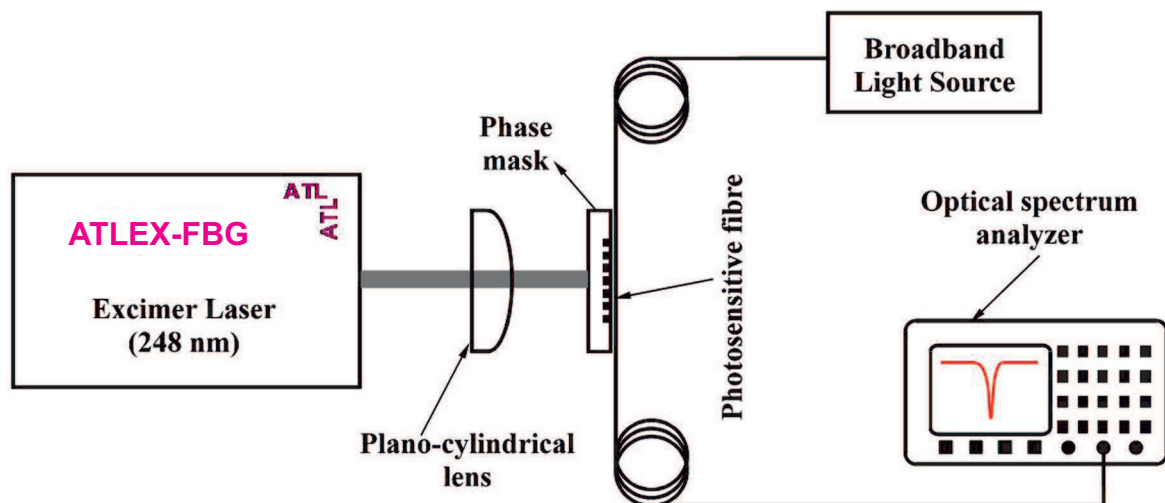
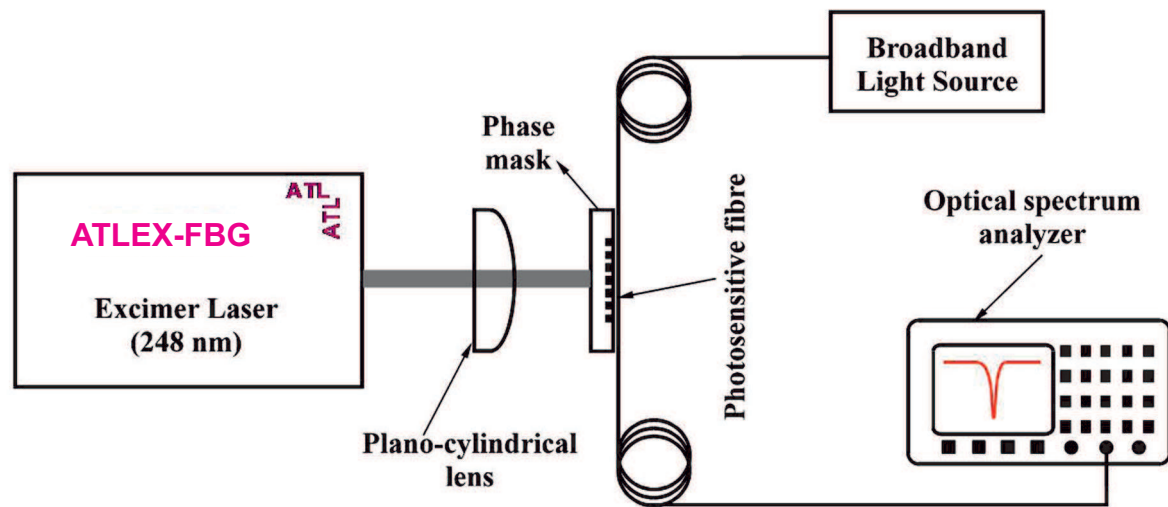


Application Note:

Fibre Bragg Grating (FBG) Fabrication System



Example of FBG fabrication



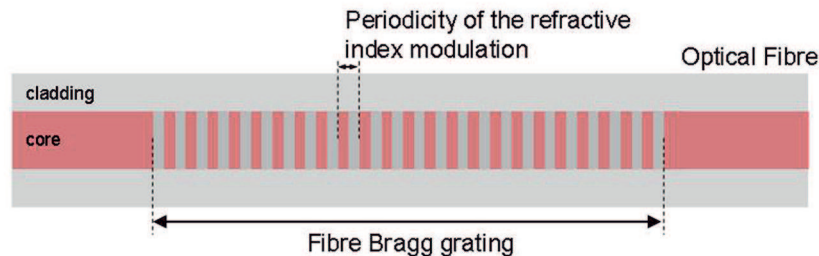
- **Photosensitive fibre:** The refractive index of the fibre core can be modulated when it is exposed to patterned UV light.
- **Excimer laser:** Generation of UV light at 248nm.
- **Plano-Cylindrical lens:** Used to focus the laser beam onto the phase mask.
- **Phase mask:** Creation of an interference pattern to be printed onto the photosensitive fibre.

Example of applications

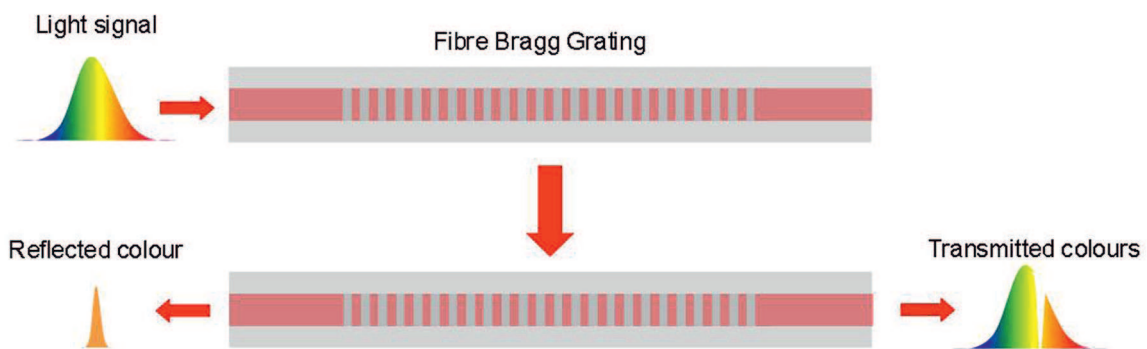
- **Optical communications:** Fibre Bragg gratings are key to modern optical communications network. They are widely used in WDM networks (Wavelength Division Multiplexing) and for fibre lasers.
- **Optical sensors:** Fibre Bragg grating based optical sensors are commonly used to measure temperature and strain in harsh environment and for structural health monitoring.

Fibre Bragg Grating (FBG): Basics

- Periodic modulation of the effective refractive index of the fibre core.

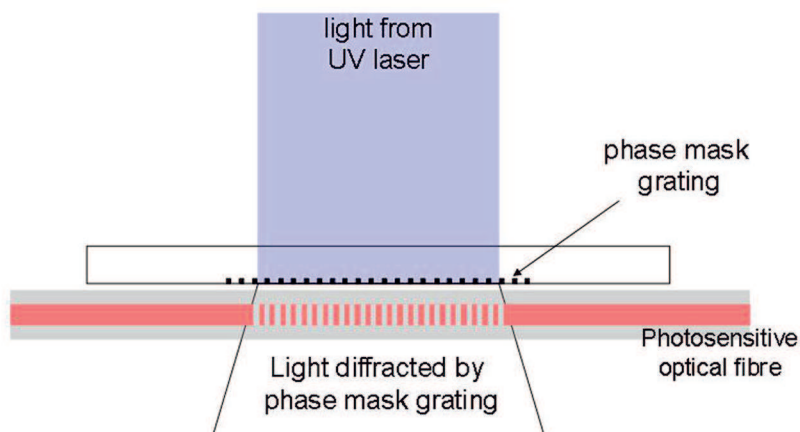


- When a broadband light is launched into a fibre with an FBG, only one colour is reflected. The other colours are transmitted through the fibre.



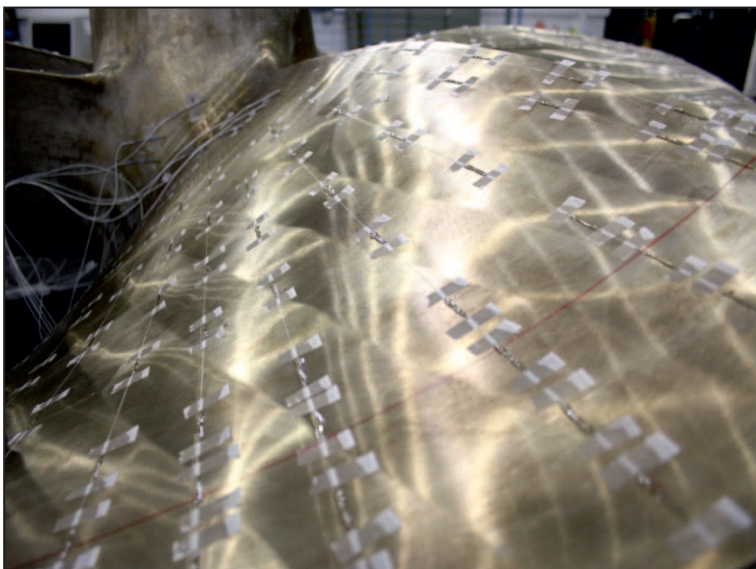
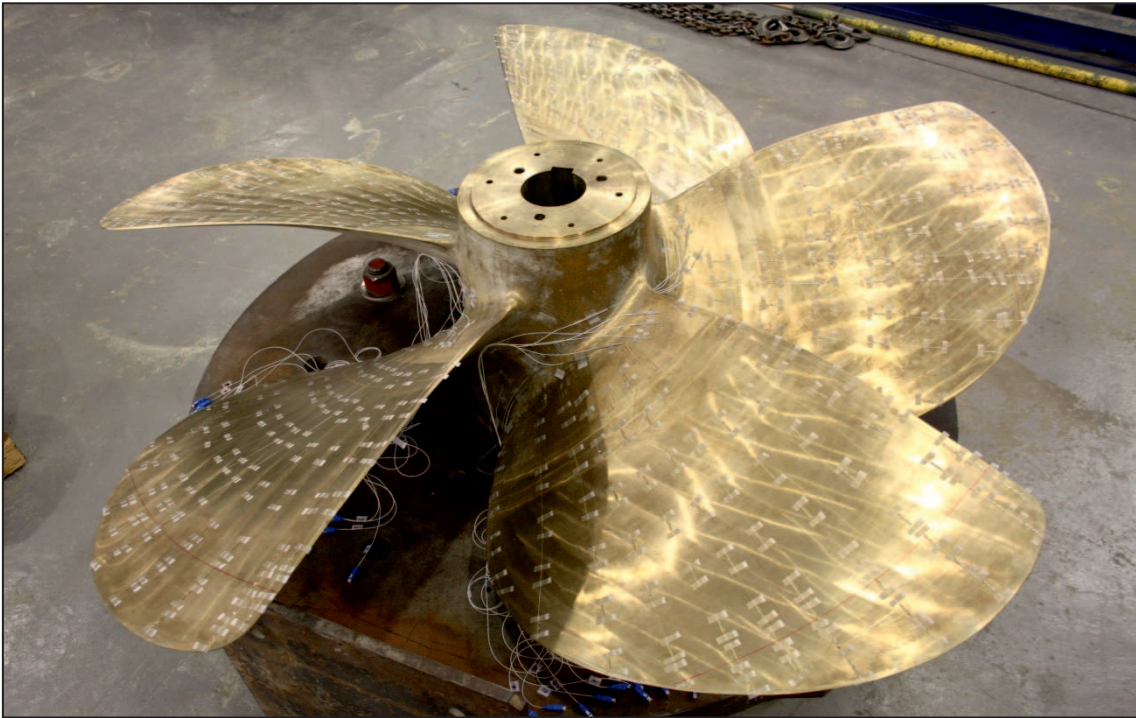
Phase mask fabrication technique

- A phase mask is used to create an interference pattern when it is exposed to a UV beam therefore inducing the modulation of the refractive index in the core of the fibre.



FBG usage examples

Full scale propeller

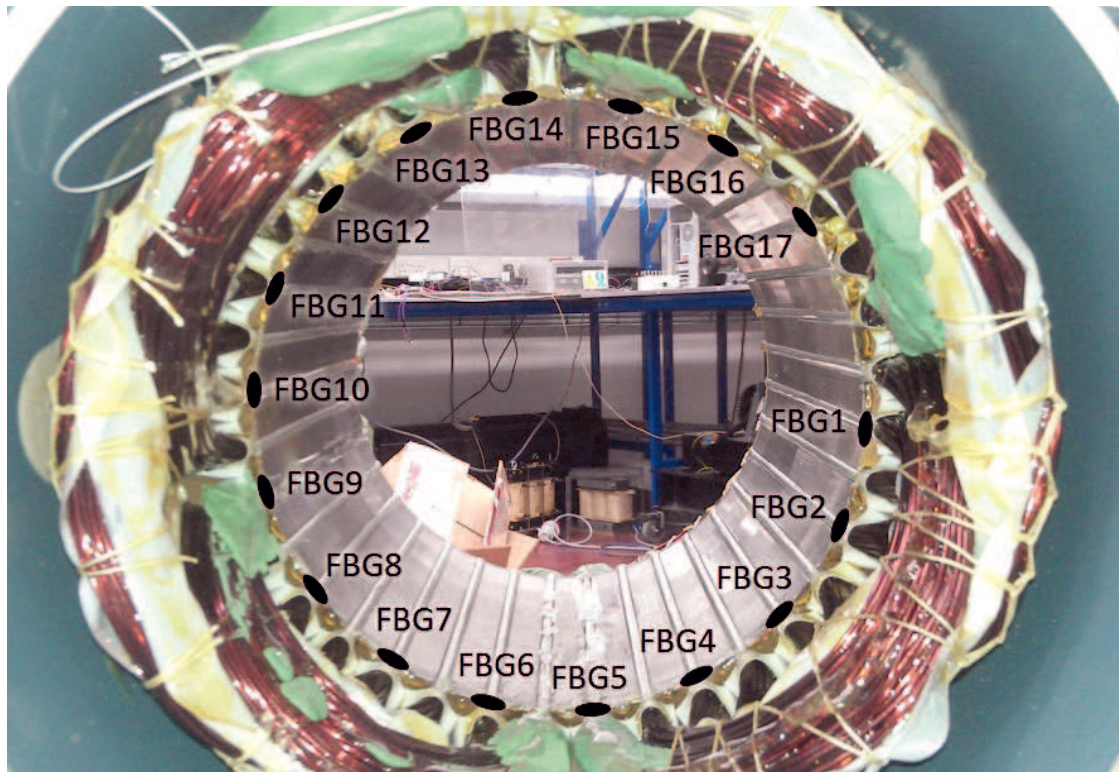


67 sensors were glued onto each blade with the locations being chosen according to the simulation results.

Total number of FBGs on the propeller was 335.

FBG usage examples

Self-sensing electrical motor



Simultaneous measurement of multi-parameters

- Temperature
- Torque/Strain
- Vibration
- Rotor speed
- Rotor position

Reliability

Fault diagnosis



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