Linear Inspection of difficult to inspect products (DIPs)

Inspection Beyond the Visible - Pulsed X-ray Technology for Medical Devices and Pharmaceutical Products

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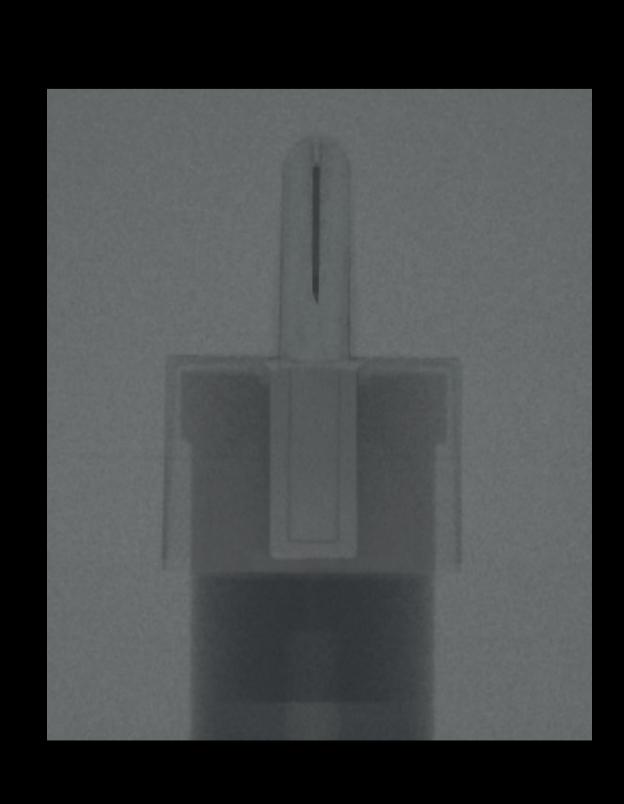
Background:

The wide range of medical products and their complexity result in an enormous variety of container designs. This demands a high degree of flexibility from inspection technologies, since many critical quality aspects cannot be detected by the human eye or conventional cameras.

What are the challenges of inspecting these products?

In particular, medical products often have essential quality features that are simply not visible, making it extremely difficult or even impossible to inspect them using conventional methods such as camera-based systems. A striking example is an emergency medication used to treat opioid overdoses: a single-use nasal spray with completely opaque optical properties. If even one component is missing or incorrectly assembled, the product may fail in a critical situation and potentially putting lives at risk.





How can these challenges be dealt with most effectively?

Pulsed X-ray technology opens up entirely new possibilities for inspecting such challenging products. Quality features that were previously invisible can now be made visible.

How does the pulsed X-ray work?

The X-ray inspection module comprises a transmitter unit (generator) and a receiver unit (flat panel). X-rays are generated electrically, enabling precise control of their intensity. This makes maintenance, operation and disposal easier. On the transmitter side, a filament (cathode) is heated by a low current, causing it to emit electrons. These electronsarethenaccelerated towards the anode by a high voltage, resulting in an X-ray

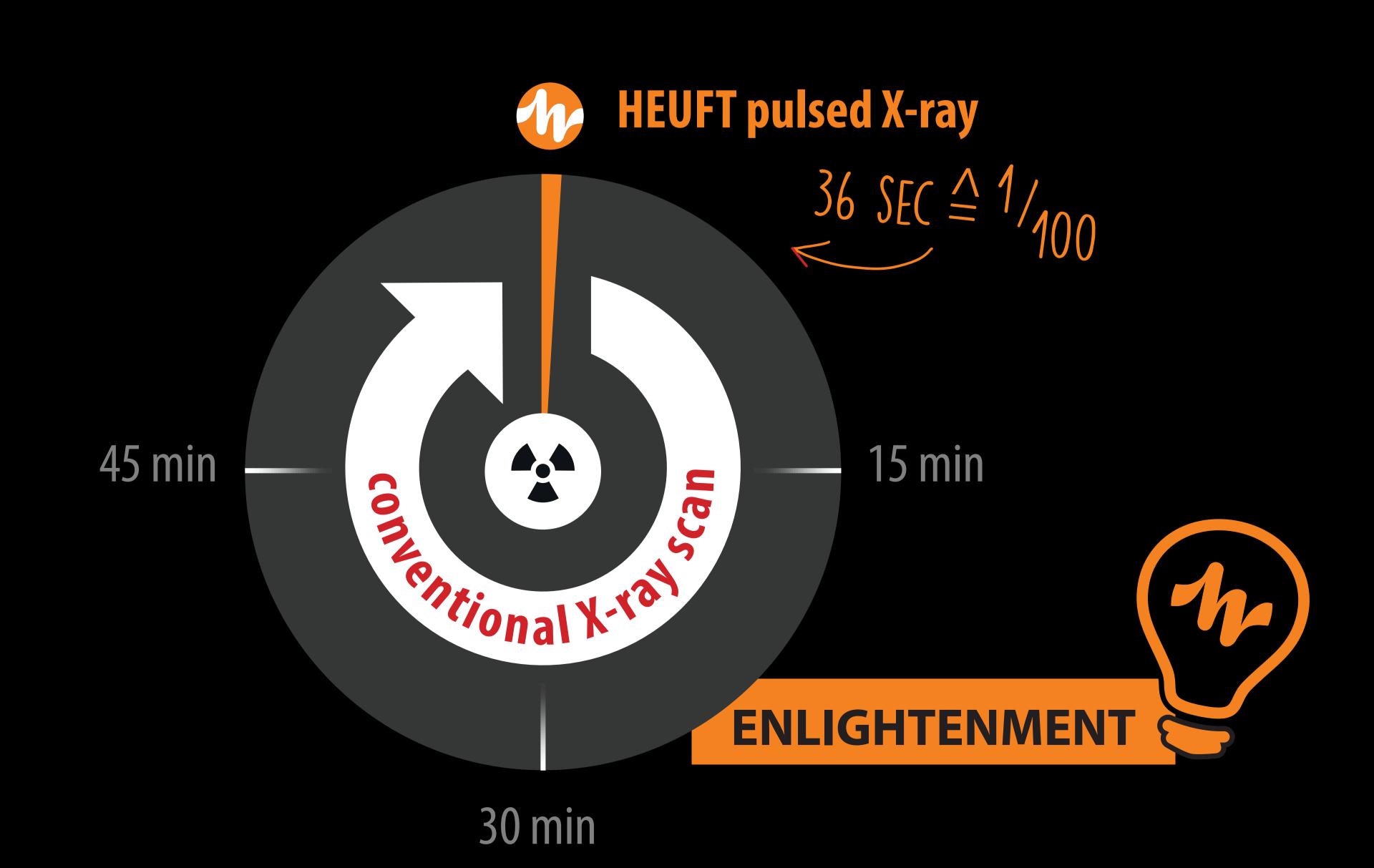
Advantages of pulsed X-ray technology over scanner systems

With pulsed X-ray technology, the X-ray source is never activated continuously. Instead, the X-ray beam is pulsed for 1 ms per container, emitting only a very low level of X-ray energy of 10 µSv.

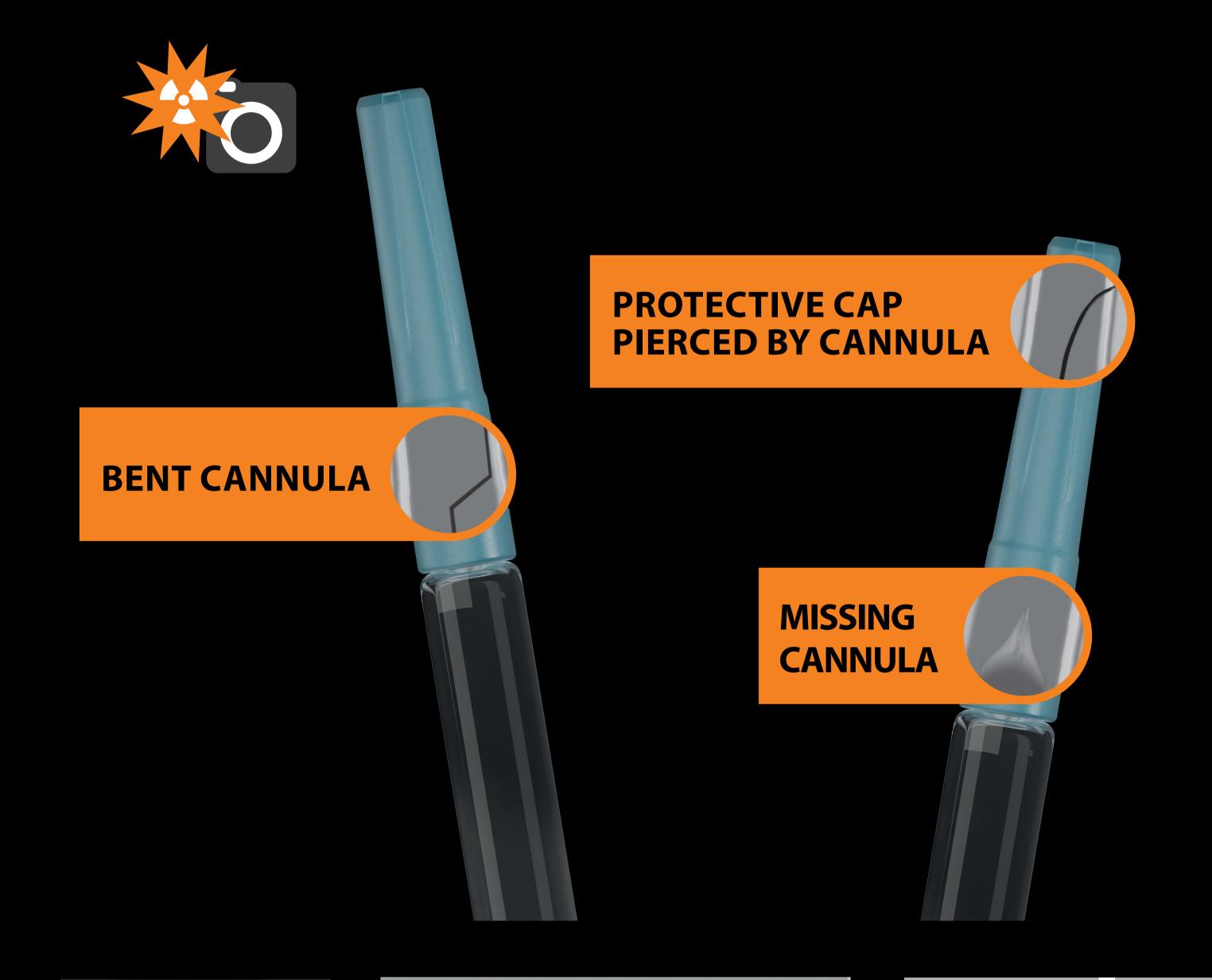


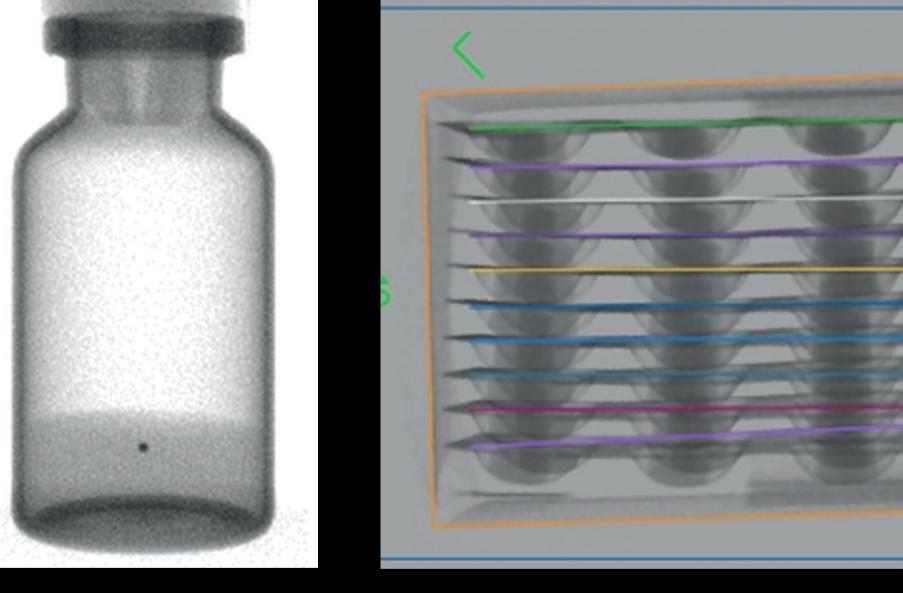
In comparison, the exposure to natural radiation during an international flight is 10 μSv per

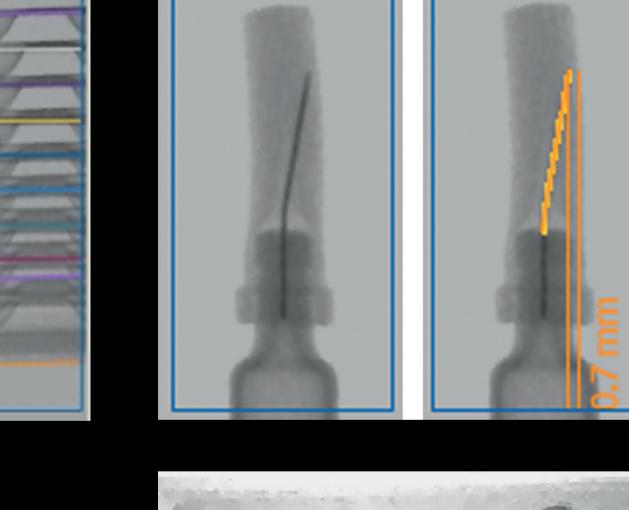
In a production line processing 36,000 containers per hour, the X-ray beam is activated for just 36 seconds per hour.



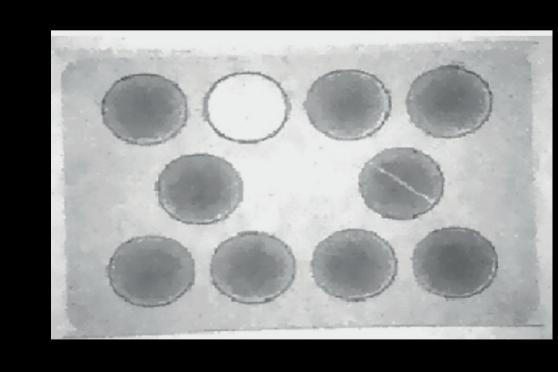
Further possible applications for pulsed X-ray technology











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