

## WHAT IS AVIDOS?

AVIDOS is a web service of Seibersdorf Laboratories federated with ESA's Space Weather portal and accessible under: <https://swe.ssa.esa.int/web/guest/avidos-federated>.

AVIDOS is an informative and educational online software for estimating cosmic radiation exposure at flight altitudes under both typical and exceptional solar conditions. It estimates the radiation dose for flights between any two locations and assesses radiation exposure during solar storms in real time. The software also provides a comparison of the estimated exposure with the natural background radiation on Earth.

Cosmic radiation consists of ionizing particles that originate both from outside the solar system and from the Sun. They generate secondary particles in the Earth's atmosphere. Some of them even reach the Earth's surface. People who are at higher altitudes, such as aircraft crews, are more exposed to cosmic radiation than people at sea level. During exceptional solar conditions (so-called solar storms), the radiation exposure in the atmosphere can temporarily be significantly higher than normal.

AVIDOS is based on Monte Carlo simulations of cosmic radiation transport in the atmosphere. AVIDOS is comprehensively validated by numerous measurements on-board aircraft. AVIDOS calculates the effective dose,  $E$ , between 8 km and 15 km altitude, for each geographic location and for the entire cycle of solar activity. The effective dose,  $E$ , is the limiting radiation protection quantity related to a cancer risk to an organism due to ionizing radiation. It is recommended that the annual dose for the population should not exceed one millisievert (mSv). The annual dose limit for aircrew is 20 millisieverts (mSv). This version of AVIDOS cannot be used for legally valid radiation protection purposes. For accredited protection services, please contact us.

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Supported by



# SEIBERSDORF LABORATORIES



FREQUENTLY ASKED SOLUTIONS



### AIRCREW & PUBLIC

Advanced analysis with a detailed flight design on multi-waypoint basis.  
 Quick and simple radiation dose assessment for interested passengers.



### SCIENCE

Scientific analysis of Solar Energetic Particle effects on radiation exposure during a flight for researchers and experts.

<https://swe.ssa.esa.int/web/guest/avidos-federated>

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### AIRCREW MODE

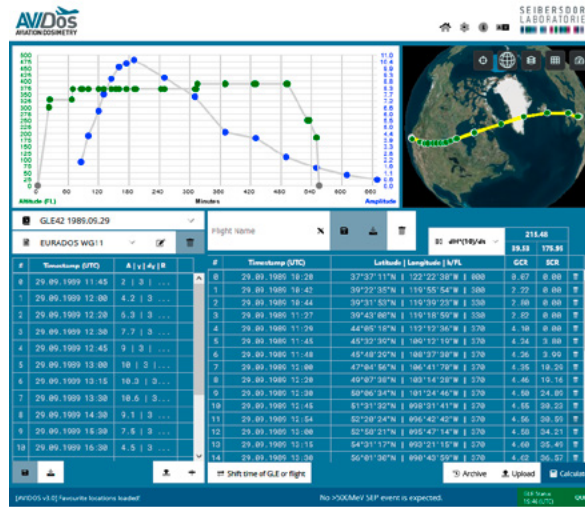
For users who want to know more and like to do research, we have developed the AIRCREW mode.

In this mode, the user can easily test the influence of the flight route, its altitude and duration and even the date of flight on the assessed radiation exposure by having the possibility to change all these parameters.

To analyze your own flight, simply enter:

- date and time of the flight with total flight duration,
- departure and destination airports,
- waypoints with cruising altitude and position.

The user can define her/his own flight profile by defining waypoints either graphically or by uploading a file. The results can be downloaded or saved in an internal database for personal use.

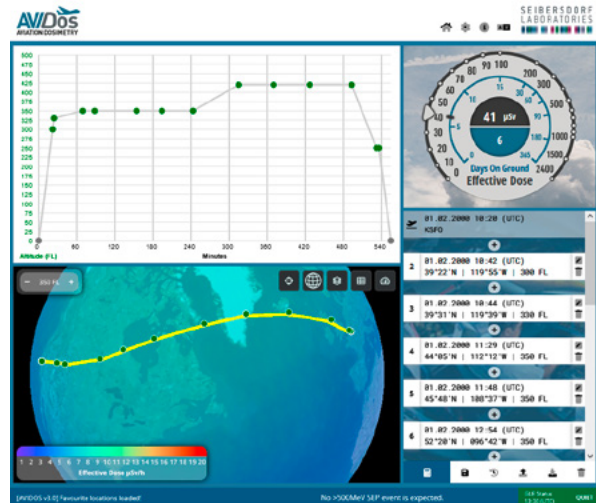


### SCIENCE MODE

We have developed the SCIENCE mode for researchers and experts to analyze the radiation dose at flight altitudes under extraordinary solar conditions. With this mode, users can analyze the dose dependence for different solar proton spectra or investigate different flight routes for the same extraordinary solar conditions.

To investigate influence of solar events on any flight, select:

- any implemented solar proton spectra or upload your own,
- any implemented flights or upload your own,
- edit all aspects of the spectra (shape and temporal evolution),
- edit all aspects of the flights (position, altitude, timestamps),
- get the results displayed in terms of  $E_s$  and  $H^*(10)$  separately for galactic cosmic radiation and solar contribution,
- and finally download or store your results in an internal database for personal use.



### PUBLIC MODE

The PUBLIC mode is intended for users who need a quick estimate of the cosmic radiation exposure for a particular flight without taking all the technical details into account. It is ideal for people who are waiting to board and just want to know what the radiation exposure is for the upcoming flight.

To get the assessed radiation dose, simply enter:

- date and time of the flight,
- departure airport,
- and destination airport.

The date and time can be easily entered via a pop-up window. Users can search for their airport by name, ICAO or IATA code or simply list all airports in the country by entering the country name. The results are displayed graphically and compared to the radiation dose you would receive from the natural environment if you stayed on the ground instead of flying.

