

# Heliophysics

Viacheslav Sadykov (NASA ARC / BAERI), Irina Kitiashvili, Kent Tobiska, Christopher Mertens, Alfredo Cruz



## Prediction of Radiation Doses Received During Airplane Flights

Development of a ML-driven radiation-environment model for airplane flights based on space- and ground-based observations and ARMAS radiation data

### COMPELLING SCIENTIFIC VALUE

- Expands knowledge about the radiation environment
- Addresses an aerospace safety challenge
- Optimizes operational capabilities
- Strong alignment with the NASA 2018 Strategic Plan

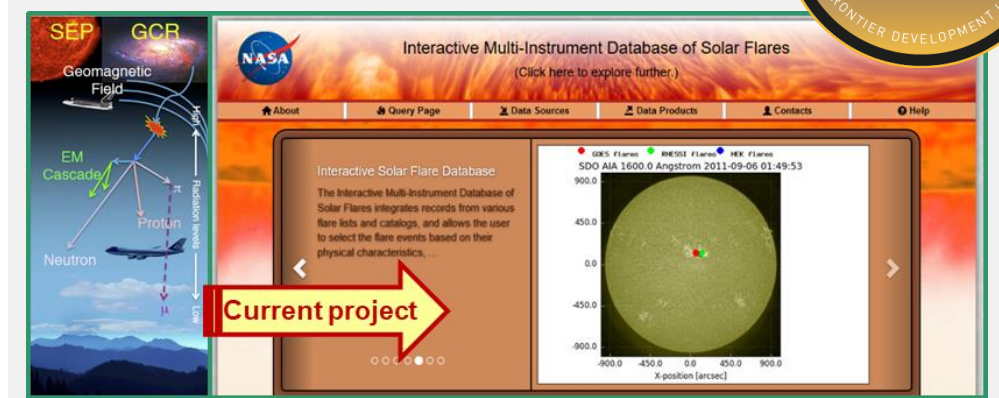
### AI AFFINITY & DATA

*AI role: establish relations between space- and ground-based observations and the radiation environment. These are not yet fully understood from a physics point of view.*

*Necessary input data and targets: AI-ready by Summer 2020.*

### INNOVATIONS, PARTNERS, & RISKS

- Sparsity of the target (ARMAS) data and complexity of the output model represent a major challenge and require AI innovations.
- To reduce risk, the problem may be restricted to finding polynomial-approximation models for the continental US.
- A partnership with PIs from ARMAS (radiation flight measurements) and NAIRAS (physics-based radiation modeling) has been established.



**Top:** integration of ARMAS measurements to the NASA Heliportal (Credits: <https://heliportal.nas.nasa.gov/>, Tobiska et al. 2016, Space Weather, 14, 1053). **Bottom:** ARMAS measurements on top of the NAIRAS model illustrated for the continental US and North America (Credits: Tobiska et al. 2018, Space Weather, 16, 1523)

