

SYMPOSIUM ON INTEGRATED APPLICATIONS (B5)
Tools and Technology in support of Integrated Applications (2)

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CUBESATS FOR MEDICAL DATA TRANSMISSION BETWEEN REMOTE AREAS AND EUROPE
TO QUICK DISEASE DIAGNOSES

Abstract

In the last years Non-Governmental Organizations (NGO) have actively provided health care and medical training to populations in war-torn regions and developing countries. As they mostly rely on local medical professionals, many sites are affected by a shortage in medical specialists, and in particular oncologists. Therefore the adopted standard procedure consists in performing in-situ preliminary analysis and sending the gathered data to a remote specialist that formulates the diagnosis and establishes the therapy. However, the logistic chain of the hand-carried data represents a significant problem. When the local hospitals are located in dangerous or difficult-access areas the time between the medical screening and the specialist response can be long and hardly predictable. The exploitation of a company providing satellite data transmissions could be a possible solution, but has a greater drawback. Medical imagery systems result in large amount of data that causes the process to be over-budget for most of the organizations. A possible, here proposed, solution may be to take advantage of CubeSats as data-relay element. This class of low budget micro-satellites is being successfully selected to answer typically educational goals by institutions and associations with limited space engineering experience and funding strong limitations. The paper presents the results of a feasibility study focused on the exploitation of the Cube-Sats to store and transmit medical data from remote regions of the Austral Earth hemisphere to European locations. To minimize costs, two main assumptions have been done: only commercial off-the-shelf components can be selected in the subsystems design and realization, and the operational orbit is not specifically tailored for the mission goals but comes as a constraint from the adoption of a piggy-back launch strategy. This solution, of course, limits the overall costs with respect to the support of a commercial company while improving readiness in data deliver, compared to conventional systems with limited performance decay. Feasibility of such a mission is discussed, and possible preliminary sizing is showed in details.