Educating the World's Best Air Force
AFIT Space Physics

- Resident Graduate Education
  - Graduate School of Engineering and Management
- Professional Continuing Education
  - Civil Engineer and Services School
  - School of Systems
- Civilian Institution Programs
  - Graduate and Continuing Education
  - Health Care Education

- Physics Dept.
  - Electrical & Computer Engineering
  - Aeronautics & Astronautics
  - Systems & Engineering Management
  - Mathematics & Statistics
  - Operational Sciences
  - Applied Physics
  - Nuclear Engineering
  - Electro-Optics
  - Materials Science

AFIT
Space Physics Curriculum

• AFIT mission differentiates it from other schools
• Primary mission to educate future space wx officers
  – Breadth of coverage
  – Ops focus to courses & research
  – Faculty field experience
• Also serve cross-over students and civilians
Space physics tracks also available to other programs (e.g. aero-, astro-, and electrical engineering)
Current Research Guidelines

- Research topics chosen from prioritized list
  - Generated by XOO-W each year; solicited from users
- Samples
  - Improve high-altitude radiation support
  - Evaluation of HAF solar wind model
  - Investigation of ionospheric response to solar flares
  - Ray-tracing applications using GAIM model
- Emphasis on funded research
Historically, most research in conjunction with AFRL

- V&V new computer models (e.g. PRISM, MSM)
- Validation, assessment, exploitation of new data
- Improve Diagnostics & Forecasting for
  - Spacecraft Hazards
  - HF Comm Outages
  - Scintillation
• “A Correlation of Geosynchronous Orbit (GEO) and Low Earth Orbit (LEO) Energetic Electron Events Using Data from the Compact Environmental Anomaly Sensor (CEASE) Instrument
• “A Derivation of the Dst Index from the SSM Magnetometer on board the Defense Meteorological Satellite Program (DMSP)”
• “Estimating Equatorial, F-Region Vertical \( E \times B \) Drift Velocities from Ground-Based Magnetometer Measurements in the Philippine Sector”
• “Derivation of a Self-Consistent Auroral Oval Model using the Auroral Boundary Index”
• “Spacecraft Charging at Geosynchronous Altitudes: Critical Temperature Analysis for Non-Maxwellian Distributions”
• “Validation and Assessment of DMSP Electron Temperatures in the Topside Ionosphere”
• “Validation and Characterization of Ionospheric Densities measured by DMSP”
• “GPS Vulnerability to High-Latitude Scintillation at Solar Maximum”
• “Testing the New USGS \( K \) Index Algorithm at Bear Lake Observatory”
• “Penetration of Magnetospheric Storm & Substorm Effects to Mid-Latitudes”
• Existing runs useful as canned classroom examples

• Classroom/laboratory open-ended projects

• Research Opportunities

• Soliciting material/ideas from community
  – An opportunity to influence future AF decision makers!
extra slides...

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