

15th SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)  
Small Space Science Missions (2)

Author: Mr. Yongseok Lee  
Kyung Hee University, Korea, Republic of, yongseoklee@khu.ac.kr

Prof. Ho Jin  
Kyung Hee University, Korea, Republic of, benho@khu.ac.kr  
Prof. Jongho Seon  
Kyung Hee University, Korea, Republic of, jhseon@khu.ac.kr  
Dr. Kyu-Sung Chae  
Kyung Hee University, Korea, Republic of, kschaek@khu.ac.kr  
Prof. Dong-Hun Lee  
Kyung Hee University, Korea, Republic of, dhlee@khu.ac.kr  
Mr. David Glaser  
University of California, United States, dglaser@ssl.berkeley.edu  
Dr. Thomas Immel  
University of California, United States, immel@ssl.berkeley.edu  
Prof. Robert P. Lin  
University of California, United States, rlin@ssl.berkeley.edu  
Mr. John Sample  
University of California, United States, jsample@ssl.berkeley.edu  
Prof. Timothy S. Horbury  
Imperial College London, United Kingdom, t.horbury@imperial.ac.uk  
Mr. Patrick Brown  
Imperial College London, United Kingdom, patrick.brown@imperial.ac.uk

## DEVELOPMENT OF CUBESAT FOR SPACE SCIENCE MISSION: CINEMA

**Abstract**

We are developing cubesats for space science mission called TRIO-CINEMA (Cubesat for Ion, Neutral, Electron, and Magnetic fields). Three institutes participate in the CINEMA; School of Space Research at Kyung Hee University, Space Science Laboratory at University of California, Berkeley, and Imperial College London. CINEMA has a 3U cubesat platform; the volume is 100 x 100 x 340.5 mm. The mass is about 3 kg, and power is 3 W. This cubesat will provide stereo ENA (Energetic Neutral Atom) imaging of the ring current and the complementary measurements of magnetic fields, waves, and currents required for interpreting the in situ STEIN electron and ion and ENA measurements. CINEMA consists of communication modules, avionics bus, solar panels, and two scientific payloads. All three CINEMA payloads are equipped with a suprathermal electron, ion, neutral (STEIN) instrument and dual 3-axis magnetometer of magnetoresistive sensors. As particle detector, STEIN uses a silicon detector, which has a heritage from STEREO mission. One magnetometer attached to the end of 1 m stacer boom. The spacecraft is spin-stabilized at a spin rate of 4 RPM. The attitude information is derived by a two sun sensors and inboard magnetometer. The spacecraft sends the data through S-band transmitter and receives commands from the ground station via UHF receiver. In this paper, we introduce the system design and the qualified model for CINEMA.