

# PI Summary - AATSR Science and Applications -

Professor David Llewellyn-Jones  
AATSR Principal Investigator

*Space Research Centre  
Department of Physics & Astronomy  
University of Leicester*

# AATSR Special Event

- Held at RAL, October 22<sup>nd</sup> 2009
- Attended by over 100 from all stages of the Programme
- Event succeeded in Raising Awareness of Success and Importance of AATSR, and
- Expressed Appreciation of Contributions to programme at all levels
- Symposium Provided an excellent an unique Overview

# RAL - October 22<sup>nd</sup>, 2009



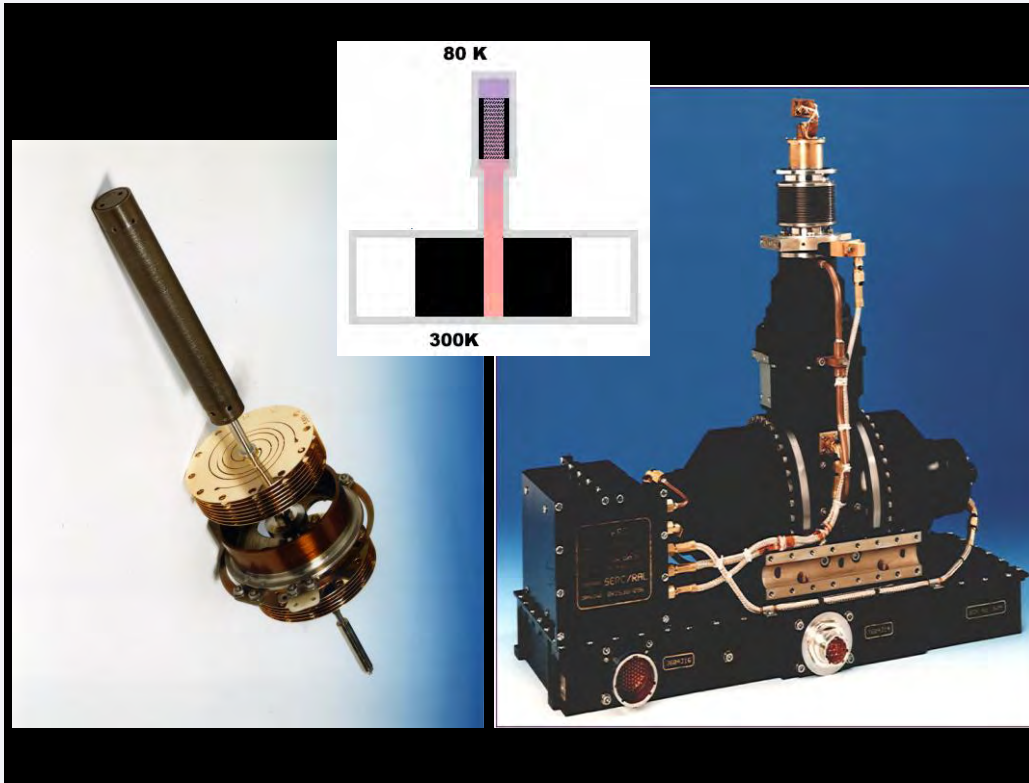
**Trefor Edwards**  
*(Chairman)*  
**Mike Sandford**  
*(First Presentation)*

## ATSR: Design and Engineering of a Precision Radiometer

Optics, Cooler, Structure, ....

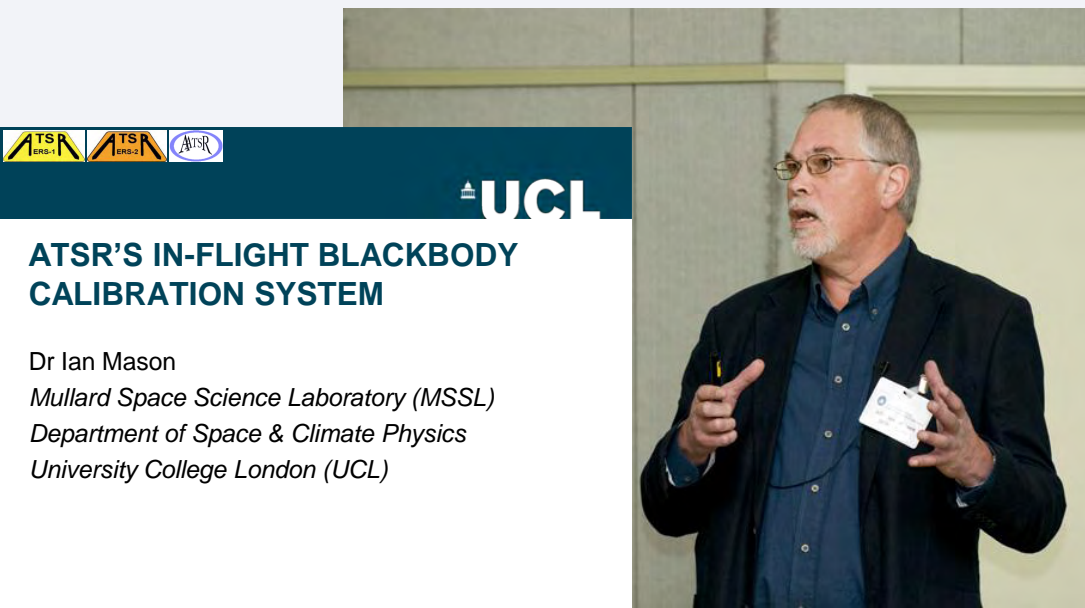
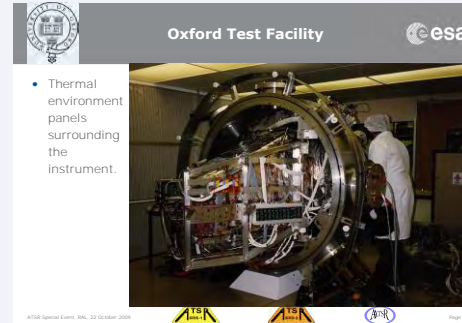
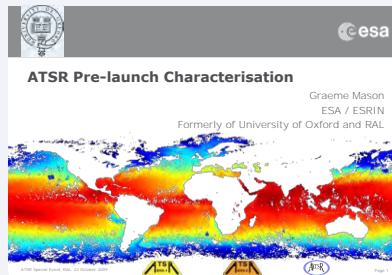
For a radiometry we need to know:

- Field of view
- Spectral Response
- Radiometric Calibration

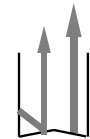




# Graeme Mason & Ian Mason (not related)

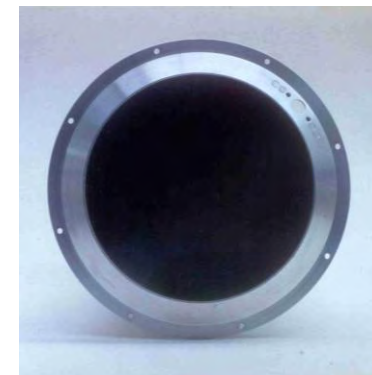


direct + reflected emission



## EMISSION DESIGN – 2

- Final design: open ended cylinder
  - Interior treated with Martin Marietta black
  - Relatively small height to diameter ratio
- 140 mm diameter aperture
  - to cover the 110-mm beam with a reasonable integration time for good signal-to-noise
- Emissivity  $\approx 0.999$ 
  - Meets the design goal
  - Confirmed by measurement in an in-house facility, designed by Jeremy Allington-Smith



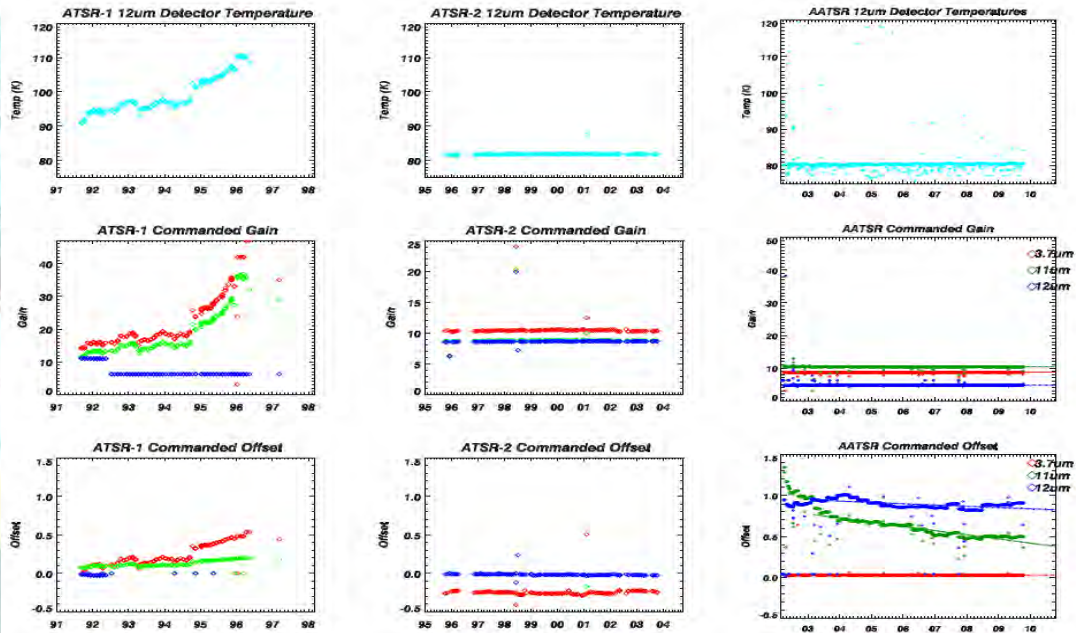
## ATSR'S IN-FLIGHT BLACKBODY CALIBRATION SYSTEM

Dr Ian Mason  
Mullard Space Science Laboratory (MSSL)  
Department of Space & Climate Physics  
University College London (UCL)



## ATSR Performance and Validation

### Detector Performance







## The AATSR SST Time Series

John J. Remedios and Karen L. Veal,  
EOS, University of Leicester

Acknowledgement to the AATSR QWG and the NEODC Archive Team particularly:

Gary Corlett, David Llewellyn-Jones *et al.*, EOS, U. Leicester

Andrew Birks, Chris Mutlow, Dave Smith, Brian Maddison, Matt Pritchard, Jack Abolins *et al.*, RAL

Chris Merchant, Edinburgh

Roger Saunders *et al.*, Met. Office

Philippe Goryl *et al.*, ESA

Hugh Kelliher, Space Connexions

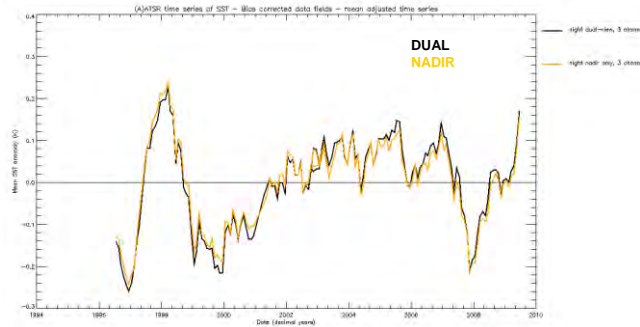


AATSR Celebration Event, 22<sup>nd</sup> October 2009



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## Most accurate V2 global anomaly time series: dual-3 night mean-adjusted, inter-instrument bias correction




AATSR Celebration Event, 22<sup>nd</sup> October 2009

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# Roger Saunders



Met Office

## SST in Climate Research

Roger Saunders, Met Office

with inputs from Nick Rayner, John Kennedy, Rob Smith, Karsten Fennig, Sarah Millington, Owen Embury.

This work is supported by the Joint DECC and Defra Integrated Climate Programme - DECC/Defra

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## Key messages

- (A)ATSR is now accepted as the “gold standard” for sea surface temperature
- AATSR SSTs are used operationally for NWP forecasts at several European Met Services
- ARC has been a success in reprocessing the complete 1991-2009 (A)ATSR dataset to provide an SST product fit for climate applications
- ARC SSTs will be a key data source for the new SST climate analysis being developed at the Hadley Centre - HadISST3.

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# Craig Donlon

## AATSR and our Weather Forecast

Dr. Craig Donlon  
European Space Agency  
Noordwijk, the Netherlands



The Success of the AATSR programme, RAL, UK, 22<sup>nd</sup> October 2009

### Use of OSTIA at ECMWF

(M Drusch)

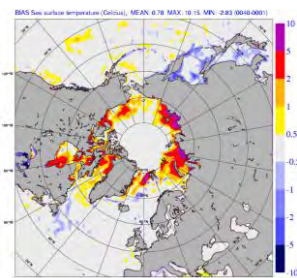


**OPER / NCEP SST**  
• RTG SST  
• 0.5 x 0.5 degrees

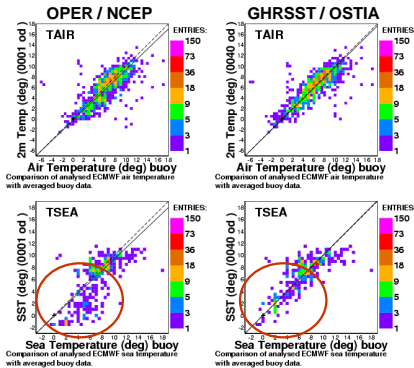


Validation against buoy data  
(North of 70 N, August 2008)

#### OSTIA / GHRSSST – OPER / NCEP



August 2008



The Success of the AATSR programme, RAL, UK, 22<sup>nd</sup> October 2009







## (A)ATSR Users and Applications:

**SST, Fire, Aerosol, Cloud, Snow, Albedo, Vapour, Temperature, Volcano**

Olivier Arino,

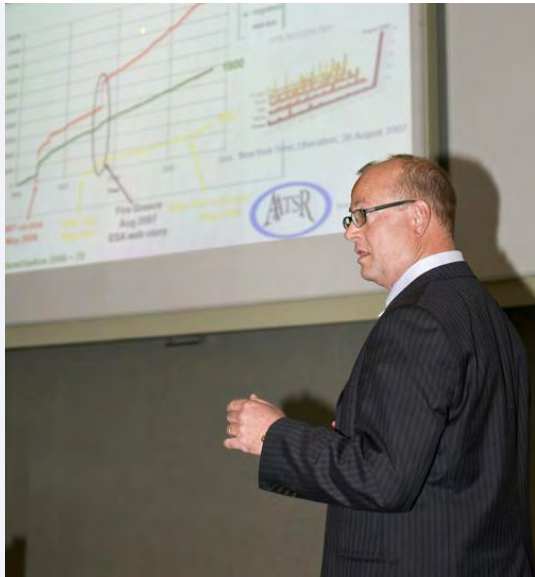
I. Robinson (NOCS), C. Donlon (UK-MET/ESA), J-F. Piolle (IFREMER),  
S. Plummer (IGBP/ESA), S. Casadio (Serco/ESA), S. Pincock (ESA),  
W. Lengert (ESA), P. Goryl (ESA), N. Houghton (ESA)

ATSR Special Event,  
22/10/2009

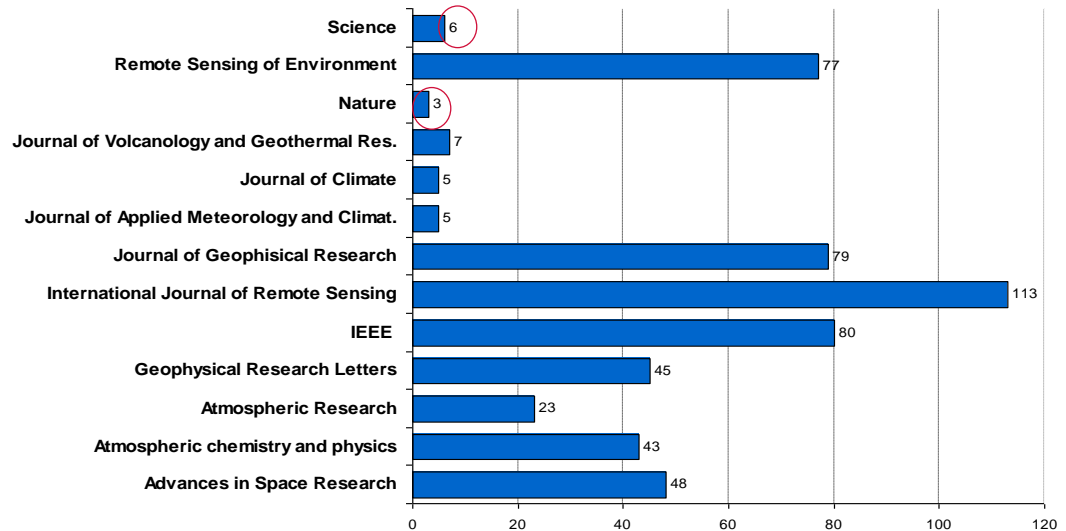


European Space Agency

Publications exploiting (A)ATSR data  
indexed by Journal

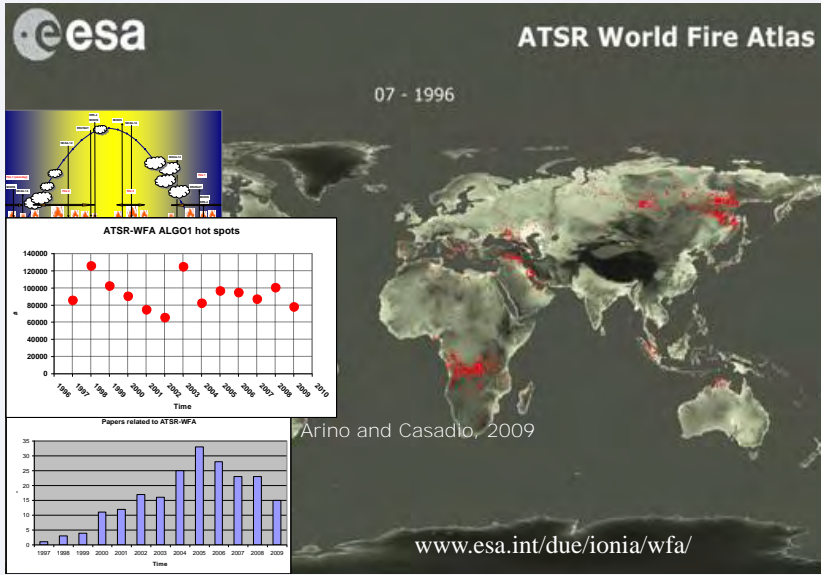


Total of **534** publications using (A)ATSR distributed by Journal



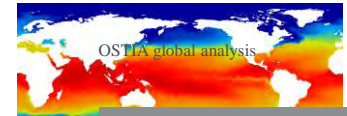
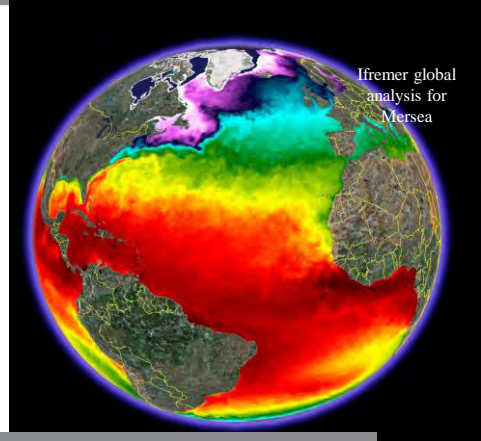
# ESA Data User Element Programme

## - Fires, SST, Aerosols and Flares

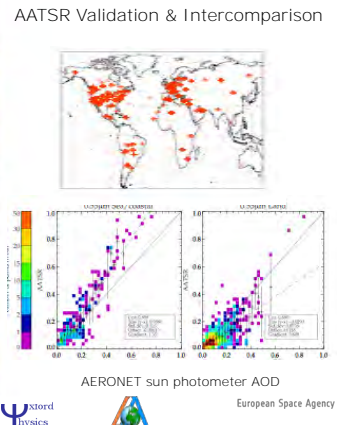
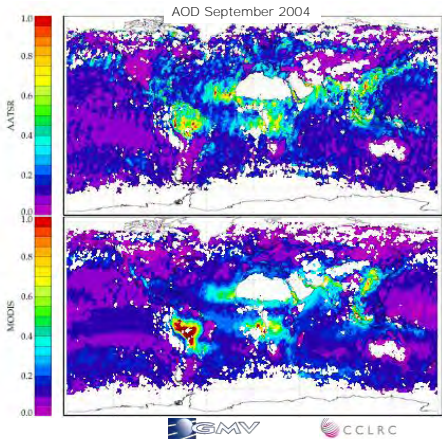


### DUE Medspiration: data use (1)

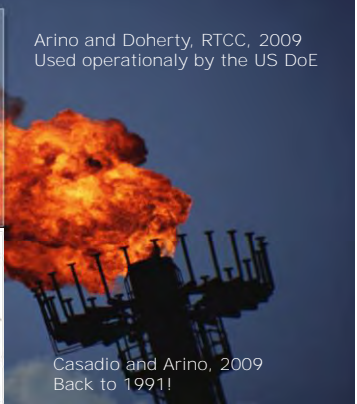
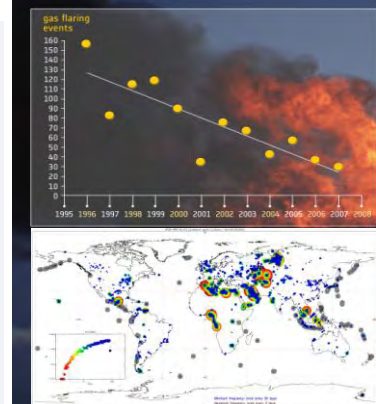
- Multi-sensor analyses
  - Mersea (Ifremer) => GMES
  - OSTIA (UKMet) => GMES
  - Daily, global
  - Use all L2P datastreams for merging
  - **Use AATSR as reference for large-scale bias correction of all sensors**
  - Use MDB for sensor error characterization



### DUE GlobGlobAerosol products and validation



### ATSR-Gas Flares



o GMES Sentinel 3 Mission

- Sea and Land Surface Temperature Radiometer (SLSTR)
- Ocean colour sensor based on MERIS
- Altimeter
- Microwave radiometer



o Series of missions from 2012 to 2025

**RALSPACE**  
Earth Observation and Atmospheric Science

 Science & Technology Facilities Council  
Rutherford Appleton Laboratory

## What Comes Next? or (A)ATSR a hard act to follow!

Dr Chris Mutlow

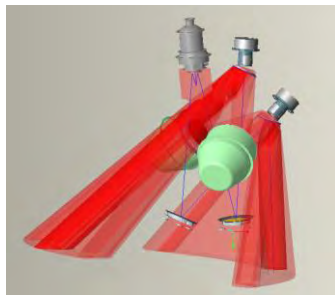
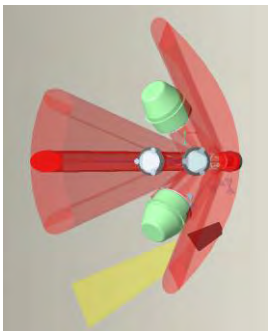
Head - Earth Observation and Atmospheric Science  
STFC Rutherford Appleton Laboratory

 ThalesAlenia Space

 SELEX GALILEO

 JENOPTIK GERMANY

## What does SLSTR look like?



 ThalesAlenia Space

 SELEX GALILEO

 JENOPTIK GERMANY

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Earth Observation and Atmospheric Science

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Earth Observation and Atmospheric Science

 Science & Technology Facilities Council  
Rutherford Appleton Laboratory





# The ATSR Story part 2

→ What is (A)ATSR achieving ?

## → CHAIRMAN'S REMARKS

Ian Robinson



[www.oceanography.ac.uk](http://www.oceanography.ac.uk)



## The creators of ATSR should be proud

Your instrument has delivered SST data of excellent quality for climate science.

It has fostered the emergence of new Earth monitoring systems and the scientists to populate them.

It all adds up to a valuable legacy for future generations of mankind

**THANK YOU - the pioneers of ATSR !!**



# Vote of Thanks- Prof Chris Rapley Director, Science Museum





 University of Leicester Reception











