



# SI-traceable laboratory inter-comparison experiments for FRM4SOC

## WP 301 Laboratory Calibration Exercise 1 (LCE-1): Reference Irradiance and Radiance Sources

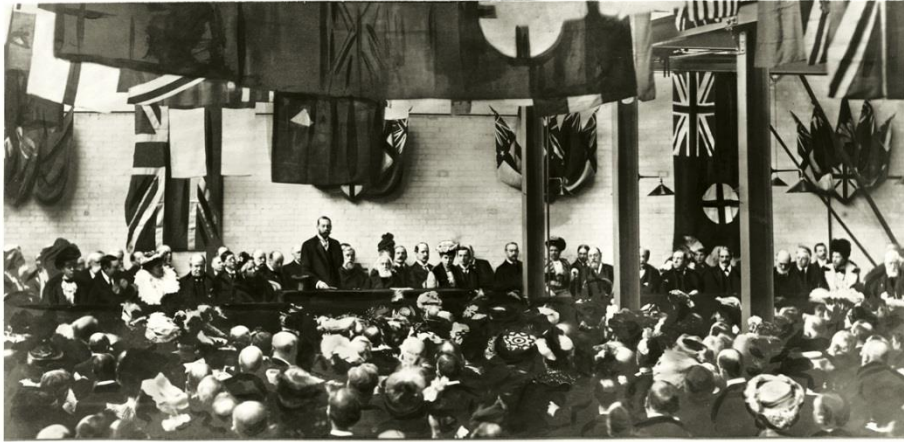
*Andrew Banks, Agnieszka Bialek, Claire Greenwell, Emma Woolliams,  
Teresa Goodman & Nigel Fox*



**National Physical Laboratory  
SW London, UK**



# NPL: UK's National Standards Lab



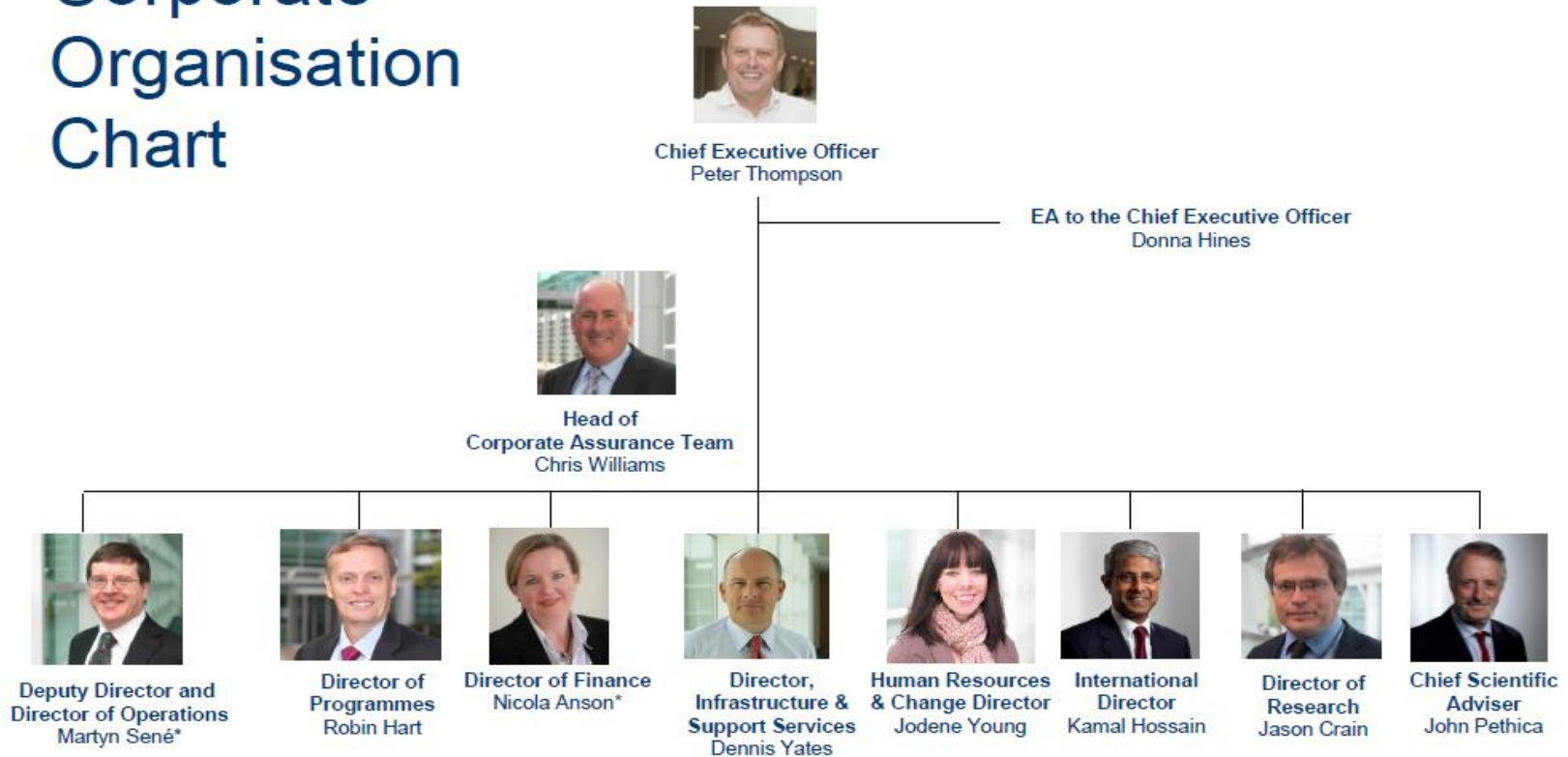
OPENING OF THE NATIONAL PHYSICAL LABORATORY  
by HRH The Prince of Wales  
on 10th August 1900



- Founded in **1900**
- World leading **National Measurement Institute**
- 36,000 m<sup>2</sup> of laboratories inc. state of the art **radiometric facilities**.
- 550+ specialists in **Measurement Science**
- Inc. a dedicated **Earth Observation** and Climate group.

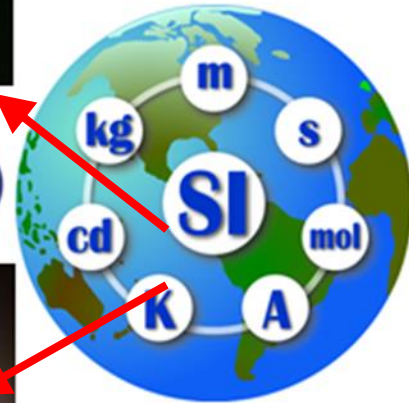
# NPL: UK's National Standards Lab

## Corporate Organisation Chart



<b>*NPLML Board</b>	
Dr David Grant	Chair
Ms Amanda Brooks	Non-Executive Director (BIS Shareholder rep.)
Prof Richard Brook	Non-Executive Director
Prof Paul Howarth	Non-Executive Director
Prof Sir Jim McDonald	Non-Executive Director
Prof Michael Kearney	Non-Executive Director <i>(Acting VC University of Surrey, pending appointment to Board)</i>

# Ocean Colour@NPL

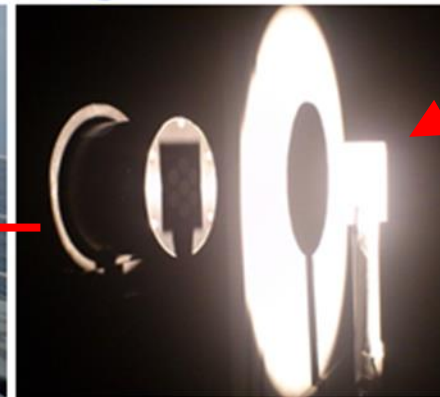


Metrology for Earth  
Observation and Climate

QA4E 

Picture courtesy of NIST

# Fiduceo



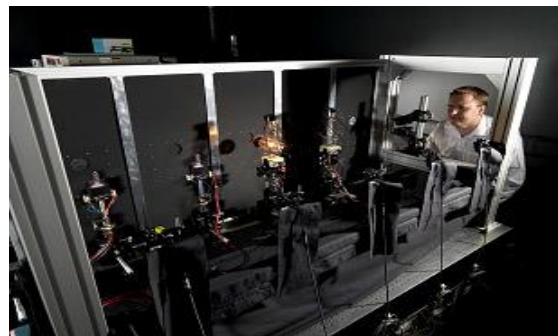
fiducial reference  
temperature  
measurements



fiducial reference  
measurements for  
satellite ocean colour

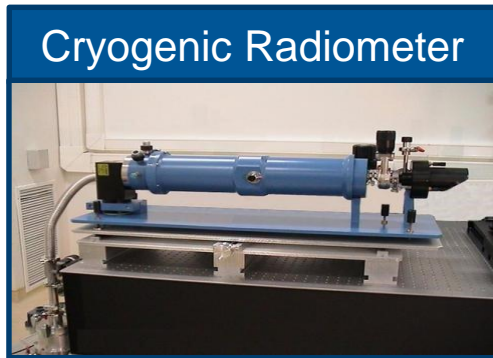
# WP301 Laboratory Calibration Exercise 1 (LCE-1): Reference Irradiance and Radiance Sources

- ❑ LCE-1 is aimed at verifying the performance of irradiance and radiance sources used to calibrate ocean colour radiometers (OCRs):
  - ✓ Will be implemented at NPL as a laboratory inter-comparison of the irradiance sources from as many OCR calibration labs as possible.
  - ✓ The inter-comparisons will be carried out to the highest possible SI-traceable standards with full uncertainty characterisation using the NPL state of the art radiometric laboratories.
  - ✓ FRM4SOC LCE-1 will use the NPL Spectral Radiance and Irradiance Primary Scales (SRIPS) facility & Reference Spectroradiometer System (RefSpec).

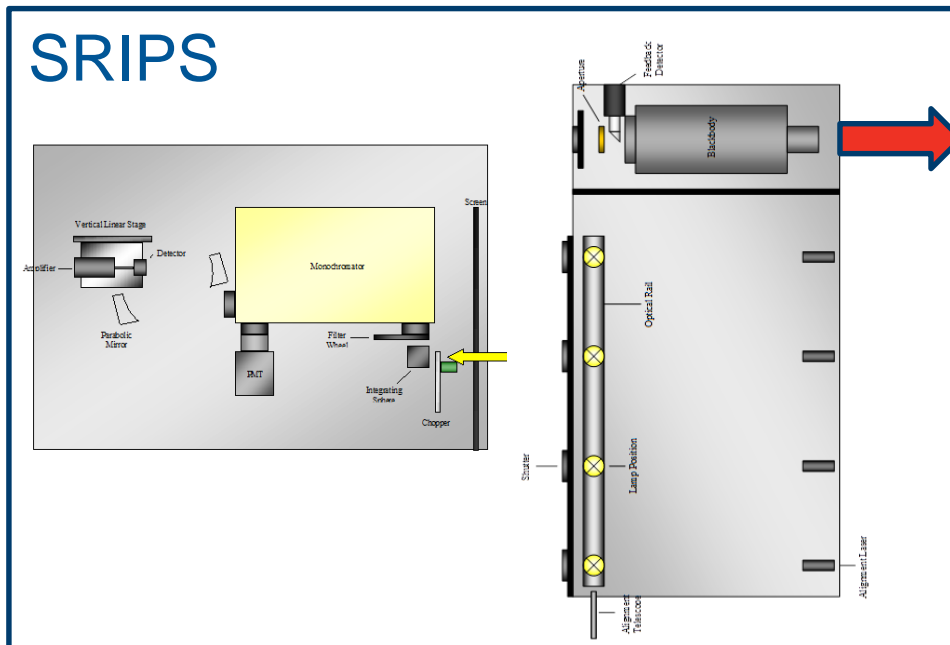
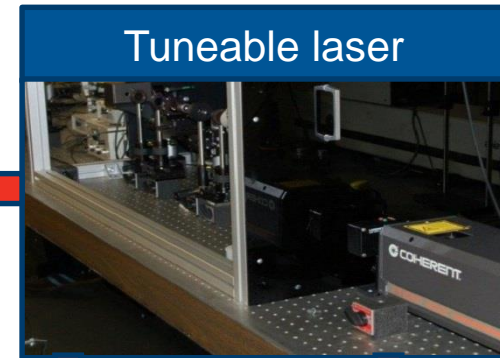


# WP301- Laboratory Calibration Exercise 1 (LCE-1): Reference Irradiance and Radiance Sources

## NPL's primary standard



*Measuring total radiant power (W) at distinct wavelengths (tuneable)*



*Similar to a filtered trap detector. Calibrated against the trap detector and then used to calibrate the Blackbody.*



*3 or more silicon diodes at different angles initially measuring radiant power (W) for calibration against C.R. and then as transfer standard measuring Irradiance (W/m<sup>2</sup>) at distinct wavelengths from a different laser.*

# WP301 Laboratory Calibration Exercise 1 (LCE-1): Reference Irradiance and Radiance Sources

- Preliminary schedule is for 1-2 weeks at NPL in April 2017.
- A global invitation and expression of interest form will be released following project kick-off through CEOS, the FRM4SOC website and if agreed through the IOCCG and other relevant bodies.
- Interested participants will need to bring their irradiance sources to NPL for comparison with the primary standards.
- Training – uncertainty budget for absolute radiometric calibration.
- Transfer radiometers will subsequently be sent back and forth to each participant lab for radiance source measurements. The transfer radiometer in this configuration will be used to compare the participant's in-house radiance sources with the NPL derived radiance scale.

