Lasting lifetimes

Long-lasting satellite components boost the European space industry

- **A technique developed by researchers at the University of Bristol is able to predict how long the tiny electronic components used in satellites will last**
- **This technique has led one company to become the first supplier in Europe to produce electronic components that meet the requirements for space applications**

Electronic components for space equipment must be extremely high performance and very reliable. Satellites on earth observation missions operate for 8 to 9 years and telecommunication satellites for more than 18 years with little room for failure.

In order to make components that are resilient enough, it is crucial to know how long prototype devices will last. Professor Martin Kuball's research group at the University of Bristol developed a new technique called 'Raman thermography' which predicts the lifetime of components using their temperature.

With the help of Bristol's lifetime predictions, new production processes have been implemented to create long-lifetime devices and circuits. As a result, one of the companies Bristol worked with, United Monolithic Semiconductor (UMS), has become the first supplier in Europe to produce devices with long enough lifetimes for use in satellites. This has enabled the European space industry to be more self-sufficient, without relying on highly restricted exports from the US.

What if all the satellites orbiting Earth failed?

Find out more

This University of Bristol-pioneered technique has been used on 1000s of industry devices, from the UK, Europe, USA and Asia. It has benifited major programmes by the European Space Agency (ESA) and European Defence Agency (EDA) as well as the US Defence Advanced Research Projects Agency (DARPA).

Typically the original devices lasted around 40 days of operation. With the help of Bristol's research, the majority of the companies they have worked with now achieve lifetimes of 100 to 10,000 years. This fulfils customer requirements and industry standards.

Bristol's device lifetime predictions have reached many companies and helped them develop better products, including: Qorvo, Selex Galileo, Thales Alenia Spaciale, NXP, Northrop Grumman, Sharp, Sumitomo, and many others.

The University of Bristol is in process of licensing the Intellectual Property of their lifetime prediction technique to the semiconductor equipment manufacturer Quantum Focus Instruments (QFI), and are also working to develop a lower cost version of the technique.

In the future, Bristol's research can be applied to many other electronic devices that have a major impact on how the world ticks. For example, electronic devices are used to avoid collisions of cars and aeroplanes, are in charge of keeping laptops' batteries full and are allowing solar panels to feed their energy into our homes.

> The technology developed at the University of Bristol and its use on our technology significantly supported the development of our next generation technologies. These technologies are an important part of our business strategy and will guarantee a significant part of our revenue. They are already generating a growing part of our sales figures.
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> **Hervé Blanck of United Monolithic Semiconductor (UMS)**

Information and Communication Technologies programme

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