The Auckland Programme for Space Systems: A Student Enrichment Programme

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The Auckland Programme for Space Systems

The only certainty in our students' future is the need to work with people outside their field, in unfamiliar environments, on challenging topics.

Challenging topics: Space

Outside their field: Mixed teams in the APSS

Unfamiliar environments: team work, group presentations, external funders, technical staff, third party suppliers, project management, etc.

The Auckland Programme for Space Systems

- is a non-credit undergraduate programme run on a two-year cycle,
- has attracted over 400 students from engineering, science, arts, medicine, law and business,
- is based on the CubeSat standard,
- attempts to mimic the concept, design, development, realisation and execution of larger missions,
- has been a signal success from the point of view of student engagement

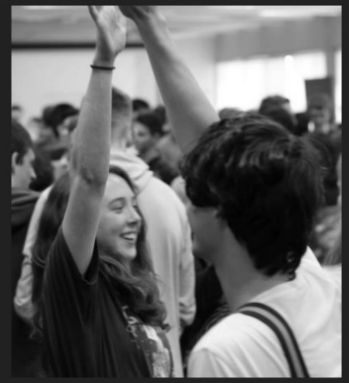
The Auckland Programme for Space Systems

Open to all students across University

Teams must be mixed faculty

Competition to choose CubeSat mission

2016* 2019
2017
2018 2021



Seed funding $150k

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Focus: The Undergraduates

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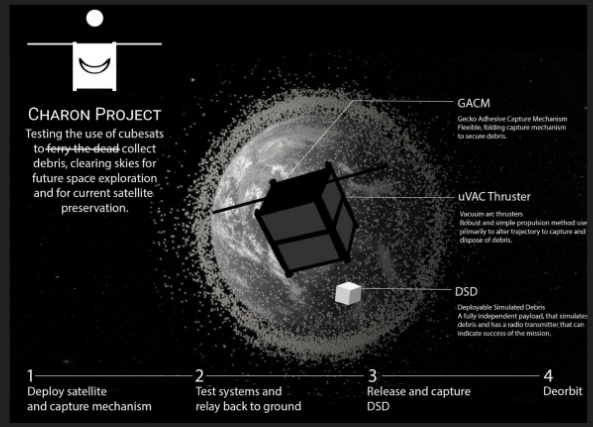
Preliminary Design Review

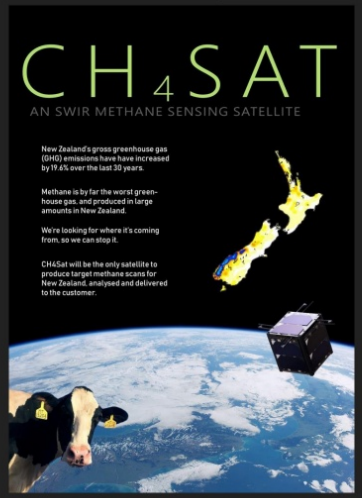
(Feedback)

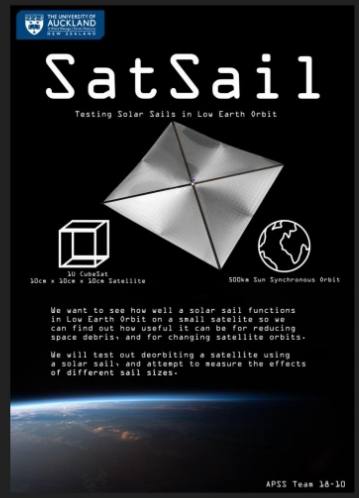
Final Design Review + Poster, Video

Competition Decision

Repeat!







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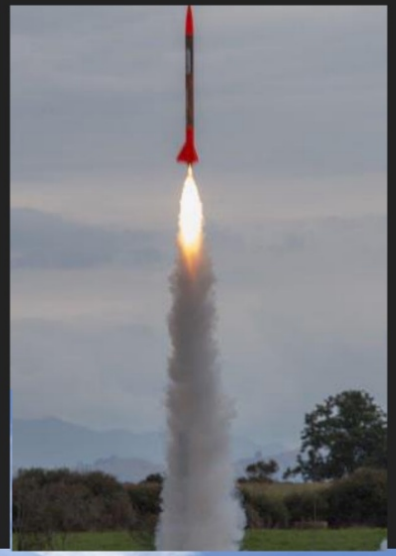
Winning team forms nucleus of larger team -- recruits

Starts specific tasking, orders placed for hardware

P-Sat program starts

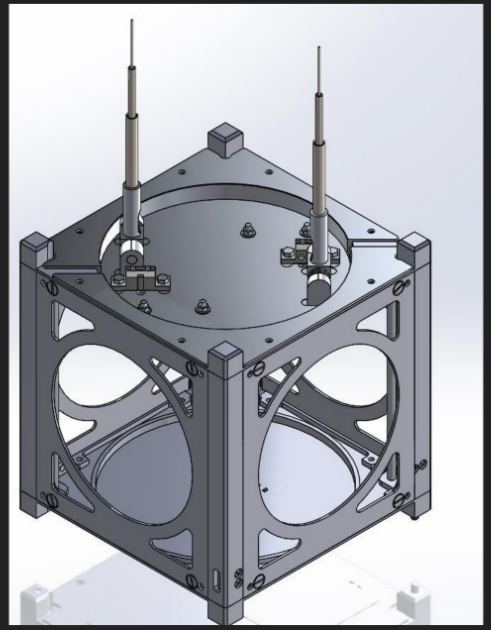


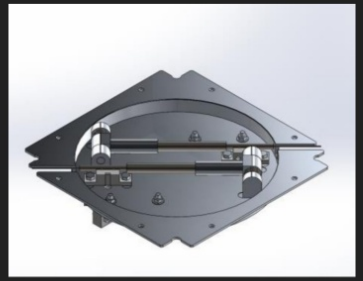
APSS-I Detail

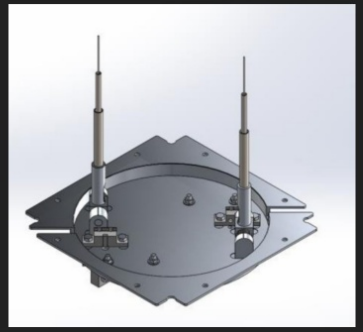
- All CubeSat subsystems purchased from Clyde Space
  - EPS and 20Wh battery
  - Four deployed solar arrays
  - OBC
  - VHF/UHF Transceiver
  - Antenna deployment module
  - Flatsat development board, 10Wh battery
  - Software (Bright Ascension)

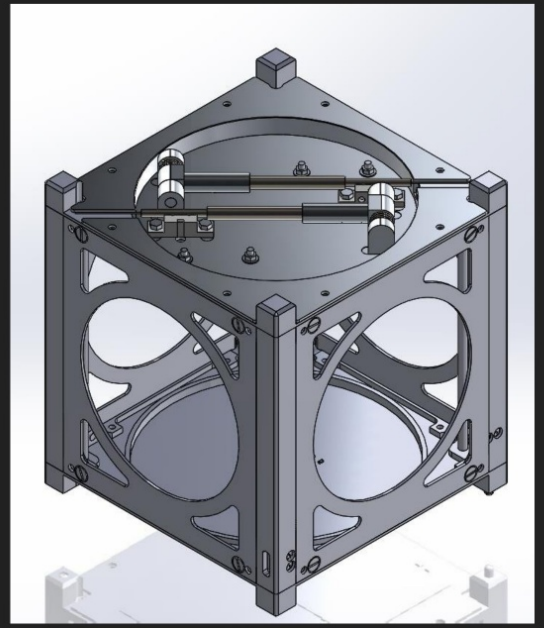
- 20mm payload volume for APSS-I

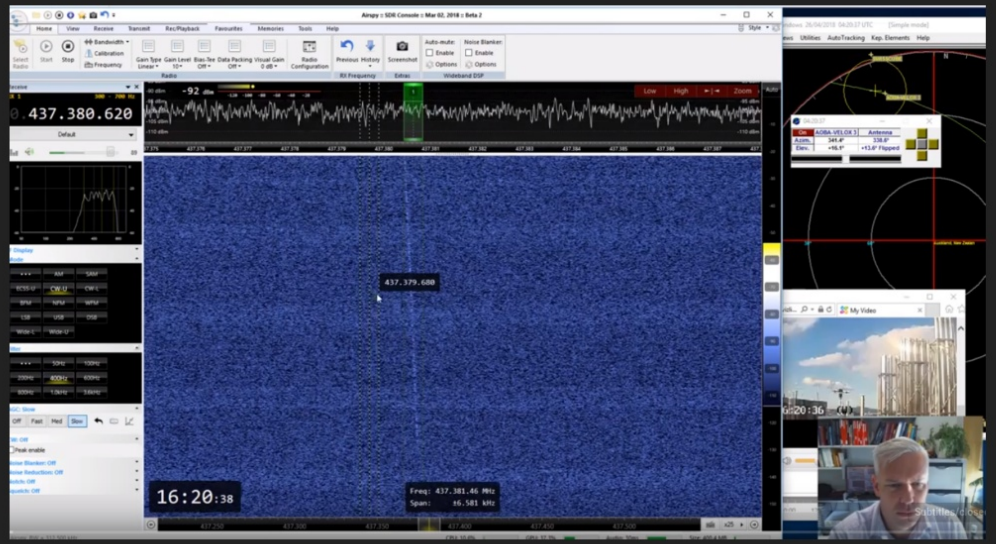
APSS-I Payload, Langmuir Probe







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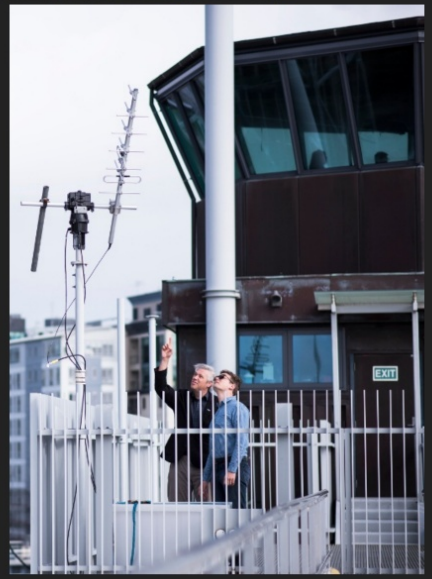

EXIT

The Auckland Programme for Space Systems

Building on our non-credit APSS programme, we aim to:

- define courses (papers) within our existing University curriculum for a space major/ theme
- extend this to taught Master's level (post-graduate)
- continue to attract excellent research students.

Launched November 2020

Currently inactive, failure mode unknown

One of the payloads, the Waka Āmiorangi Aotearoa APSS-1 satellite, was built by University of Auckland student at Te Pūnaha Ātea - Auckland Space Institute.

It was designed to monitor electrical activity in Earth's upper atmosphere to test whether ionospheric disturbances might be linked to earthquakes.

The data from the mission will deliver deeper knowledge of hard-to-access altitudes and drive understanding of how phenomena such as solar wind and geophysical events affect atmosphere.
--stuff.co.nz (3/11/20)

APSS Spin-out companies

Zenno Astronautics

Received $10.5M funding in 2022 and have hired several APSS graduates

Astrix Astronautics

Received $0.5M pre seed funding and flew Tech Demo to orbit in 2022 on board Electron

Out There Astronautics

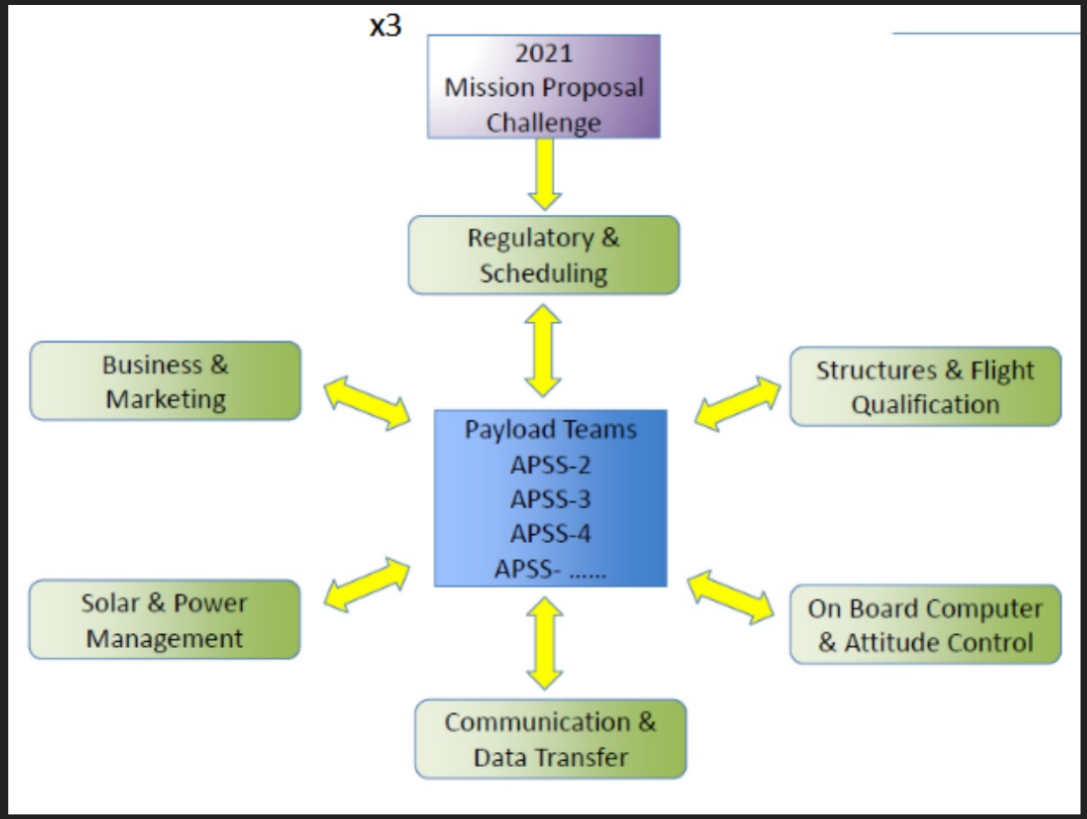
Currently competing in the $100k Challenge and being nurtured in the APSS lab

APSS Reformat

Format restructed to retain expertise.

Students work in teams on subsystems across several missions.

Mission ideas are still sought via competition, and recruits students to payload and subsystem teams.



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Restructure the APSS program to improve continuity and knowledge retention

Prepare to launch MPC 2023 when students return

Further engage Space Institute staff for satellite construction to fill gaps in knowledge