

23rd IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
17th Workshop on Small Satellite Programmes at the Service of Developing Countries (1)

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THE 3 LEVELS OF SMALL SATELLITE CAPACITY BUILDING. EXPLAINED WITH REAL
WORLD EXAMPLES.

Abstract

Capacity building for using small satellites is both a necessity for new spacefaring nations as well as a major business for experienced suppliers. However many of the training missions fail to accomplish their primary goal: enabling the participants to build satellites. Nearly 10 years ago this was the authors motivation to create industries first benchmark for success in capacity building:

Level 1: Client engineers are participate building the satellite at host's lab. # Level 2: Client engineers design and build satellite on system level in their own labs while buying key subsystems from foreign suppliers. # Level 3: Client engineers build and design key subsystems and the whole system independently in their own labs

Today many institutions interested in small satellites actively use this benchmark and it is further proof of its usefulness it has found wide application also in the industry itself.

It is thus time to re-evaluate ongoing training programs to see whether todays capacity building programs are better suited to the needs of the new spacefaring nations. Three examples have been selected to do this analysis:

Level 1: National University of Singapore (NUS) The Kent Ridge 1 satellite program was a classical level 1 training program. It has been concluded with the launch of KR1 in December 2015. As part of the program the ground works have been laid to pass over to Level 2 as a satellite kit (sub systems for a 2nd satellite) have been provided NUS.

Level 2: National Authority for Remote Sensing Space Sciences (NARSS - Egypt) Within the NExSat program NARSS will independently build a satellite on system level using foreign components. This program started in mid 2015 is the logical next step for Egypt after concluding the previous Level 1 program in 2007.

Level 3: Dhruva Space Dhruva Space is an Indian commercial space entity that aims to provide satellite systems and services for the south east asian region. Dhruva Space in 2015 has entered into a joint venture with an experienced supplier which will enable it to build complete missions including the subsystems in India.

Based on these 3 examples the paper will explain the 3-Level approach of capacity building using small satellites. In addition a overview and update on ongoing and recently finished training missions will allow to assess whether or not training programs have improved their performance in the last 10 years.