

Infrared Centenary, October 2010

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The Royal Photographic Society of Great Britain is coordinating a series of events in 2010 to commemorate the first publication of an infrared photograph. In October 1910 Professor Robert Wood, (fig1) visited the UK to present his paper on infrared photography to the Royal Photographic Society in London. It was also published in *The Journal of Photographic Science* at that time[1]. Using Eastman film sensitive to the near infrared he showed unique images of natural objects including trees in a format that had never been seen before. The technique was later applied to medical applications, and was particularly useful to make permanent images of the network of blood vessels near the human skin surface (fig.2).

The modern developments in electronic infrared sensors did not occur until the 1940's and now have reached a high level of performance, and provide us with radiometric temperature measurements by infrared thermal imaging.

One main event in 2010 will be a two day conference in London in October. The first day will discuss the early work of Wood and others, the emergence of infrared imaging with electronic sensors, and applications in medicine and industry. The second day will be devoted to infrared astronomy, and will include the current infrared studies of our universe with data from the Herschel Space telescope launched in 2009 by the European Space Agency from Europe's spaceport at Kourou in French Guiana. This new telescope has been named after Sir William Herschel, who first discovered the presence of infrared radiation in 1800.

The far-infrared space observatory is ESA's latest mission designed to study the formation and evolution of stars and galaxies. Herschel has the largest telescope ever flown in space, giving astronomers their best view yet of the cold and most distant objects in the universe. It is collecting very long infrared wavelengths, peeking into star-forming regions, galactic centres and planetary systems. Inside the cryostat the sensitive instrument detectors are cooled down to about $-273\text{ }^{\circ}\text{C}$ (0.3 degrees above absolute zero). This low temperature is achieved using super fluid helium (at about $-271\text{ }^{\circ}\text{C}$) and an additional cooling stage inside the focal plane units. This is why the spacecraft's brain – or its payload module – hosts a cryostat, a cryogenic module inside which the cold components of the scientific instruments are mounted. The service module is the spacecraft's heart, which keeps the spacecraft going by monitoring all its vital functions. It also carries the 'warm' components of the instruments – those that do not require cooling with the cryostat. (Figure 3) This new era in

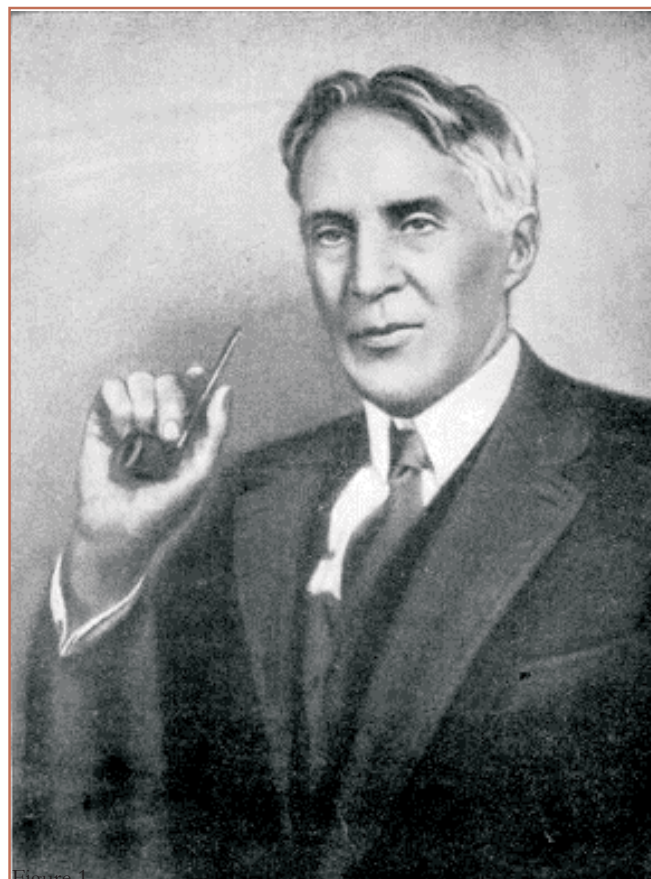


Figure 1
Prof Robert Wood, 1910



Figure 2
Infrared photography of superficial blood vessels

infrared imaging in space will be aptly timed to coincide with the commemorations of Robert Wood's innovative photography.

Professor Wood was an accomplished American scientist who also did much work in the ultraviolet, his name is also given to the safety filter used for many years with ultraviolet lamps used in treatment of some skin conditions [1].

References

- 1 Wood R Photography by invisible rays. Photogr. J 1910, 50 (Oct) 329-338
- 2 Ring EFJ. The historical development of thermometry and thermal imaging in medicine. Thermol Int. 2003; 13(2): 53-57.
3. [http:// esamultimedia.esa.int/multimedia/publications/BR-262](http://esamultimedia.esa.int/multimedia/publications/BR-262)

TTP 2009 Conference Report

The 8th Conference on Thermography and Thermometry in Practice was held on 22nd-24th October 2009 at Ustron in South Poland. A half day pre-conference course was attended by some 50 delegates. The speakers were Prof. Ammer, and Prof. Ring who presented four short lectures from the "Glamorgan University Course on Thermal Imaging in Medicine" followed by Prof. Minkina and Dr. Dudzic on Infrared Thermography, "Errors and uncertainties". Prof. Van de May (Belgium) and Prof. Wiecek from Lodz University, who was the organiser and President of the conference, presented a lecture on "An Introduction to Heat Transfer, the practical use of thermal time constants".

The main conference programme began on Friday morning. Prof. Ring presented the opening lecture on The New ISO Standard for Fever Screening, followed by Dr Rogalski on Latest Developments in Microbolometer, and Multi Spectral Infrared Detector Arrays for Thermal Imaging. This included interesting material from Dr Tissot of ULIS France, the main European manufacturer of infrared detectors. We saw exceptional high definition thermograms with 1064 x 768 /17um detectors that give an NETD of better than 50 mK (figure A). Prof. De May presented a paper on the use of thermal impedance for characterization of electronic devices.

The majority of papers given were by engineers and covered a range of different applications of temperature monitoring and thermal imaging. A medical session on Saturday morning chaired by Dr Kalicki from Warsaw included four papers. Prof. Ammer spoke on "Temperature gradients of fingers with Raynaud's Phenomenon, Comparison of young and elderly adults". Marzec et al presented "Automatic temperature measurement on thermograms for headache diagnosis". Barjorek and Nowakowski from Gdansk gave a paper on "Possibility of using thermal tomography for diagnostics of burn wounds" and Kaczmarek and Zajackowska presented a paper on the "Analysis of sequential thermograms in dynamic thermography". A number of the papers have already been published in the current issue of the Polish journal "Measurement Automation and Monitoring" 2009 no.11.

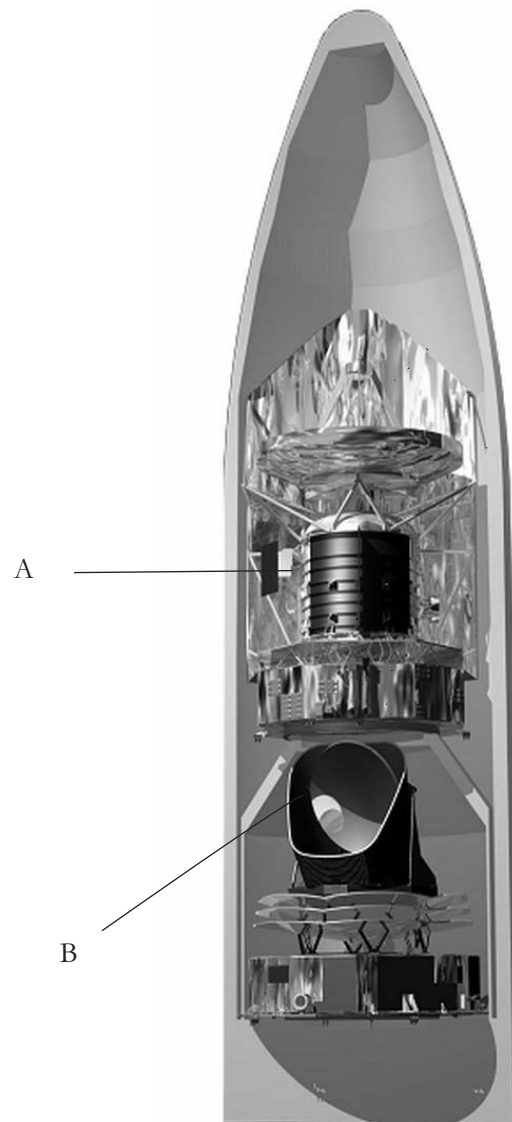


Figure 3
Ariane Rocket Launch Vehicle
A: Herschel Space Telescope
B: Plank Space Craft



Figure A
High definition IR 1024 by 768 image

In total 32 oral papers and 23 posters made up this interesting programme, and the presence of three companies with thermal imaging equipment from FLIR, VIGO and Infratec added to the considerable amount of information contained within the conference. A book of proceedings, with a CD of all papers in colour was produced, and Prof.

Wiecek and his colleagues should be complemented on such an excellent conference, attended by about 100 delegates (figure B).



Figure B
Delegates at the TTP 2009 conference Ustron, Poland