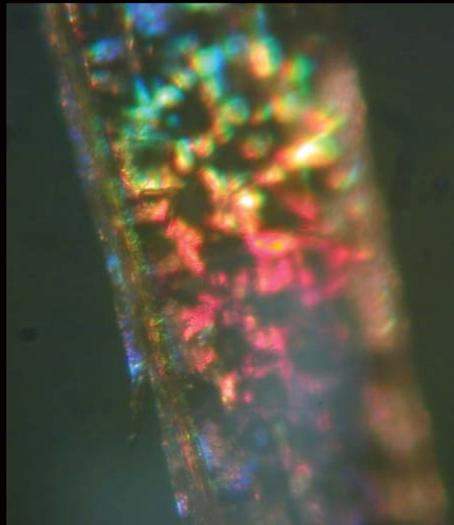


# Application of a Holographic Diffractive Microstructure to Polyester Fibre for Security Purposes



Enlarged image of fibre with holographic diffraction evident.

## Outline of the research area:

This research investigated methods of encoding holographic data onto textile fibres (1). The results aim to enable the reduction of counterfeits, and subsequent failure of safety critical components such as air bags and safety belts (2). The Modern Holography Research Group, part of the Photographic Studies and Creative Imaging research cluster carried out this research. The research is led by Prof Martin Richardson (3) who conducts innovative research into holographic imaging materials, methods and applications such as Optical Security Devices for industry. He is currently PI for resource efficient design (Low Cost Holographic Optical Elements for Next Generation Lighting Systems: funded by a Technology Strategy Board award (4). The group currently has two full time members of academic staff and two full time PhD research students. The investigators have a combined sixty years experience of research and development in the field of holography and optical security systems.

## When it took place and who conducted the research:

The research took place in 2007 at DeMontfort University and was conducted by the Modern Holography Group, Department of Imaging and Communication Design, De Montfort University, Leicester LE1 9BH, UK, 3-D Optical Systems Ltd, Unit 1, Deans Hall Business Park, Little Maplestead, Halstead, Essex CO9 2RT and Research & Development Amann Group, Amann & Söhne GmbH & Co.KG, Hauptstraße 1, D-74357 Bönningheim, Germany.

## Why the impact is significant:

Textile piracy - the scale and nature of the problem.

The global pirate textile market totalled 2.8 billion units in 2009. This means that more than a third of all garments around the globe are illegally produced and sold. Worldwide sales of pressed garments were 475 million units, up from 450 million in 2000, with pirate garments estimated at around 165 million units (at least 60 million in 2000). The value of the overall global pirate market, from rose from US\$4.1 billion in 1999 to \$8.2 billion in 2009. The value of the pirate market does not indicate losses in revenue to the legitimate fibre manufacturer, which are likely to be far greater. In territories where piracy proliferates, the entire development of legitimate markets is impeded and the value of the pirate market is calculated at local pirate prices, rather than the legitimate market price. In the mid to late 1990s, the infiltration of organised criminal gangs into garment piracy took hold as it was perceived as a low risk, high profit illegal trade. The profits generated have often helped to fund other serious criminal activity and its associated terrorist investments. The impact of this research will help identify counterfeit goods and enhance the identification of safety critical items such as seat belts and car air bags (5).

## Who has benefited from the research and in what way:

The Results of this research will be published in The Royal Photographic Society's Special Holographic Edition of 'The Imaging Science Journal' in July 2010 (6), and has contributed to the Universities external income generation targets. The research was sponsored by the German textile manufacture AMANN who are currently developing the machinery required for it's mass replication holographic seal and it's subsequent commercial potential (7).

## What evidence there is of the 'impact':

### EU: Copyright Directive

AMANN have lobbied the EU for a copyright directive aimed at implementing the protection of textile copyright. The Directive clarifies that garments are protected in the on-line environment by harmonising copyright rules throughout the EU and by introducing the legal protection of technological measures aimed at combating unauthorised, mass copying. The Directive provides a legal framework in which textile companies can offer new services to consumers as well as giving the legal basis to pursue pirates (8).

## Key References

1. This invention relates to a method for adhering holograms to textile wearing apparel and, more particularly, to such a method which firmly adheres holograms [www.patentstorm.us/patents/4956040/description.html](http://www.patentstorm.us/patents/4956040/description.html)
2. Counterfeit Goods and the Public's Health and Safety. Adverse reactions due to counterfeiting, imposing liability [www.iipi.org/reports/Counterfeit\\_Goods.pdf](http://www.iipi.org/reports/Counterfeit_Goods.pdf)
3. Modern Holography is one of six main research groups within the 'Institute of Creative Technologies' at DeMontfort University, Leicester. Modern Holography has been carrying out innovative research into the investigation and development of Optical Security Devices applied to Digital Versatile Discs, (DVD's), and safety critical items, such as seat belts, for the textile industry.
4. The TSB focuses on a number of priority areas including lighting, lasers and displays. [www.bis.gov.uk](http://www.bis.gov.uk)
5. IPR in China - Chinese textile facing "piracy" and "counterfeit" 30 Jan 2007 .The appearing prosperous Chinese textile industry is now facing the threat of "piracy" and "counterfeit". [www.chinaipr.gov.cn/news/enterprise/248607.shtm](http://www.chinaipr.gov.cn/news/enterprise/248607.shtm)
6. The Royal Photographic Society was founded in the United Kingdom in 1853 as The Photographic Society "to promote the Art and Science of Photography". [www.theroyalphotographicsociety.org](http://www.theroyalphotographicsociety.org)
7. Amann & Söhne GmbH & Co. KG: The company offers its products for clothing and underwear, shoes and leather, home textiles, technical, and machine embroidery applications. [www.investing.businessweek.com/research](http://www.investing.businessweek.com/research)
8. Global market review of counterfeit apparel - forecasts to 2014, Published: May 2008 by Aroq Ltd. Address & registered office: Seneca House, Buntsford Park Road, Bromsgrove, Worcs, B60 3DX, UK.

## Acknowledgement

The concept underlying this proposal was initially developed under the guidance of Mr. Kenny McMaster – AMANN, and Dr. William Fagan - DMU.

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