

HAS Meeting Notices August 2012

1. 2012-13 Programme Update and Dates for Your Diary.

Saturday 1st September 14:00 - 18:00

DOORS OPEN DAY when the general public are invited to view the observatory and use the solar telescope, weather permitting. Pat Escott is looking for volunteers to cover a 2-3 hour shift to welcome visitors (we had 100 last year). Contact details: Tel. 01463 239746 or [mailto:Pat.Escott](mailto:Pat.Escott@btinternet.com) (pmescott@btinternet.com) or simply sign the Doors Open Day sheet tonight.

Saturday 1st September around 20:00

Our **Telephone Alert System** subscription is due for renewal on the 2nd of September. I propose to send a test alert on the evening of the 1st to make use of our remaining credit. Please send me feed-back either to <mailto:pat@spacegazer.com> or telephone or text 07930183999.

Should you see an aurora, noctilucent clouds, sprites or anything else of astronomical interest please alert Pat W. (0793 0183 999), Paul (01667 456789) or Pauline (07751 112586).

The Next Meeting is on Tuesday 4th September 2012.

Curiosity has landed. Come and hear Prof. Mark Sims give a talk entitled *Is There or was There Life on Mars, Exploring Mars* with up to date reports on information being sent back from the red planet.

The Discussion Group, with Arthur and Prof. Sims, will take place as usual and, if there is time, Michael will run a break-out group about Sirius.

The "Youngstars" session for 8-14 year olds, before the main meeting, will run from 19:00 until 19:30 led by Pauline and Triona.

Please keep the weekend of 7th, 8th and 9th September 2012 free.

"A special event to celebrate the all new **Orkney Astronomy Society (OAS)** during this year's Orkney Science Festival which is from 6 to 12 September. The event is exclusively for members of HAS, Sigma, Caithness Astronomy Society, OAS and Shetland. Individuals can of course extend their stay".

www.oisf.org

Please make your own arrangements re tickets, travel and accommodation.

If Orkney is too far, then that same weekend the **BAA** has their weekend meeting at **King's College, University of Aberdeen AB24 3FX** to consider Sun, Aurora and Noctilucent Clouds.

<http://britastro.org/baa/>

Basic Astronomy Break-out Groups.

At the **October, November, January, February and March Meetings** the break-out group will cater for those new to astronomy or wishing to brush up on their basic knowledge. The programme is provisionally as follows:

Month	Topic	Group Presenter
Oct.	Standing on the Shoulders of Giants - the History of Astronomy	Paul Jenkins
Nov.	Telescope Terms and Types	Steve Cullen
Jan.	Solar System Geometry and Terms	Paul Jenkins
Feb.	Earth's Seasons - Earth as a gyroscope. Seasons on other planets?	Arthur Milnes
Mar.	Our Local Universe - Sun, planets, the asteroid belt, comets etc.	M. Marett-Crosby

Wed. October 17th Apollo 12's Command Module Pilot Dick Gordon will be in Glasgow.

<http://www.walkwithdestiny.com>

2. Observatory and Home Viewing.

11/12th and 13/14th August - the Perseid Meteor Shower is at its peak. After dark, look towards the North-East to Perseus (just under Cassiopeia) to see up to 50 shooting stars per hour, clear skies permitting.

Solar Saturday Observing Sessions - JSL Observatory, NTS Visitor Centre Car Park, Culloden Moor.

Please check www.spacegazer.com before setting out.

Date	For Whom	Time	Supervisor
Sat. 11 th Aug.	public and members	14:00 - 16:00	Antony
Sat. 18 th Aug.	public and members	14:00 - 16:00	Gerry
Sat. 25 th Aug.	public and members	14:00 - 16:00	Pauline
Sat. 1 st Sep.	Doors Open Day	14:00 - 18:00	

From April to 22nd September, weather permitting, Solar Saturdays will be held at the Observatory. If the Sun is shining the solar 'scope will be taken to venues other than the observatory, possibly on Sundays. Watch the website for these Solar Road Shows.

Solar Saturday Assistants - Antony is compiling a rota for August and September. Please contact him if you are willing to help out <mailto:antony@spacegazer.com> or 07733179670. When the Sun is shining we can have a good number of visitors and the supervisors would appreciate members being available to talk to them.

Winter Observing - We shall shortly be asking for volunteers to train as supervisors or as assistants. Rhona, in mid-August, will start compiling the rota for mid-September through until December and later in the year from January to March. Winter sessions each month are for two Fridays (for the public) and two Saturdays (for members and guests only) away from the full Moon. Please contact Rhona at <mailto:rhonabifraser@tiscali.co.uk>. If you wish to discuss your involvement informally speak to Paul, Pauline, Pat W, Rhona, Gerry, Steve C. or Antony.

3. Free On-line Study Courses.

<https://www.coursera.org/#about>

<https://www.coursera.org/#course/astrobio> Astrobiology and the Search for Extraterrestrial Life - University of Edinburgh

<https://www.coursera.org/#course/introastro> Introduction to Astronomy - Duke University, USA.

<https://www.coursera.org/#course/earth> Planet Earth - University of Illinois

<https://www.coursera.org/#course/cosmo> Galaxies and Cosmology - California Institute of Technology

<http://www.spacegazer.com/> SC 037209 Pat Williams

Runaway Rockets by Dr John Davies

Born in Liverpool, he graduated from university of Nottingham 1976 with a degree in chemistry. He became president of the local astronomy society whilst in Nottingham but worked as a test flight engineer for three years. Planes of various sorts are enjoyed as a hobby. He also gained a PhD in astronomy at Preston University and then joined the astronomy department in Leicester. Using the infrared Astronomical Satellite he discovered six new comets and a few asteroids including 3200 Phaethon, the asteroid that is the source of the Geminids. He has worked in a number of universities, joining ROE in 1987 and enjoying six years in Hawaii at Mauna Kea. His personal research focuses on small solar system objects. In 2001 he returned to Edinburgh to become Project Scientist for the European Opticon project, an EC sponsored activity aimed at integrating all of European astronomers.

If it can go wrong, it will. Alternatively the talk could also be called "Carry on Launching".

Dr. Davies began his talk by telling us why space accidents are spectacular. Engineers have to deal with high energies and low margins. For example, speeds and temperatures can be very high and these need to be reduced. Conversely, rockets tend to be designed with low margins, which are not a good thing; rockets cannot be too heavy or too expensive or they will blow up as his next video clip demonstrated nicely.

Dr. Davies then went through a number of examples of the difficulties experienced by various missions explaining what went wrong.

Apollo 13 April 1970

One of the oxygen tanks in the service module exploded, power was lost and oxygen was vented into space. The lunar module had to be used as a lifeboat. The reason the oxygen tank exploded was because one of the little heaters for the tank must have had bare wires due to the heater being left on for many hours during testing and this burnt the insulation off the wire. The thermostat that should have turned the heater off didn't work because the voltage had been changed in the spacecraft except this one switch and that was because this oxygen tank was originally on Apollo 10. It had been dropped so a new one was used on Apollo 10. It was returned to the manufacturers who tested it and declared it safe so it was installed in Apollo 13 but someone forgot to change the voltage to that used in Apollo 13...

Skylab launched 1973

It was found to be overheated and underpowered. A thermal heat shield had somehow been ripped away which damaged the solar panels thus making Skylab too hot inside and unable to produce any power. It had to await the arrival of astronauts who managed to push an emergency sunshade, made by numerous seamstresses on Earth, out of a port of the command module and the temperature dropped. With difficulty, astronauts, using a metal pole with shears attached, managed to get the damaged solar panel open.

Salyut 7 - spacewreck

Suddenly all systems went quiet on board this craft, which was unmanned at the time, so a crew was sent to investigate. Despite Salyut 7 tumbling they managed to dock and climb inside. Temperatures were below freezing due to no power, which they fixed. The water tanks were frozen solid so had to be warmed up using torches!

Atlas - Centaur - America's first hydrogen fuelled rocket 8th May 1962

It blew up. Because it spent a year on the launch pad it had to be lifted upwards from the top every so often to help it depressurise. This was done so often, it got metal fatigue so when launched it exploded.

Soyuz T-10A September 1983

The cosmonauts were already in the rocket when a fire started. In order for the crew escape module to be ejected from the rocket it required manual control using two keys simultaneously turned in two different control rooms. This could only be achieved by the scientists talking on a radio to each other. Fortunately it was done in time.

Many Mars missions were failures.

Mars Observer launched September 1992 and was due to arrive August 1993.

All contact was lost before it went into orbit around Mars. It is thought that the fuel for the boosters may have leaked into the rocket during the year-long journey. Usually the boosters are fired early but for this mission were fired late and the accumulated fuel caused the rocket to explode.

Next came the series of missions that were faster, cheaper, better. You can have two but not all three.

Mars Climate Orbiter December 1998

It arrives at Mars without any problems and then as it about to go into orbital insertion, it disappeared. Lockheed Martin, writing the ground software, worked in pounds thrust, whereas the flight system software worked in Newtons. Unfortunately the wrong units slowed the spacecraft down four times faster which ended up plunging into the atmosphere.

Mars Polar Lander January 1999

Once it reached Mars it was not heard from again. To land, the heat shield was to fall off and parachutes deploy. These are released and the final decent is under rocket power. As the legs went out there was a big clonk, which tripped the switch to indicate it was landing so the rockets turned off and it fell 100 feet. The landing switch should have been reset.

Beagle 2

Made cheaply and not given enough time to develop and test the craft. Airbags were known to be a weakness or it may have been due to atmospheric conditions being different to those expected.

Phobos Grunt 2011

Due to land on Phobos and return a sample to Earth but it failed to leave Earth's orbit.

Latest Mars mission using more money

Curiosity landed safely on Mars 06/08/12. It had a very complicated landing procedure, never attempted before, but which was fortunately successful.

To succeed, you have to be:

Bold

Imaginative

Clever

Very, very careful

And sometimes just lucky

Curiosity fulfilled all the above.

An excellent and very interesting talk that was full of pictures and videos of exploding rockets.

Next time Professor Mark Sims returns to the Highlands to tell us about Mars exploration.

Pauline Macrae