

## **ABSTRACT**

### **Technology Transfer From Didactic Satellite Subsystems to Space Vehicles from a Small Satellite Constellation for Humanitarian Applications**

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#### **Abstract**

This paper shows the highlights regarding the technology developed in México for the SATEDU didactic satellite which was designed, manufactured and fully validated at University of México (UNAM), <http://proyectos.iingen.unam.mx/satedu/Default.htm>. SATEDU subsystems were developed according with the cubesat standard and in addition special latch-up protection circuitry was added at every satellite subsystem.

Then the paper explains the satellite technology transfer that is being done to manufacture the first 3-axis stabilized Mexican Nanosatellite within the frame of an International project being headed by Spain (University of Vigo), United States (Cal Poly) and México (promoters from the Mexican Space Agency).

All SATEDU technology resources as well as its development experiences are being employed to build on the first indigenous satellite to be launched into space as one of the first satellites of the International Nanosatellite constellation project called HUMSATC (humanitarian satellite constellation). The satellite constellation aims to provide basic tele-health services for both rural and underdeveloped areas from all over the world, on one side. While on the other it pursues to gather worldwide information from networked sensors to contribute to the better understanding of the global climate change.

HUMSATC constellation will be composed by at least 12 Nanosatellites, each one fabricated by a different country. A couple of these countries might lack enough technology to develop its own satellite. In such a cases both SATEDU and Humsat/México technology will be available for them to ease and fast its access to space projects.

Therefore, the paper shows the developed work being done towards the creation of the Humsat/México Nanosatellite which gathers following subsystems: 3U Structure, Power with deployable solar panels, flight computer, wireless communications, platform satellite sensors, reaction wheel and magnetic torquer coils based stabilization, inertial navigation sensors and ground station.

Humsatc/Mexico Nanosatellite subsystems are interconnected and controlled through distributed software placed at each one of its intelligent subsystems. In this way the satellite will accomplish high complexity tasks that will enable the validation of Mexican 3-axis satellite stabilization technology. It should be highlighted that the main payload for HUMSATC constellation satellites does not require 3-axis stabilization, however Humstac/México pursues this goal to achieve satellite domestic technology development as part of the program of its Mexican Space Agency which is about to be initiated.

On the other hand, the HUMSATC payload subsystem will be explained in a different publication.

### **PROJECT WEBSITE**

<http://proyectos.iingen.unam.mx/satedu/Default.htm>

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