Heliophysics

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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*

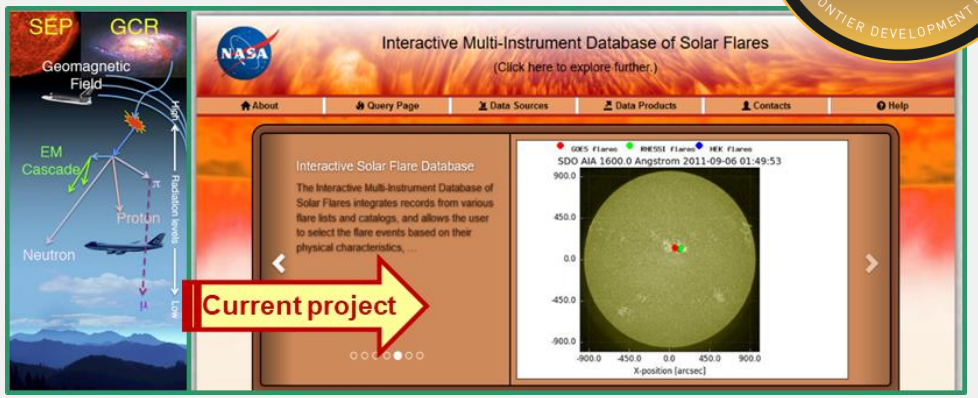
AI AFFINITY & DATA

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 NAS Helioportal (Credits: https://helioportal.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)