

Thermal Camera Overview

The camera that the ATLAS Cooling group is using is an infrared or thermographic Varioscan 3011-ST. Like a normal video camera, the Varioscan produces streaming video and/or single shot photographs which are referred to as thermographs and unlike normal coloured photographs or videos, which show the object in true living colour, a thermograph is a photograph of temperature distribution associated with the subject. These temperature distributions in a thermograph can be accurately measured and compared to other thermographs or temperature readings to confirm analysis/diagnosis.

The major advantage of the camera is that it is a non-contact, non-invasive and operator safe technique. Another major advantage is its operation range, the camera can comfortably and accurately operate from 0.2m to hundreds of meters away from the subject – thus making it suitable for both internal and external applications.

All thermal cameras require cooling and for the 3011-ST this is achieved via a miniature Stirling heat pump, other models in the range use liquid nitrogen and peltier heat pumps. The advantage of the Stirling pump is that unlike liquid nitrogen the camera can be rotate through a complete circle and the cooling still remains effective. The nitrogen-cooled models are unable to move more than a few degrees out of the horizontal, as the nitrogen has a tendency to escape!

The 3011-ST is connected to a PC which has both software for controlling the camera e.g. Zoom, Autofocus, Auto Range etc and the thermograph image analysis software; IRBIS.

The specifications for Varioscan 3011-ST are:

Temperature range (°C)	-40 to +1200
Temperature accuracy (@30)	± 0,03 K
Temperature on screen range(°C)	-10 to +40
Electro-optical Zoom	6:1
Field of View	30° (H) x 20° (V)
Object Distance (m)	0.2 to ∞
Detector type	HgCdTe
Detector cooling	Stirling-cooler
Wave length [µm]	8 to 12
Pixel per line	300
Lines per picture	200 (50, 100)
Interfaces	External Power and Data combined, Internal Battery
Automatic Functions	Auto Focus, Auto Range, Auto Levelling
Power Supply	PC supplied 12v or internal rechargeable battery
Mass (kg)	4.8