

8/14/2015

Re: Cubesat information - Karun Thanjavur

Re: Cubesat information

Windell Jones <jones@cfht.hawaii.edu>

Thu 8/6/2015 3:05 PM

To: Karun Thanjavur <karun@uvic.ca>;

Hi Karun,

Thank you for the compliments! Suggestions are only as useful as how much they're practical :) I hope they help.

The University Nanosatellite Program (UNP) is the program that funds universities to develop nano satellites that are selected to compete in the program. The selection is done by proposal. For two years, the funding is usually \$100k during the competition. Then if you place high in the Flight Competition Review, then you'll get another round of funding to develop your flight model. I haven't looked into the details if the university needs to be in the US.

<http://prs.afrl.kirtland.af.mil/UNP/>

The cubesat launch program is called Educational Launch of Nanosatellites. More specifically though, you would be part of the CubeSat Launch initiative (CSLI). Again, I'm not sure if you would need to be a US university.

http://www.nasa.gov/offices/education/centers/kennedy/technology/elana_feature.html

http://www.nasa.gov/directorates/heo/home/CubeSats_initiative.html#_VcPY3mDkRjI

I'm really sorry if these suggestions don't work for you guys :(

windell

On Aug 5, 2015, at 8:21 AM, Karun Thanjavur <karun@uvic.ca> wrote:

Hi Windell

It was indeed a pleasure to meet you too. Thank you for all these ideas and suggestions, a real treasure trove. I look forward to reading your thesis in detail. I will pass these on to my supervisor as well and let you know about our upcoming telecons. I am sure we can move the telecon time to make it more convenient for you in Hawaii.

Could you also please send me the link to the USAF cubesat launch program, which you used? I've forgotten the acronym, sorry. Also please let me know about the universities nano/cube sat funding program, that sounded really useful for us too.

Thanks again very much. Looking forward to keeping in touch and benefitting from your expertise.

Aloha

karun

From: Windell Jones <jones@cfht.hawaii.edu>

Sent: Tuesday, August 4, 2015 3:04 PM

To: Karun Thanjavur

Subject: Cubesat information

Hi Karun,

It was a pleasure to talk with you today. I hope that you had a safe trip back home!

Here are some links to the bunch of things that we talked about. :) The star tracker by sinclair i've heard of the most and I believe has a bunch of flight heritage. I think that one is about \$10k??? and has radiation shielding (might not be required for a short proof of concept mission). I believe that cubesats have reliably operated without radiation hardened parts for over 1 year fine from LEO. Seems like the star trackers from sinclair can give under 10 arc-sec for cross-boresight accuracy. For rotation about boresight, under 75 arc-sec. The update rate is 2 Hz.

If you want to maintain nadir-pointing, a GG boom would be the least energy hungry. I have a design that I used for our satellite and some videos if you ever want to see. Otherwise, there are 3-axis could work. They require more power and are quite bulky for a 1U. I would say that embedding magnetorquer coils into the solar panels would be your best bet at detumbling and alignment, but you won't be able to create a moment about the magnetic field without a reaction wheel. Magnetorquers and reaction wheels usually need to be used together to desaturate the reaction wheels.

I feel that your mission is great! Man I wish I thought of it :)

Well these are my thoughts for now! Keep in touch and let me know about those telecons!

sincerely,
windell

[Click to Download](#)

thesis_writeup_r6wj.pdf
41.6 MB

Star tracker

<http://bluecanyontech.com/portfolio-posts/cubesatsystems/>
http://www.berlin-space-tech.com/index.php_id=42.html
<http://www.sinclairinterplanetary.com/startrackers>

ELaNa

http://www.nasa.gov/mission_pages/smallsats/elana/index.html

CubeSat Launch Initiative

http://www.nasa.gov/directorates/heo/home/CubeSats_initiative.html#.VcEsDmDkRjI

COTS CubeSat Deployable antenna System

http://www.cubesatshop.com/index.php?option=com_virtuemart&Itemid=70&vmcchk=1&Itemid=70

University Nanosatellite Program

<http://prs.afrl.kirtland.af.mil/UNP/index.aspx>