

14TH IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND
DEVELOPMENT (D3)

Space Technology and System Management Practices and Tools (4)

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Canadian Space Agency, Canada, wanping.zheng@canada.caCAPABILITY DEMONSTRATION: CSA PROGRAM FOR INCREASE SPACE READINESS OF
SPACE SCIENCE AND TECHNOLOGY WHILE TRAINING THE NEXT GENERATION**Abstract**

Launching a payload onboard a satellite or space platform (e.g. ISS) is the most desirable method to demonstrate new technology, scientific approach or capability. However, there are only a limited number of opportunities on space platforms and the associated cost is usually high. As such, using space platforms to train next generation space scientists and engineers or to quickly demonstrate a new concept is often beyond the financial capacity of academia and small industry. Therefore, pre-space platforms (rovers, balloon, sounding rockets, and parabolic flight) remain popular for the academia and industry engaging in space science and engineering to test their hardware and approaches. Although these platforms don't give the full in-space "flight heritage," they reproduced some aspects of it and are equally effective in training university students and postdoctoral fellows (PDF). The flight data obtained in the near-space environment provide preliminary scientific data and more importantly, allow identification of problem or deficiency in the experiment or prototype. All these are possible because pre-space flights are low cost and readily available. With this in mind, the Canadian Space Agency (CSA) implemented the Capability Demonstration program which will make the pre-space platforms available to Canadian academia and industry. Canadian academia and industry are also encouraged to utilize these platforms for international collaborations. This paper will provide greater details on each of the pre-space platform and the approach taken to optimize their utilization. Particular emphasis will be put on the Stratospheric Balloon Base and the rover facility. The rover facility was developed between 2009 and 2012 and offer a fleet of rovers with their equipment, a large analogue terrain and an experimental control center. The balloon base in Timmins, Ontario, is operated in collaboration with CNES. Since the base was completed in 2014, over 10 stratospheric balloons were launched. These two facilities created many test opportunities for Canadian and international researchers and students in addition to industry staff. Over a hundred of them have used these facilities and gained first-hand experience in analogue deployment and balloon-based experiments. The effectiveness of the such facilities in offering quick and low-cost opportunity to test new technology and scientific approach while training the next generation space scientists and engineers is clearly demonstrated.