

# Electronic security tag for protecting valuable shipments

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In collaboration with its EU project partners, VTT has developed an electronic security tag, which can be used to protect valuable shipments and enhance product safety in the future. By using a security tag equipped with sensors, the sender and the recipient can ensure, for example, that the packaging of the product has not been tampered with and that the product is genuine. Previously, printing techniques have been applied to integrate electronics into plastic labels only, but with the VTT methods it is now also possible to produce more environmentally friendly paper-based security tags.

Both logistics companies and the retail sector are seeking new methods for protecting shipments, preventing forgeries, and ensuring that products remain unspoiled during transportation. Using the roll-to-roll technology developed by VTT, electronic circuits and sensors can be integrated directly into different materials by printing, thus producing novel security tags for sealing shipments and verifying the authenticity of products.

"With the help of roll-to-roll technologies, VTT has implemented a security element that can be used for supervising the integrity of shipments. Our project partners have been examining the recyclability of the security element and its feasibility in logistics chains, so we now have a functional package in our hands," says Liisa Hakola, Senior Scientist from VTT, describing the results of the EU-funded ROPAS project. "In its studies, our project partner ITENE has detected that the components used in the security element have a very minor influence on

the optical and mechanical properties of recycled fibres. The use of conductive printing inks is also so minimal that their impact is almost negligible," Hakola points out.

The security tag consists of a paper tag with an embedded battery and two coloured LEDs. When the package is opened, the signal light will show whether the shipment has been opened earlier during transportation.

In the ROPAS project, VTT showed that roll-to-roll technology for printing electronics is also suited to the manufacturing of paper-based security tags. This will improve the cost-efficiency of production, the environmental friendliness of the tags, and their suitability for mass production.

Now the consortium is looking for someone to adopt the technology. In the [project](#), the Spanish logistics sector partner Loginser tested the functionality of the security tag in its own [shipments](#). The tag is also suited to the use of diagnostics companies, for example.

Provided by VTT Technical Research Centre of Finland

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