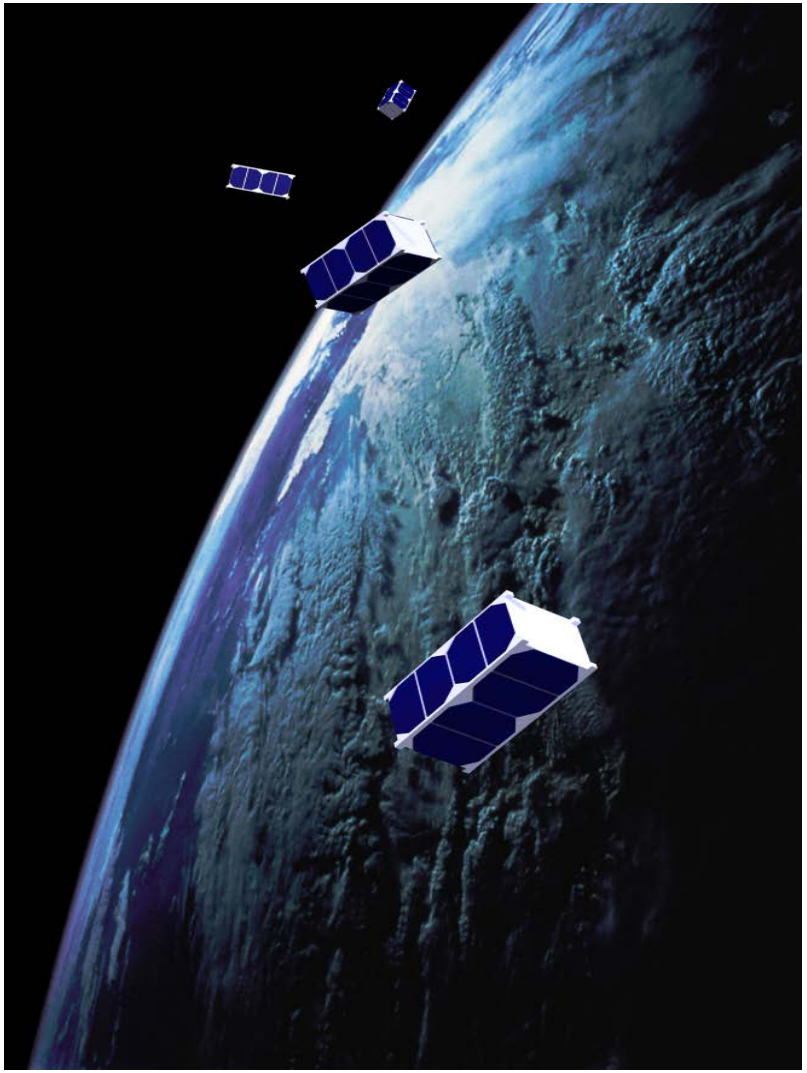
QB50

Mission Objectives



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5th QB50 Workshop
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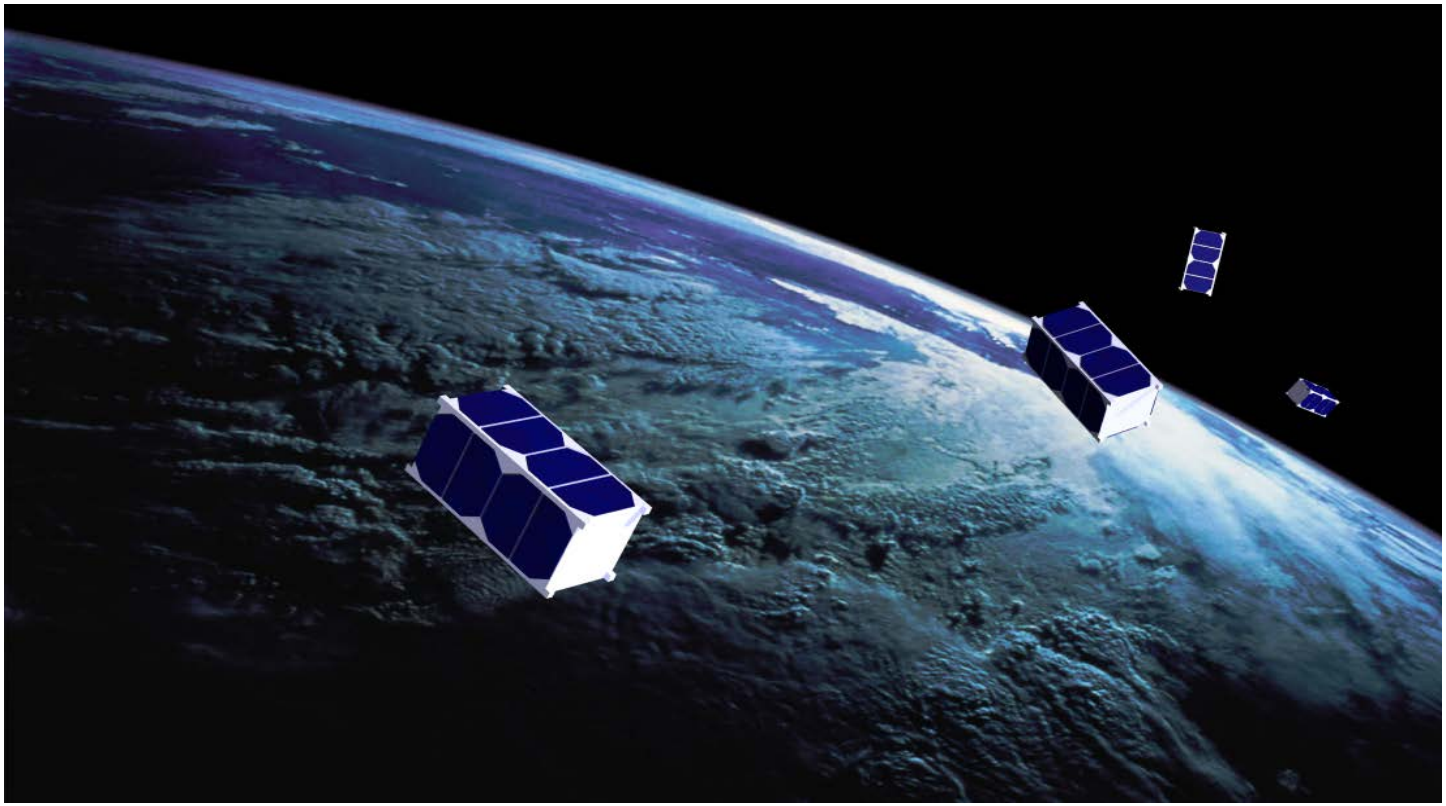
Rhode-Saint-Genèse, Belgium

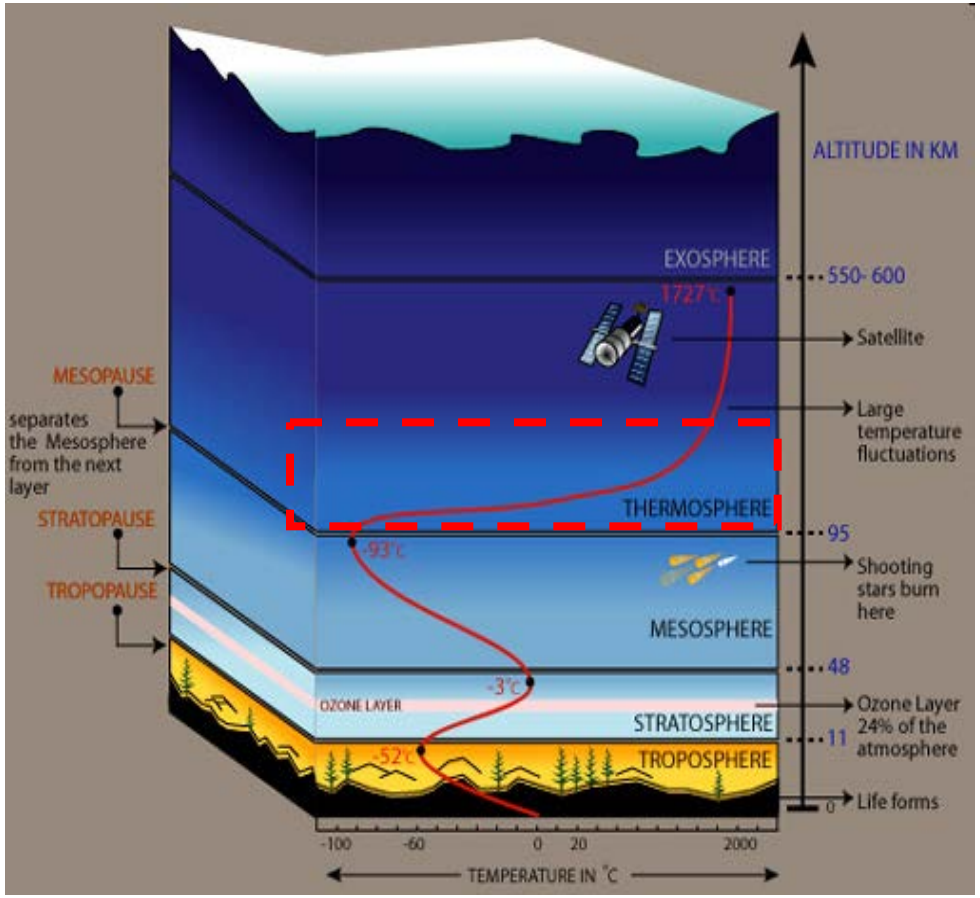
QB50 Mission Objectives

• For the first time, to launch a large number (about 50) of double and triple CubeSats on a single launch vehicle as a primary payload and to successfully manage the complex technical, programmatic and legal interfaces with 50 different CubeSat providers given the constraints of a fixed launch date.



QB50 Mission Objectives

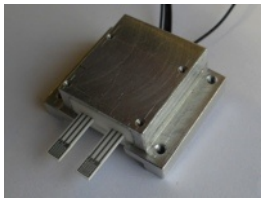
- To study the spatial and temporal variations of key constituents (neutrals, ions, plasma) and parameters in the largely unexplored lower thermosphere and, thereby, improve currently existing atmospheric / ionospheric models

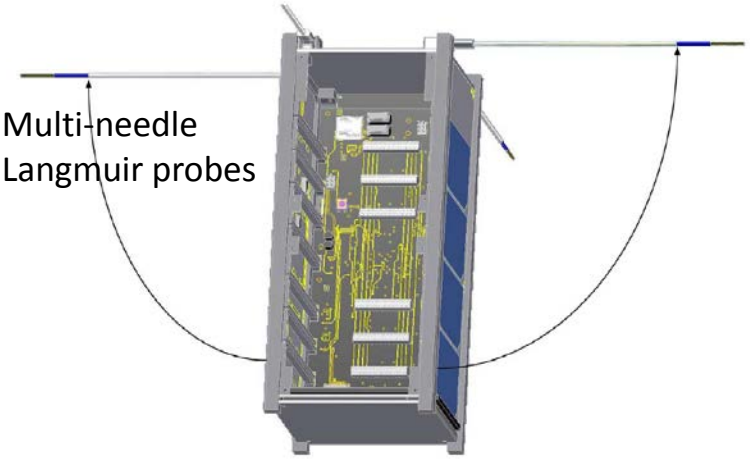


QB50 Mission Objectives

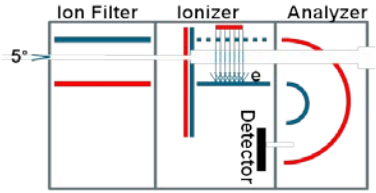
- To provide in-situ measurements in the lower thermosphere/ionosphere which are complementary to the remote-sensing observations obtained at the same time from much larger Earth observations satellites in higher orbits, lidar and radar remote-sensing observations from the ground, and short-duration (minutes) in-situ measurements by experiments on sounding rockets.

FIPEX sensor

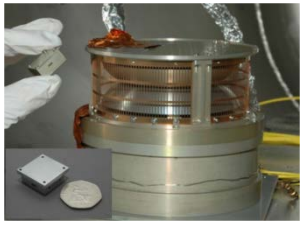




Multi-needle Langmuir probes



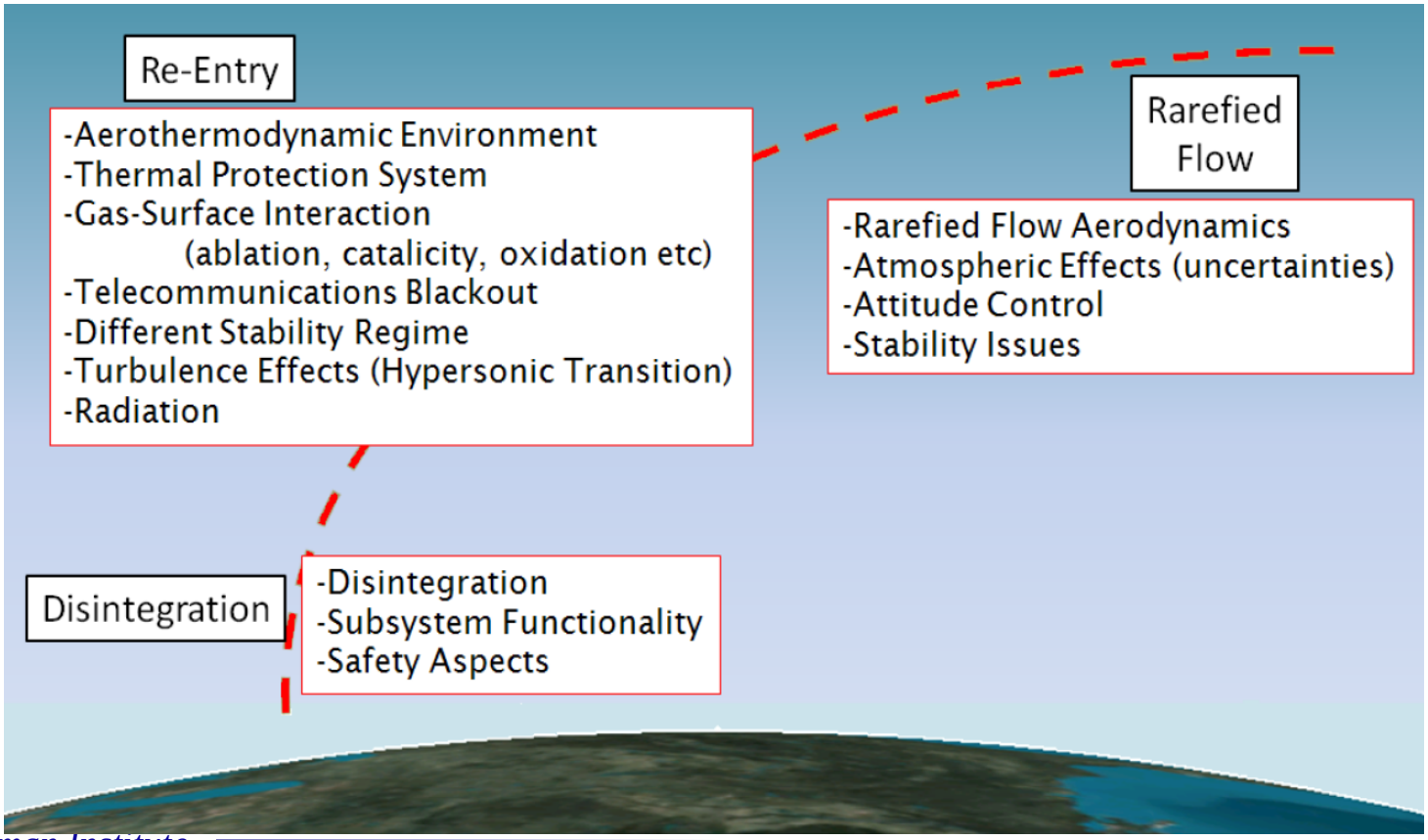
Schematic of the principle of working of the INMS



Miniaturised charged particle analyser along with the Improved Plasma Analyser

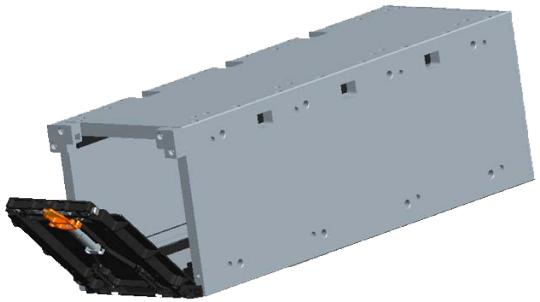
QB50 Mission Objectives

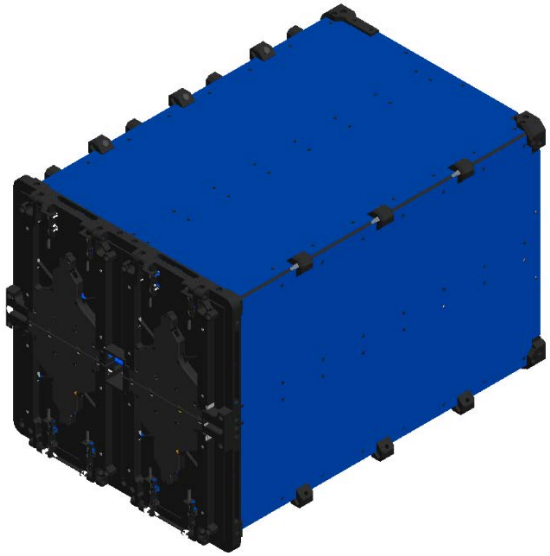
• To study the atmospheric re-entry process by measuring key parameters (such as temperature, pressure and location) on board the CubeSats during re-entry and by comparing predicted and actual times and locations (longitude, latitude, altitude) of re-entry.



QB50 Mission Objectives

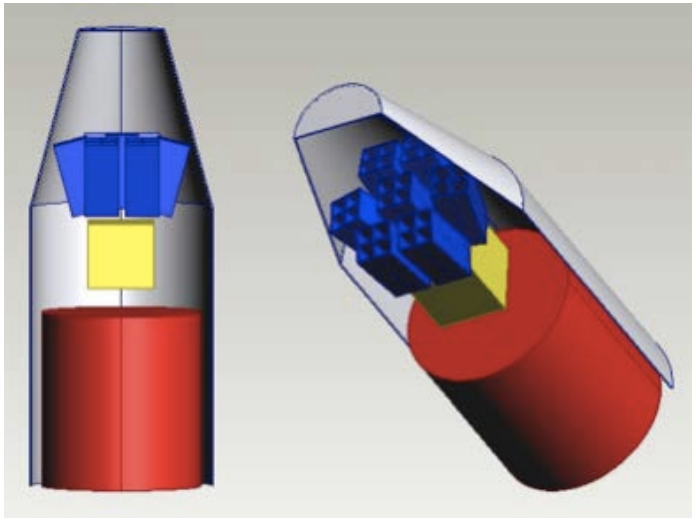
- To develop a deployment system for launching a large number (about 50) of CubeSats on a single launch vehicle and to deploy the CubeSats sequentially.

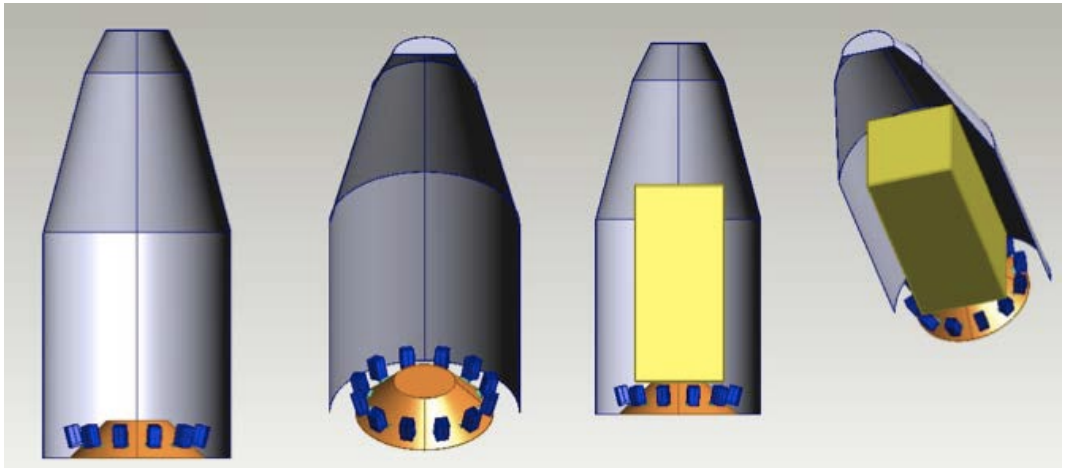




QB50 Mission Objectives

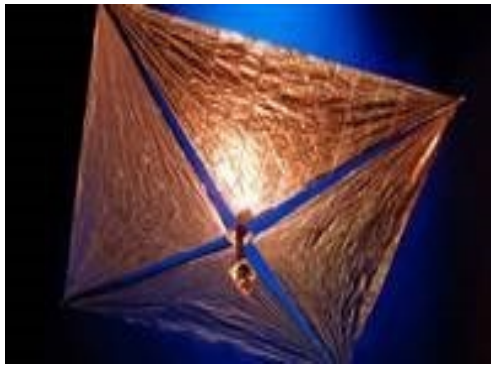
• To identify a sustainable low-cost opportunity for launching a large number of CubeSats on a single launch vehicle as a primary payload, thereby facilitating sustained access to space for small-scale research missions.

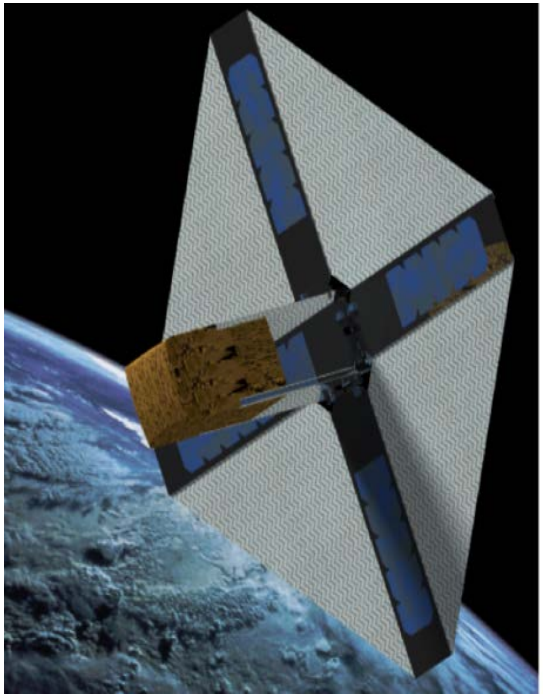




QB50 Mission Objectives

• To demonstrate the capability of CubeSats for a variety of science and innovative technological applications, such as climate-change monitoring, solar physics, atmospheric physics, materials testing, fundamental physics, in-orbit validation of components, debris mitigation, re-entry research, formation flying, inter-satellite communication and solar sail inflatable boom technology.





QB50 Mission Objectives

• To provide a large number (500 to 1000) of university students with practical experience in all aspects of a real space project and to enhance their motivation to work in the fields of space technology and science, thus helping to ensure the availability of a suitable and talented workforce in the future. About 50 PhD theses and 250 Master theses are expected to result from QB50.

QB50 Requirements

- CubeSat teams and VKI shall sign a Contractual Agreement
- CubeSat teams shall deliver their fully tested flight model CubeSats to ISIS no later than 4 months before the launch date.
- The CubeSats shall be launched into a circular orbit at 350 km altitude.
- CubeSats carrying the standard atmospheric sensors shall commence payload operations within 7 days after deployment, and secure the science sensors to look in the ram direction with a precision of ± 10º, and to operate for a minimum period of two months.
- CubeSat teams shall have access to a ground station with uplink (VHF-band) and downlink (UHF-band) capability.
- CubeSat teams shall provide selected science data (quick-look data) and key housekeeping data in real time to the Mission Control Centre and fully processed science data, key housekeeping data to the Data Processing and Archiving Centre (DPAC) within 3 after the end of the mission operational phase.