

Large Format HgCdTe Infrared detectors in Europe

M.Casali¹, N.Bezawada², O.Boulade³

¹ European Southern Observatory, Garching, Germany

² UK Astronomy Technology Centre, Edinburgh, UK

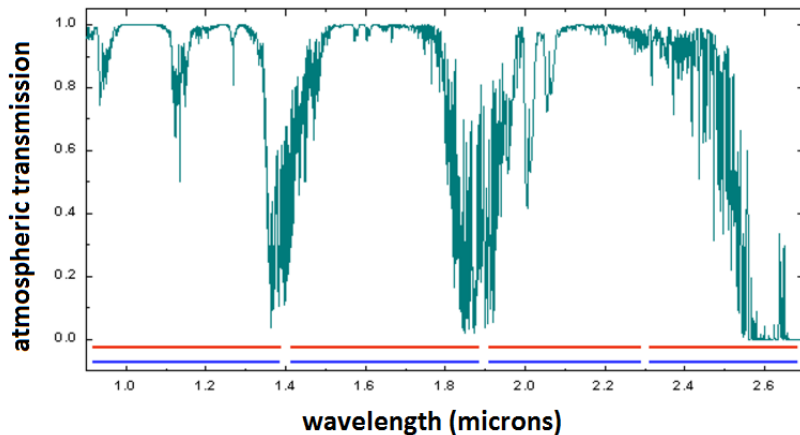
³ Service d'Astrophysique, CEA, Saclay, Paris

Introduction

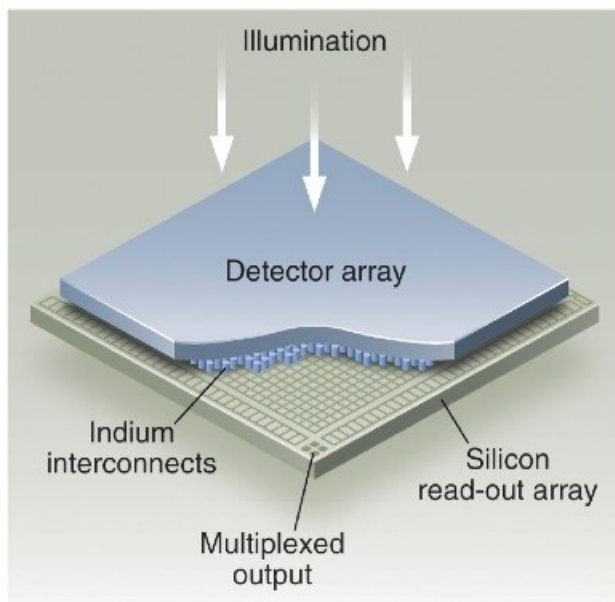
The earth's atmosphere has good transmission in a number of infrared atmospheric windows, suitable for astronomical observations from the ground. The infrared is becoming critical for state-of-the-art astronomy due to our ability to correct the effects of atmospheric turbulence in this wavelength range.

Large format (4Kx4K) Infrared detector arrays are hybrid devices coupling a HgCdTe detector layer with a large CMOS readout. US companies currently dominate the market, primarily due to the large tactical demand for the technology. But the situation has become difficult for non-military customers. With only one reliable supplier of 4K devices in the world (Teledyne), prices are high, and ITAR restrictions complicate procurement and discussions.

Europe has strong technological capabilities in HgCdTe with companies such as Sofradir (Fr) and Leonardo (formerly Selex, UK). There is every reason to believe that an alternative European source for this technology can be established.



Transmission of earth's atmosphere



Schematic layout of hybrid detector array

	Digital Imaging Step	Technologies	
}	1	Get light into the detector	Infrared Detector Material
	2	Charge generation	
	3	Charge Collection	
}	4	Charge-to-Voltage Conversion	CMOS Integrated Circuit
	5	Signal Transfer	
	6	Digitization	

The Idea/Concept

European companies have strong capabilities in manufacturing HgCdTe for both tactical and commercial applications. However, the step up to the very large formats and high performance characteristics (high QE, low noise and dark current) required for astronomical research will require resources in both money, people and special equipment. The *European Space Agency* has funded preliminary large format developments, and positive steps forward have been made. However the final challenge, the development of techniques and processes for reliable manufacture of 4Kx4K devices, remains to be faced. ATTRACT provides a rare opportunity to secure funding for this final step in development and establishing a competitive European industry in this area.

Potential Impact

Large format IR detectors have a substantial market in both ground and space-based astronomy, as well as earth observation. A competitive European source for these devices would help to (i) lower prices through competition (ii) improve quality (iii) ease ITAR complications and (iv) bring a new industrial capability and markets to Europe.