Increasing EU citizen Security by utilizing innovAtive intelligent signal processing systems For Euro-coin validation and metal quality testing

Results in Brief

Better detection systems for counterfeit coins

The incidence of counterfeit Euro coins has been steadily rising since their introduction in 2002. Scientists have now developed high-resolution detection technology to help banks and vendors identify coins unfit for circulation.

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Paper currency does not have a monopoly on counterfeits circulating in the market place. Within a recent 2-year period, the number of known illegal mints of Euro coins jumped from 14 to 17, and the different classes of counterfeit coins that have been identified increased from over 80 to around 140.

It is imperative that manufacturers of coin validators in vending machines and banks devise increasingly accurate validation technologies to reduce counterfeiting. Non-destructive testing methods and electrical conductivity tests are widely applied to metals and alloys in the aerospace and nuclear sectors. Scientists initiated the EU-funded project SAFEMETAL to develop metal validation techniques that distinguish between the counterfeit and the tightly-

specified Euro coin alloys.

Studies focused on increasing the sensitivity of two technologies based on applied electromagnetic (EM) fields — planar EM sensors and pulse-based broadband eddy current measurements. In these techniques, the EM field is altered by the material and causes a change in conductivity that can be correlated with complex system properties.

To begin with, the team characterised the electrical conductivity and EM responses of Euro and other currency coins and metals. Additionally, the effects of embossing, plating and other surface finishing techniques on electrical conductivity were assessed. Extensive theoretical and mathematical modelling supplemented the experimental work. Scientists developed advanced signal processing routines using low-cost and low-power electronics and integrated data fusion techniques to combine information from EM and other sensors.

Researchers delivered several prototypes for different applications. Prototype machines for coin sorting and counting at banks were designed for high speed and high integrity. Coin validators for vending, automated service and amusement machines were designed for high-volume and low-cost applications. Finally, the team also delivered a prototype calibration and conductivity measurement system for mints, coin blank suppliers and banks.

Since the Euro coin was introduced, counterfeiting has been steadily increasing. SAFEMETAL technology will help to further confine the parameters of genuine coins through higher-resolution detection methods. Even automated vending machines will then be able to notice the difference between a genuine coin and a fake one.

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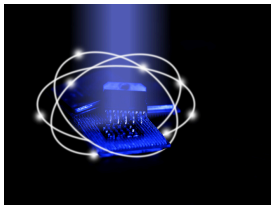

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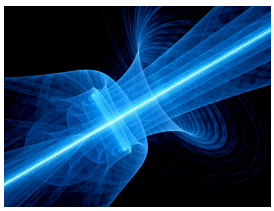

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Project Information

SAFEMETAL

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