

IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)
Radiation Fields, Effects and Risks in Human Space Missions (5)

Author: Ms. Shreya Choudhary
R.V.College of Engineering, India, flyingmonal@gmail.com

Ms. Megha S Shetty
R V College of Engineering, Bengaluru, India, meghashetty.bt17@rvce.edu.in

Ms. Shreesham Madhu
R.V.College of Engineering, India, shreesham.ae16@rvce.edu.in

Mr. Raj Kedia
R.V.College of Engineering, India, rajkedia98@gmail.com

Ms. Priyanshi Chaturvedi
R V College of Engineering, Bengaluru, India, priyanshic.ch18@rvce.edu.in

VAN ALLEN RADIATION BELT IMPACT ON HELA CELLS

Abstract

Life on earth is constantly protected by harsh space conditions, like radiation, threatening its existence. The magnetic field of Earth traps high energy particles in Van Allen Radiation Belt (VARB) supporting life on earth but challenges human interplanetary ventures. It is of great importance to have a prior assessment on the effect of VARB on human health and give proper countermeasures to sustain the health of the on-board astronaut. This paper proposes a payload design for studying VARB effects on HeLa cells.

HeLa cells will be grown using Magnetic 3D cell culturing techniques at an altitude of 10,000 m where it is exposed to necessary radiation from VARB. Various imaging techniques are employed in the payload to study the progression of cell growth. An optimum controlled environment will be provided using active and passive thermal control systems like heaters, peltier, mylar sheets and thermal sensors. Cryopreservation techniques for enhancing survivability and revival on orbit is also discussed. On ground analysis of growth of culture and cryopreservation studies simulating on orbit environment is also done for comparative study with on-orbit data.