Radiation and its Effects on Air and Space Systems

Introduction
- Objective
- Nomenclature
- Definitions

Basic Radiation Physics
- Stopping Charged Particles
  - Stopping Power
  - Range
  - Linear Energy Transfer (LET)
  - Brehmsstrahlung Radiation
- Stopping Photons (-rays, X-rays)
  - Compton Scattering
  - Pair Production
- Stopping Neutrons

The Radiation Environment
- Galactic Cosmic Rays (GCRs)
- Solar Proton Events (SPEs)
  - Solar Cycle Dependencies
  - Solar Proton Event Models
- Trapped Radiation Belts
  - Magnetic Field Effects
    - Magnetic Trapping
    - Magnetic Shielding
  - Inner and Outer Electron Belts
  - Proton Belt
- Atmospheric Environment
  - Energetic Neutrons
- Hostile Radiation Environments
  - Fission and Fusion Weapons

Radiation Environment Effects
- Total Dose Effects
  - Effects on Electronics
    - Solar Arrays
    - Processors
  - Effects on Materials
  - Effects on Crew
    - Radiation Dose Limits
    - Examples of Past Missions
- Dose Rate Effects
  - Single Event Upset
  - Single Event Latchup
  - Single Event Burnout

Design Guidelines
- Shielding
- Parts Selection
- Error Detection and Correction

Modeling & Simulation
- Radiation Environment Models
  - AP8, AE8, CRRESRAD, …
- Radiation Effects Models
  - CRÈME, TREE, …

Point of Contact:
Dr. Alan Tribble
Phone: (319) 295-9479
Email: alantribble@home.com
Internet: www.alantribble.com