



ARMAS Dual Monitor Pre-Operations Mission Demonstration (ARMAS DM POMD)

Technology Need

- Tech demo of operational capability for **long-duration regional radiation monitoring** applicable to global commercial, business, and suborbital air traffic safety
- **Identify radiation source** for air crew members' higher melanoma and basal cell carcinoma rates
- **Culminate an extensive technology development** from 6 predecessor ARMAS contracts since 2011

TRL 7 Technology Concept

- Analogous to **parking a jet** over North Pacific and northern CONUS air corridors for 30-days
- **30-day mission of 1 WVE Stratollite balloon** with 4 radiation detectors
- **AFRC ER-2 under flight** separating GCR & radiation belts sources

Technology Development Team

- **Space Environment Technologies (SET)** ARMAS flight detector team
- W. K. Tobiska (**SET Chief Scientist, PI**)

Test Apparatus

- **WVE balloon launch** out of McCall Idaho with 4 instruments (10 kg)
 - ARMAS FM5 (TID)
 - GAMMA-RAD5 (gamma-rays)
 - Liulin (LET spectrometer)
 - ATED (TEPC Quality factor)
- **AFRC ER-2** with 2 instruments (10 kg)
 - ARMAS FM3 (AFRC)
 - TinMan thermal neutron monitor (LANL)

Flight Requirements/Objectives

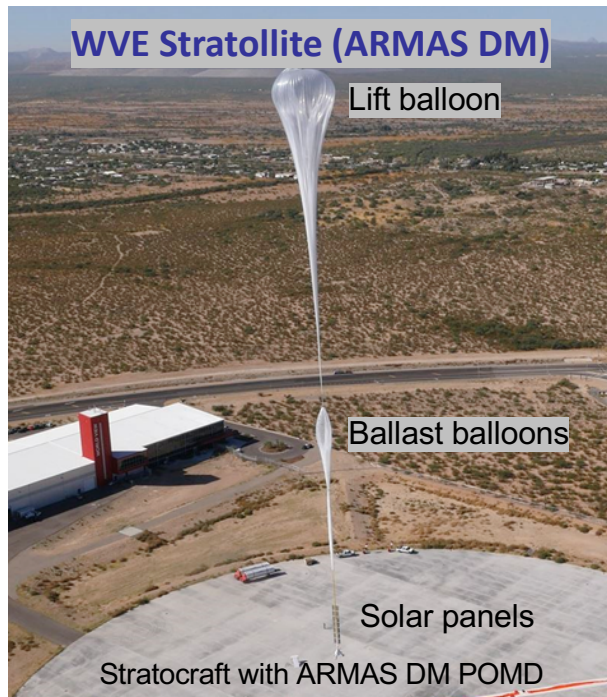
- 2 weeks – **30-days of one WVE stratospheric balloon in June 2021**
- Location track over **NoPac** and **northern CONUS** at 50,000–70,000 ft.
- **ARMAS FM5 Iridium real-time data**
- One **AFRC ER-2 under flight** for GCR and radiation belt separation
- **Calibrate all instruments** prior to flight at Los Alamos neutron beam

TRL 8 Technology Advancement

- Will leverage NASA HPD SBIR Phase II ARMAS DM funding and will **provide a fully validated tech demo of an atmospheric radiation monitoring operational system**
- Will **identify a radiation source** that leads to crew shallow tissue cancers

Technology End Users

- NASA suborbital, ISS, and Gateway radiation monitoring protocols with **real-time data assimilated in NAIRAS** global physics model
- DoC, FAA, and commercial air/space traffic radiation management



Technology Applicability: demonstrate pre-operations capability for 30-day radiation monitoring

April 22, 2019