Science

We will be explaining a little of the science behind the MDRS experiments below, as our intrepid crews brave the wilds of the martian atmosphere, sample the alien geology and take in the sights of a truly dark sky.

A Word from the Curator

KiwiSpace **Mars** Analog missions will simulate a manned expedition on the surface of planet Mars.The research conducted by the MDRS expeditions is very useful for the future exploration of Mars – such missions were performed by NASA prior to the Apollo trips to the Moon. The missions take place at the Mars Desert Research Station in Utah.

Planetary Sciences

Introducing Mars

(add here the relevant part of the curriculum)

- Welcome to Mars!
- Water water everywhere but not a drop to drink!

Geology

- Mars' past - volcanism and canyons

Weather

- Martian weather - dusty with a chance of storms

Life

- Could any Earth life survive there?

Human Activities

Hab Science

- The hab design
- Power sources

Health and Safety

Food and Food Safety

- Food Safety
- Recipes from Mars - Melanie's Space Cook Book
- Link to the Cornell University Hi-Seas Programme

Biology

- Greenhouse experiments
- Biosecurity for Mars
  (impact of human activities on Mars)

Rovers

Geographical Information Systems GIS

- StoryTelling

Human Factors

Mars Clock

Culture

Astronomy

- - Solar clock
  - Navigation using the stars
  - Dark-sky requirements

Interplanetary Comms?

Antipodes

- Antipodes 0 - Communications and the AoudaX
- Antipodes 1 - Rover command
- Antipodes 2 - Biological sampling at MDRS
- Antipodes 3 - Soldering at Dachstein

Exploration & Research

Following an initial training and induction period, the crew will perform a range of experiments and exercises, related to their areas of expertise or interest. Schools and other groups within New Zealand will be able to propose and contribute additional experiments. We will also be encouraging schools to run 'control' versions of experiments back in New Zealand for comparison, and to increase engagement.
The experiments proposed by the analog Mars crew include:

- **Geological Research**: collecting and analysing rock samples in a geological and microbiological context
- **Nutritional Studies:** to help plan the cuisine for future lunar and Martian space colonies, the crew's diet will be based on food supplied through a nutritional study programme undertaken by Cornell University Professor Jean Hunter on behalf of NASA
- **Biological Studies** ** Biosecurity: How do you avoid back contamination, and what impact would human presence have on an alien ecosystem?
  - **Environmental Management Research:** waste recycling and systems thinking
- **Astronomical Research:** Dark skies awareness, astro-navigation, Sun dials
- **Social and Behavioural Studies:** stress, isolation, teamwork.

Mission Progress

Also see Education and Outreach section.

Students and the public will be able to get regularly updated information from our website. This will include:

- daily mission reports;
- live web cams of in and around the habitat; and
- webcasts.

Following the expedition completion, a formal report will also be produced and distributed to schools and via the website.