dental and vision)**

- **Worldwide Career Opportunities**

- **Compensation for overtime**

- **Competitive retirement system**

Why is This Job Fun?

- Wingman Activities
- Base Facilities
  - Travel
  - Tickets and Entertainment
  - Government Discounts
  - Rentals
- Training
- Challenges
- Problem Solving

Hill AFB Hiring Forecast

■ U.S. Federal Govt. is Nation's Largest Employer

   ■ Largest employer of engineers and scientists in the world

■ Hiring 150 Scientists & Engineers each year

    - Electrical Engineers
    - Computer Engineers
    - Computer Scientists

Pathways Internships

- Targets students completing sophomore/junior year in:
  - Electrical and Computer Engineering or Computer Science
- Work summers or off-track
  - Part time during school is optional
- Non-competitive conversion to permanent positions
  - We place nearly 100% of our PIs
  - Best PIs selected into PAQ/SMART Programs
- Starting salary is $13.84 per hour
  - May promote to $15.49 per hour after one year
- You must apply through usajobs.gov
- POC: Cassie Unguren, 777-9802, casaundra.unguren@us.af.mil

How to Apply for Jobs at Hill AFB

- Go to http://www.usajobs.gov
  - Lists all Federal jobs worldwide
- In the "Where" block, enter Hill AFB, UT
- Click on the blue "Search" key – it will show all jobs within 20 miles
- Read entire announcement and follow "How to Apply" directions carefully.
- Video instructions available on YouTube

PAQ (Palace Acquire Program)

- Students apply the fall of their senior year
- Benefits
  - Signing bonus ~ $11,000
  - Student loan repayments – up to $20,000
  - Master's Degree
    - Pays tuition and books for 3 semesters
    - Full salary while going to school
- Requirements
  - US Citizenship
  - GPA: 3.5+
- We hire about 40 PAQs per year

SMART Program
(Science, Mathematics, and Research for Transformation)

- Great Benefits – Highly Competitive

- BS, BS/MS, MS, and PhD Degrees

- Apply August through December
  - Full tuition and $1,000 book allowance
  - $25,000 to $38,000 yearly stipendium
  - Paid summer internship - $1,200/wk living expense
  - Post graduate employment (1:1 repayment)

- We target juniors in concurrent BS/MS programs

- We awarded 8 scholarships for Hill AFB this year
  - Worth $650,000

QUESTIONS?