

BUSINESS INNOVATION SYMPOSIUM (E6)

Entrepreneurship and Investment for Innovations in Commercial Space Access Activities (1)

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USER COMMUNITY DEVELOPMENT FOR SUBORBITAL SPACE FLIGHT OPPORTUNITIES IN JAPAN

Abstract

The general public is interested in suborbital vehicles because they will take us up to space at an affordable cost. However, this paper will focus on other on-board utilizations of suborbital vehicles in Japan; microgravity experiments, engineering test and qualifications, ignerosphere science and observation, etc.

Japan had started the ground base microgravity experiment fund for 1997-2009 to build and test precursor experiments for ISS by drop towers and parabolic flights with government funding. However they were closed because of expensive operating and maintenance costs. Now parabolic flights are the only active microgravity service in Japan.

One of the most precious aspects of suborbital vehicles is that it makes it possible to repeat experiments because of flight frequency with equipment return at reasonable cost. Life science experiments are a typical case, to examine the assessment of the impact of microgravity environments on biological mechanisms for innovative medicines and so on. Late access characteristic of suborbital space flight will be good for this user group. Combustion research is also necessary to have repeated experiments. Engineering test and qualification are also expected to make the best use of suborbital space flight both interior and exterior. Before ISS and satellite assembly, components and parts should be tested to become space qualified and operational in both the microgravity space environment and space atmospheric environment. These are attractive user aspects, especially for small satellite development. Talking about uses of exterior of suborbital flights, high altitude atmospheric physics and astronomy physics can be done in what is called "ignerosphere" science and observation. Space based observatory users will also be expected by suborbital space flight.

The first suborbital users panel was held at the largest domestic space symposium in December, 2011. This is the first step to build up the suborbital users community in Japan.

Suborbital flight opportunities will be helpful to make the best use of ISS. Suborbital space flight is the new platform which will open space opportunities with frequency, reasonable cost, easy access, late access, on board operation and so on. Most recently, Japanese microgravity users have started to participate in the new US suborbital market study led by Tauri Group.

This paper will review the current status of the microgravity user community in Japan and other Asian markets, and provide a regional market perspective and a roadmap for international collaboration in suborbital flight research opportunities.