

# 55th Wing

*Integrity - Service - Excellence*

## Constant Phoenix Immersion



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**ACC/Det 10**  
**8 Sep 17**  
**Version 1**



# *Introduction*

- **History and Overview**
- **Mission**
- **Aircraft and Equipment**
- **Strengths and Challenges**
- **Way Ahead**



*Breaking Barriers ... Since 1947*



# History & Overview

## ■ Original Tasking:

- “The Army Air Force is hereby charged with the overall responsibility to detect atomic explosions anywhere in the world.” General Dwight D. Eisenhower, September, 1947

- Air Force Technical Applications Center (AFTAC), based at Patrick AFB, Florida, performs nuclear treaty monitoring and nuclear event detection

## ■ Nuclear Detection

- Space – GPS, DSP
- Airborne – WC-135
- Surface - ACR, AGFU
- Subsurface – Seismic, Hydroacoustic Arrays





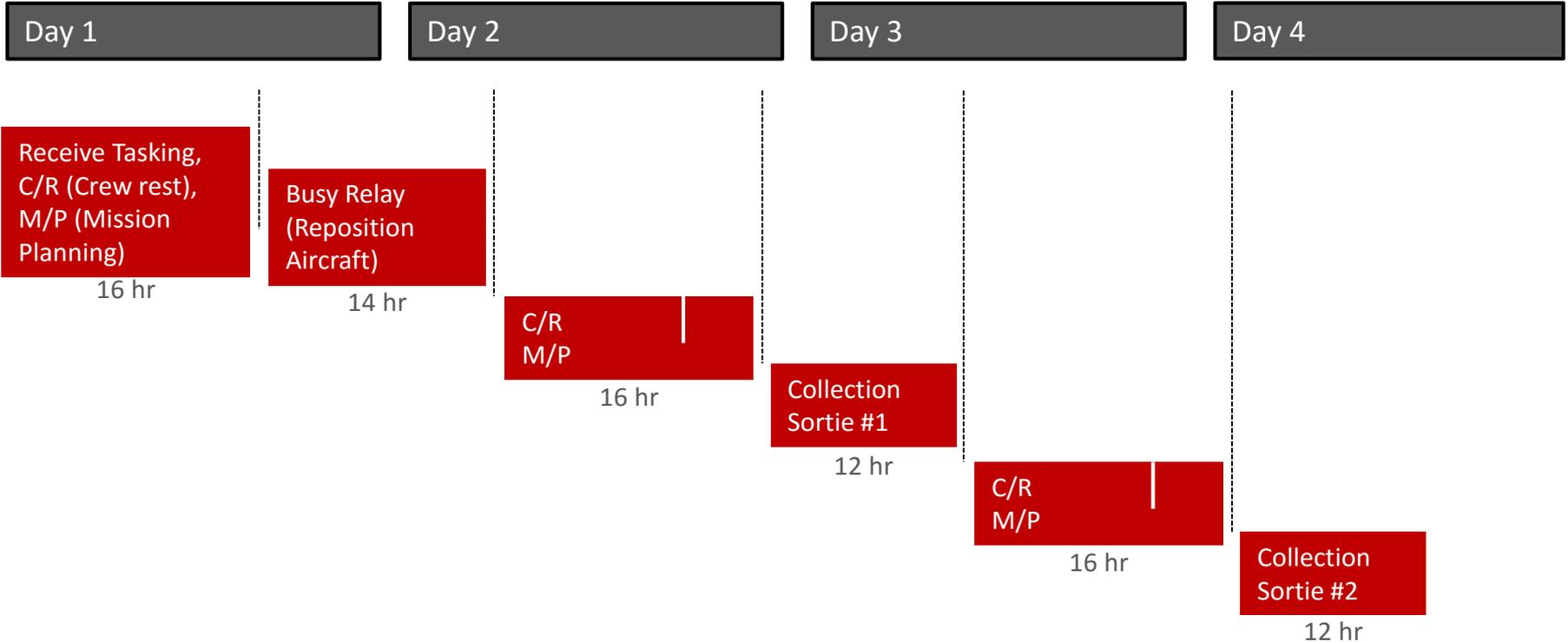
# Mission

- **Constant Phoenix supports national-level intelligence consumers by collecting particulate debris and gaseous effluents from accessible regions of the atmosphere in support of the Limited Nuclear Test Ban Treaty of 1963**
- **55th Wing provides WC-135 aircraft, pilots, navigators, and maintenance crew and support for airborne monitoring/detection**
- **AFTAC Detachment 1, Offutt AFB, provides Special Equipment Operators (SEOs) to fly with 55th Wing aircrew**
- **Airborne missions can be proactive (i.e. backgrounds) or reactive (i.e. suspected nuclear detonations or incidents)**





# Mission



\*Samples due to lab 91 hours from start of collect



# Mission

- **Contaminated aircraft recovery and decontamination plan**
  - **Offutt AFB plan reviewed and revised consistently**
  - **Used as a basis for other bases' plans**
  - **Spot decontamination permits continued use for follow-on missions**
  - **Full internal and external decontamination of the aircraft allows unrestricted future use and maintenance**





# Aircraft and Equipment

- One each WC-135C/WC-135W
  - AARE – Advanced Atmospheric Research Equipment
    - WACS
    - U-1B Foils
    - RMAS
    - DGSS
    - SCADA
  - Crew Safety





# Aircraft and Equipment

- **Whole Air Collection System (WACS)**
  - Collects air samples from aircraft bleed-air
  - Pressurizes air to ~3000psi
  - Removes heat and moisture prior to filling 900 in<sup>3</sup> steel vessels





# Aircraft and Equipment

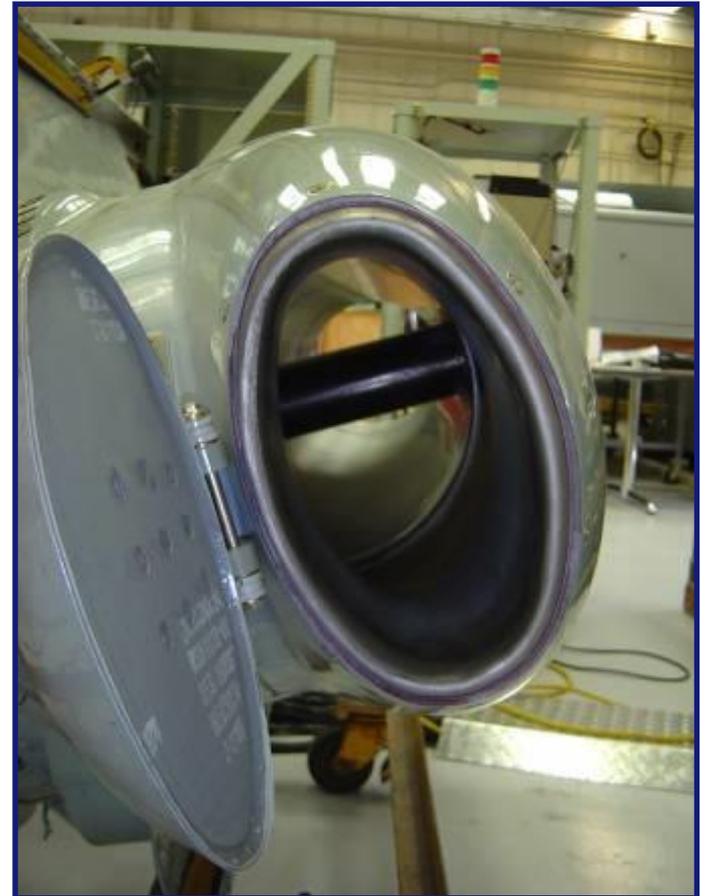
- **U1-B Particulate Sampler Assembly**
  - Captures dust/debris on cotton filters
  - 12x filters per U1-B, 2x U1-B's per aircraft
  - Houses RMAS assembly





# *Aircraft and Equipment*

- **RMAS – Radiation Monitoring and Analysis System**
  - **Measures Gamma emissions to determine radioactivity on particulate filters**
  - **Sends findings to SEO software interface**
  - **Used to determine if aircraft is in contact with radiation**





# *Aircraft and Equipment*

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- **DGSS – Directional Gamma Sensor System**
  - Provides directional indications of gamma radiation relative to the aircraft
  - Allows SEO to vector the aircraft towards radioactive debris
- **SCADA – Supervisory Control and Data Acquisition**
  - Command interface for all mission equipment
  - Provides real-time internal and external radiation levels



# Aircraft and Equipment

- **Crew Safety**
  - **Lungs**
    - **3-stage HEPA filter scrubs all cabin air**
  - **CSRMS – Crew Safety Radiation Monitoring System**
    - **Provides real-time cabin radiation levels**
  - **EPD – Electronic Personal Dosimeter**
    - **Placed throughout cabin**
    - **Real-Time feedback**
  - **Handheld Alpha, Beta, Gamma Detectors**
  - **TLD – Thermo-luminescent Dosimeter**
    - **Issued to every crew member**
    - **Tracks quarterly exposure levels**





# **Strengths/Challenges**

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## ■ **Strengths**

- **Quick response and deployment capabilities enable coverage of worldwide events**
- **Lungs provide the rare capability to collect and monitor airborne radioactive material while ensuring the crew's safety**
- **Background measurements provide a baseline for future events**

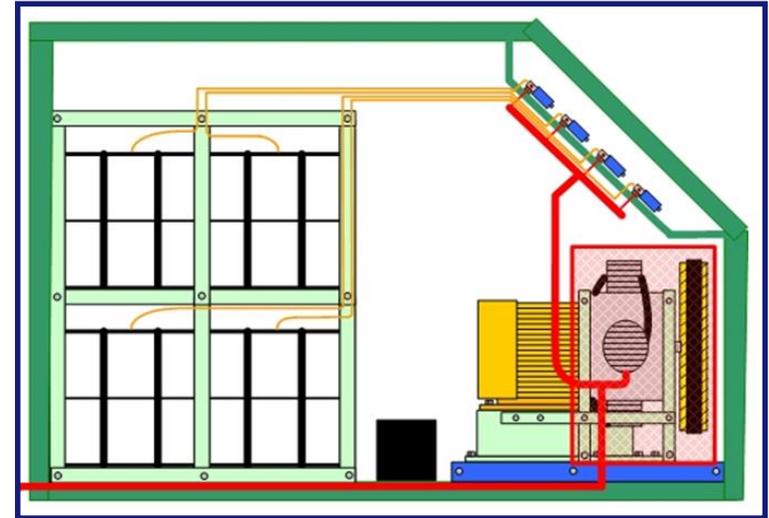
## ■ **Challenges**

- **Aging aircraft**
  - **Parts reliability and supply is increasingly problematic**
  - **Engines dissimilar from C-135 fleet, requires unique qual**
- **Tight timeline to get samples analyzed due to short half-lives**
- **Each part of a contaminated aircraft must be decontaminated before maintenance actions can be performed**



# Way Ahead

- **Harvester – Particulate Collector**
  - Pod-Based
  - Platform Agnostic
  - Full radiation detection capability
- **MWACS – Gaseous Collector**
  - Roll-on/Roll-off
  - Platform Agnostic ISU-70





# Summary

- History and Overview
- Mission
- Aircraft and Equipment
- Strengths and Challenges
- Way Ahead



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