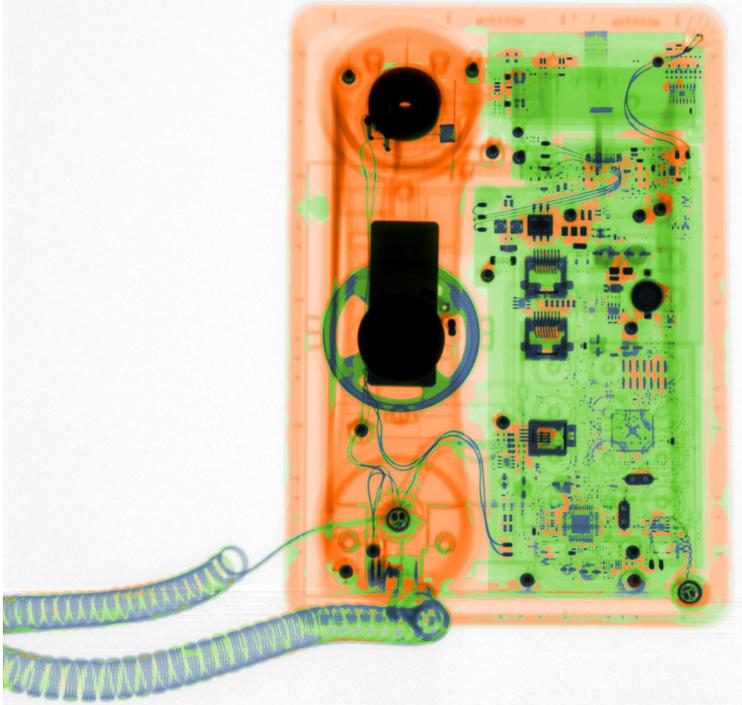




CASE STUDY:

SECURITY SCREENING EXAMPLE



More than meets the eye

Security threats may be disguised within everyday objects such as laptops and mobile telephones, which are legitimately carried everywhere.

X-ray security scanners typically use measurements taken at two voltage settings of the X-ray generator in order to generate materials information. This approach requires two scans, with a slight possibility of a relative movement between object and detector between the two. Such energy-dependent absorption information is required in order to classify materials, since the absorption of X-rays by a material depends on both its composition and its thickness. Neither can be deduced independently from a single absorption measurement using conventional methods.

IBEX Multi-Absorption Plate (MAP) technology can be applied to existing X-ray detectors, restoring energy-dependent information to a single image taken at a single X-ray generator kVp setting, and enabling any system to reveal the material composition of the object.

See more...

- Materials classification using conventional X-ray detectors
- Materials classification regardless of absorption contrast
- Distinguish plastics, light metals and heavier metals

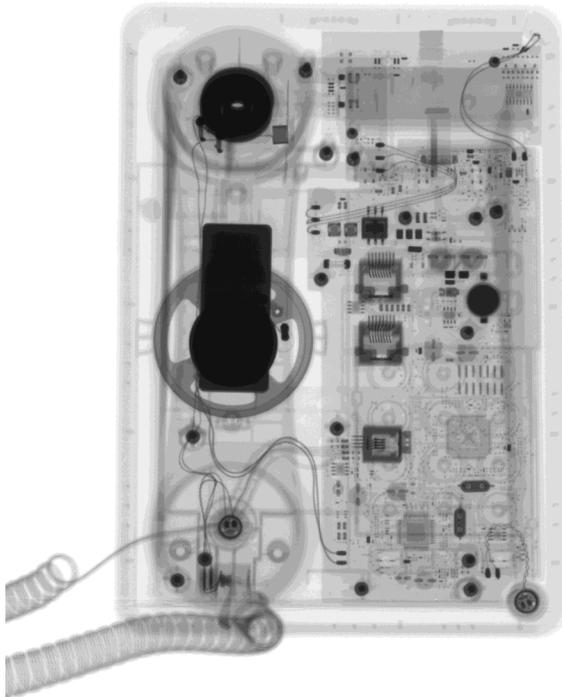
...with IBEX

- Flat-panel detectors, line scanners, direct or indirect sensors
- Retrofittable to existing detectors
- Scan at a single kV setting

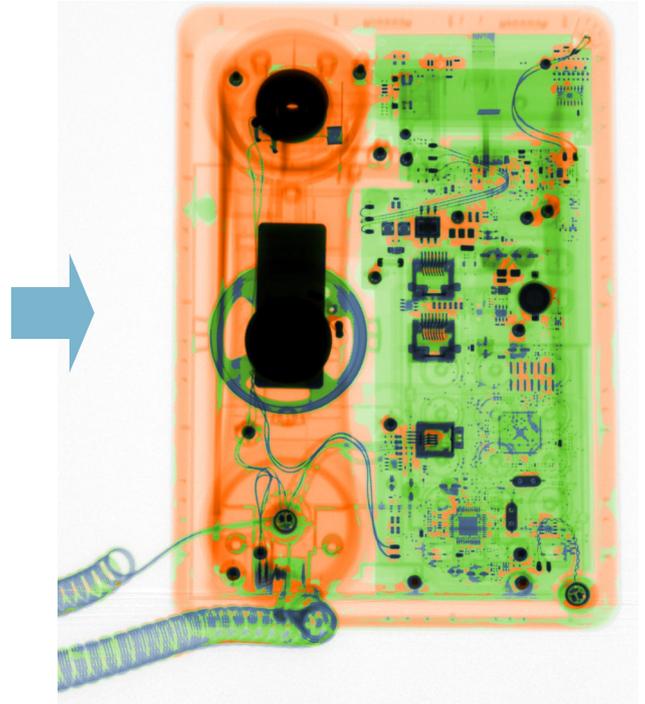
MATERIALS CLASSIFICATION OF A COMPLEX OBJECT

More than meets the X-ray eye

Absorption contrast image, delivered as part of the IBEX analysis. Many parts of the telephone have the same grey level and so different materials cannot be classified.



IBEX materials contrast image, classifying plastics and organics materials (orange), poor metals (green) and heavier metals (blue).



What is inside a telephone case?

A desk telephone was measured as an example of a complex object containing electronic circuitry and plastics. Data were collected at 120 kV, 0.5 mA, with a 0.5 s exposure, using a conventional, low-power tungsten X-ray source and a silicon flat-panel detector equipped with IBEX MAP (Multi-Absorption Plate) technology.

The grey-levels in the X-ray absorption image (above left) are similar in different regions of the telephone, despite parts being made of different materials. Analysis of the image data obtained using IBEX MAP technology leads to the materials discrimination image shown above right. The colour-scheme here is one typically used in security

applications: plastics and other organic materials are presented in orange; so-called “poor” metals, such as aluminium and copper, are shown in green; denser metals are shown in blue.

Caller ID

IBEX materials technology successfully identifies plastic components such as the casing of the telephone, including the thick stand beneath the printed circuit board. The PCB itself shows green, thanks to its copper plane. The outline of the keypad buttons can be seen superimposed on this. Where the metal is more dense, it is coloured blue—for example, the ferrite coil in the loudspeaker, internal screws and some components on the PCB.