

# The Blott Matthews Challenge



## Mission to Mars

Judging and Expert Support

# Experts and Support

## Experts:

- ❖ Prof. Andrew Coates, Deputy Director and Head of Planetary Science at UCL's Mullard Space Science Laboratory (MSSL). Science missions include Exo-Mars Rover, Cassini (Saturn) and Mars Express
- ❖ Dr David A Green, Senior Lecturer of Human & Aerospace Physiology, King's College London.
- ❖ Doug Liddle, Director In-Space Missions Ltd who has lead the design of Surrey Satellite Technology Ltd Satellites up to 3 tons.
- ❖ Dr Kathryn Graham, Surrey Satellite technology team leader for the Missions and System team responsible for the Systems engineering.
- ❖ Camilla Blott, young aerospace engineer at QinetiQ working on Tornado, Typhoon and Watchkeeper projects.
- ❖ Nick Williams, young aerospace engineer.

## Support:

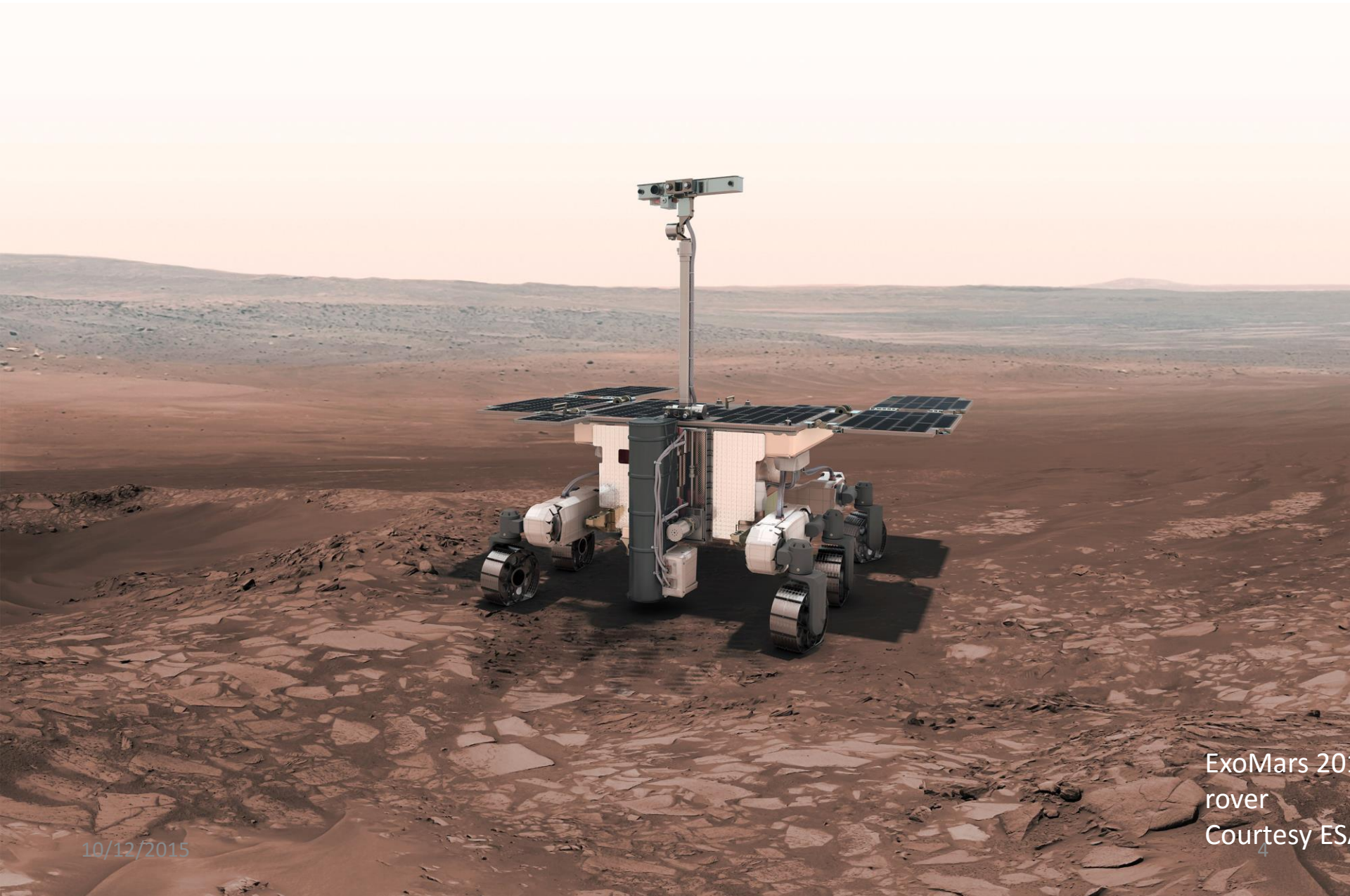
- ❖ Rod Edwards, Chief Executive Young Engineers

# Professor Andrew Coates

- BSc in Physics from UMIST (1978), MSc (1979) and D.Phil. (1982) in plasma physics from Oxford University.
- Deputy Director and Head of Planetary Science at UCL's Mullard Space Science Laboratory (MSSL).
- Principal Investigator for the PanCam instrument on the ExoMars 2018 rover.
- Other space mission involvements include Cassini (led the CAPS electron spectrometer team), JUICE, Venus Express, Mars Express and Giotto.
- Scientific interests:
  - solar wind interaction with planets and comets
  - planetary surfaces
  - plasma interaction with moons including Titan, Enceladus, Ganymede and Europa, space instrumentation.



Courtesy UCL-  
MSSL



# The challenge

- ❖ The ESA-Russia ExoMars 2018 rover will be the first to drill up to 2m under the Martian surface to look for past or present life
- ❖ Particularly relevant following this week's NASA result – liquid water on the Martian surface, sometimes
- ❖ We are leading the PanCam team for this (at top of the mast about 1.8m above the surface)
- ❖ PanCam, and other instruments, provide context for the drilling and analysis
- ❖ Vitrally important to have scientists and engineers working together as a team, as at our Laboratory
- ❖ PanCam's main engineering challenge is the cold Martian night
- ❖ Good luck with your challenge!

# Doug Liddle

- ❖ 21 years in the space industry at:
  - In-Space Missions Limited
  - Surrey Satellite Technology Ltd
  - UK Defence Evaluation and Research Agency
- ❖ Doug has worked on over 20 satellite missions and has experience working in:
  - Military, institutional and commercial space
  - Earth Observation, Communications, Navigation, Science and Exploration
  - Designing and building spacecraft from 3 kg to 3000 kg



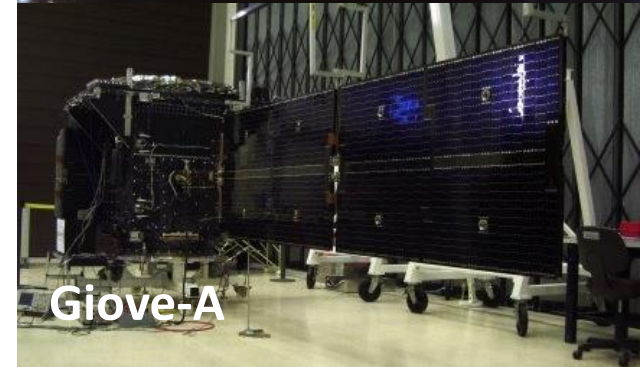
*STRaND-1, UK's first  
cubesat  
programme devised by Doug  
Liddle while at SSTL*

## Highlights include:

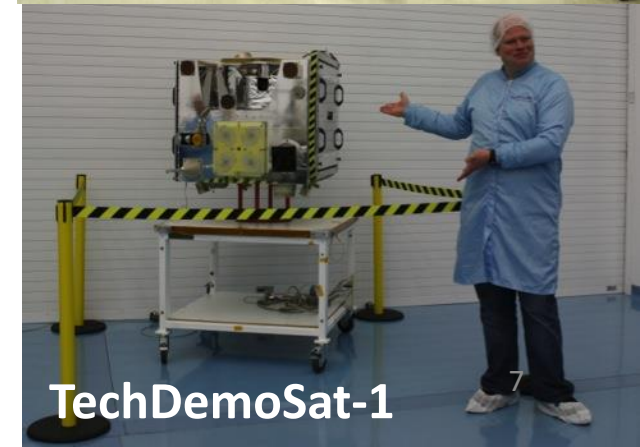
- Supporting launch and operations of the military Skynet 4D and 4E satellites
- Led design of Europe's first navigation satellite – GIOVE-A
- Led design of Surrey Satellites small geostationary telecoms satellite
- Programme management of the UK mission – TechDemoSat-1
- Devised the UK's first cubesat mission – STRaND-1
- Leading or part of design teams for space science and exploration activities covering: exoplanet observatories, lunar communications, Mars comms relay, radio astronomy...



Skynet 4



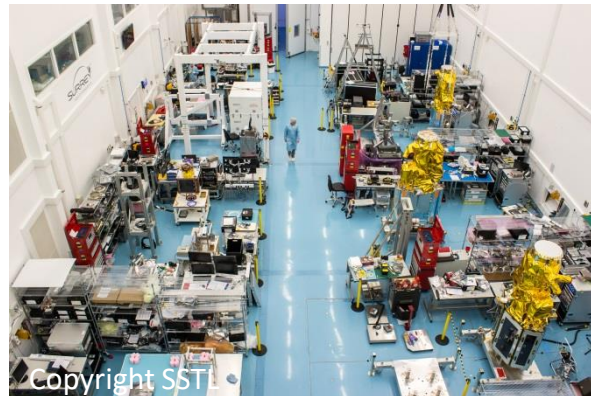
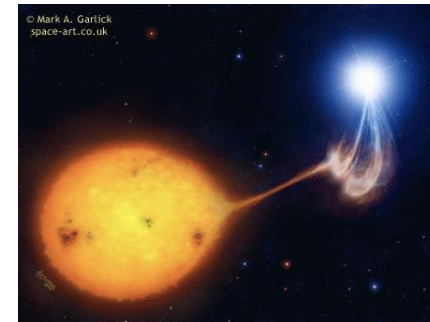
Giove-A



TechDemoSat-1

# Dr Kathryn Graham PhD, BSc Hons, CPhys

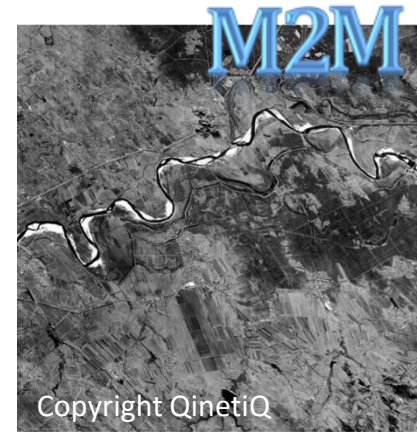
- A levels: Physics, Chemistry and Maths
  - Participated in the capability Trust scheme for engineering whilst at 6<sup>th</sup> form, working with British Nuclear Fuels
- BSc Physics with Astrophysics from University of Birmingham 1992
- PhD ROSAT and HST observations of Magnetic Cataclysmic Variables , University of Leicester 1996
  - Highlight: Got the opportunity to use the United Kingdom Infra-red telescope in Hawaii
- Since then ~ 19 years experience in the space industry





# Career

- First 10 years- I worked at QinetiQ in the space missions group
  - Worked on a wide range of space mission applications for future projects.
  - Highlights:
    - Work with foreign partners on some concepts
    - Worked on the image processing for the TOPSAT mission – processed the first images received.
- Last 9 years – Working at Surrey Satellite Technology (SSTL)
  - Started working in future mission concepts, including:
    - Earth observation concepts; e.g. altimetry, fluorescence from plants
    - Carbon dioxide monitoring, Tropical carbon mission
    - Earthquake detection
    - Lunar/ mars communications architectures
  - Worked with a range of customers including ESA and NASA
  - During this time got the opportunity to start a new engineering team in the company for future mission concepts
    - Became a team leader and built up the team from just myself.
  - For the last 5 years I have been the team leader for the Missions and System team responsible for the Systems engineering for all our missions.
    - Leading a team of 20 engineers
    - Work on mission level bids
    - Interesting technical issues
    - Recruitment both from graduates and senior engineers.
    - Highlight: knowing you were involved in many of the missions launched.
    - Also do a lot of the photography for the company (as its my hobby!)



# Camilla Blott

Senior Project Manager, QinetiQ

## Experience

- ❖ A Levels – Maths, Physics, Chemistry
- ❖ Aerospace Engineering BEng (Hons), University of Manchester
- ❖ Army Officer Training, Royal Military Academy Sandhurst
- ❖ Royal Engineers, British Army



# Project Manager, QinetiQ

- ❖ Led multi-million pound Safety and Airworthiness projects on Tornado, Typhoon Eurofighter and Watchkeeper.



- ❖ Key roles include planning, scheduling, finance, establishing teams, monitoring and controlling projects.
- ❖ Experienced in bidding, corporate governance, programming, safety, risk and quality management.

# Nick Williams M.Eng. CEng

University: Masters in Mechanical Engineering from the University of Bath

- Participated in Formula Student with final year team at university
- Designed and built a car from scratch to compete against other universities from around the world in a number of events.
- Came 4<sup>th</sup> overall (best ever UK result at the time)



10/12/2015



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# Career

- Project and development engineer
- Started working at Eaton Aerospace on fuel systems including components of CH53K heavy lift helicopter for US military.
- Current job is at Cobham working with aerial refuelling probes and weapon carriage systems for fighter aircraft.
- Work on planning and carrying out qualification testing – exposing equipment to accelerated environments e.g. high temperatures, vibration, loads and fuel flow conditions.



# Judging and Submission Format

Judging Team:

- ❖ Charles, Richard and the Experts will judge your mission designs,
- ❖ We will explain how we reached our decisions at the Prize Giving.

Judging Criteria:

TOPIC	MARK
Science or Exploration objective unique benefit	15
Overall Mission Strategy	25
Spacecraft, human protection, propulsion, launch and assembly design	40 (10 each)
Optimising Cost and Schedule	10
Presentation	10
Total	100

You must upload your Mission Design to the BMC website by 15th February 2016, It is an opportunity to show that you can present a complex topic clearly and imaginatively.

To give a 'level playing field' for comparison please follow these rules:

- ❖ In PDF format not exceeding a file size of 20MB,
- ❖ Not exceeding 30 minutes presentational time including any videos,
- ❖ Video up to 5 minutes in length may be included by link to YouTube,
- ❖ Animation and/or computer assisted designs(CAD) must be embedded in the file so that they can be viewed with standard Microsoft Office programmes.



# Rod Edwards



Electrical Engineer (Imperial College London)  
Royal Navy Weapon Engineer Officer (17 years)  
International Business Experience (20 years)  
Chief Executive Young Engineers (since Jan 2013)

BSc (Eng)    MSc    MBA    CEng    FIET<sup>15</sup>