

**IAEA safeguards and space-based radar**

Bhupendra Jasani
Department of Was Studies
King's College London
UK

The use of space-based optical sensors to enhance the IAEA safeguards procedures has been demonstrated. Further investigations are under way in which various sophisticated image processing methods are being explored to extract more information from the images acquired over various parts of the nuclear fuel cycle. In this paper some of the results are discussed. However, very often it is argued that at critical times the earth's surface may be obscured by clouds so that the space-based optical sensors become unusable. The availability of space-based radar sensors may overcome such objections. Not only can microwave radiation penetrate clouds but it can detect objects on the earth at night and even under all weather conditions. Moreover, synthetic aperture radar can generate images similar in quality to those obtained from optical sensors. The scattered microwave radiation reflects the geometrical characteristics of an object being monitored as well as its dielectric properties. If this is true then the possible changes in the dielectric properties of water in a lake or a river due to the discharge of warm water in them would be reflected in the scattered microwave radar beam. A number of images, acquired over a period of time over a nuclear reactor in the UK by the European radar satellites, the ERS-1 and -2, have been analysed. The results are discussed in this paper.