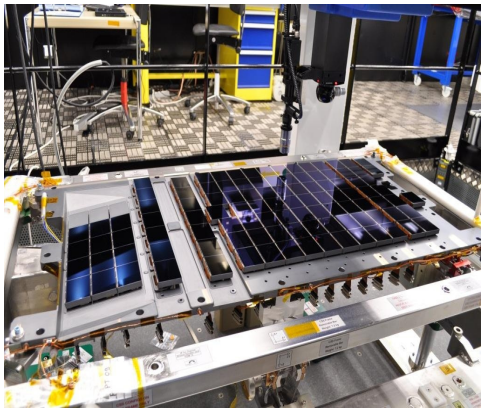
Printech Helping to Map the Stars

‘Flexibility and Beyond!’

Since the proposal of Lennart Lindergren in 1993 the European Space Agency (ESA) has been working on the Gaia space observation Satellite. It’s mission is to compile a 3D catalogue of approximately 1 billion astronomical objects in the Milky Way.

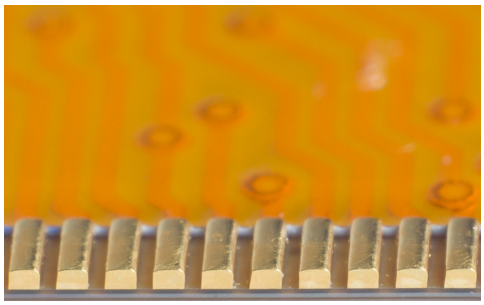


Printech Circuit Laboratories Ltd have been assisting E2V of Chelmsford over the past 10 years culminating in the manufacture of the most powerful camera ever to be launched into Space on the Gaia satellite.

E2V have become World leaders in the manufacture of high sensitivity imaging sensors and Printech are the suppliers of specialist flexible circuits that have helped e2v achieve this high accolade.

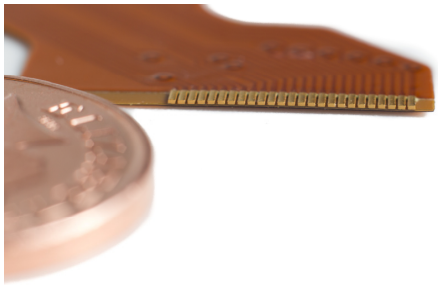
The camera is comprised of a series of charged coupled devices (CCD), which are an advanced version of the chips in digital cameras. Each CCD is 45 x 59mm and contains 1,966 x 4,500 pixels. Each pixel will detect light which will then be transformed into electronic data. This data will be processed on a supercomputer to generate a 3D map of the Milky Way. The camera is so powerful it can detect a human hair (17µm) from a distance of a thousand kilometres and it will be able to view stars 400,000 times fainter than the human eye can see.

The key to the success of the E2V proposal was that the design is compressed into a single focal plane that could fit into a Soyuz rocket and not require an Ariane 5.This fitted the budget ESA had in mind and imperative to this are the flexible circuits manufactured by Printech. By selectively ‘bump’ plating the gold fingers on the flexible circuit Printech have enabled E2V to gold wire bond to the end of the gold pad minimising the dead space between devices making it buttable on 4 sides.

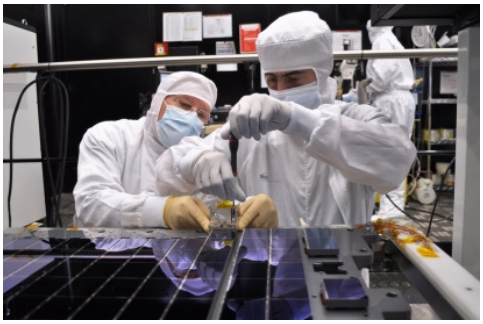


The flexible circuits are manufactured under the strict criteria required for any space product with complete traceability and documentation. A clean room was specifically built to provide the correct environment for manufacture. The gold fingers are plated up to between 250 and 300 µm and finally finished with 99.999 % pure gold to provide a bondable surface on the cross section of the fingers.

Each of the fingers is individually inspected to ensure that the there are no defects in the plating layer that could outgas at a later stage.



The CCD array is mounted in a cryogenic chamber with a constant temperature of -120 °C to ensure that the flatness of the array is maintained. The flexible circuit takes the signals from the focal plane through to the processing electronics underneath running at temperature of 25 °C, so the low thermal conductivity of the flexible circuit material is essential.



Gaia was launched on 19th December 2013 on a Soyuz rocket from Kourou French Guiana.

For more information contact Printech Circuit Laboratories
+44 (0) 1245 323244
www.rfpcbs.com
sales@rfpcbs.com