



How to integrate e-seals into legacy HW/SW systems at Ports and Terminals?



PROTECTION – CONTROL – IDENTIFICATION – TRACKING

E-seals

RFID electronic seals

RFID electronic seals better protect cargos and goods from any contamination/manipulation and provide extra informative contents that can significantly improve operational processes in ports and terminals.

New operating methods and new services for the "Port of the Future" are enabled by making use of innovative electronic technologies (RFID, IOT, integrated sensors).

LeghornGroup is able to offer e-seals to increase physical security - such as ensuring no replicability of the seal - and inform in real time on how the goods are stored, tracked, routed, maintained and delivered to customers.



E-seals:

- Guarantee information in real time and greater physical protection of goods
- Increase the level of security in port access control procedures for vehicles and people.
- Enable completely paperless information solutions.
- Facilitate full integration between the different transport segments: maritime, port, land.

The business model that Port Authorities are pursuing to push Logistic 4.0 and Port of the Future models is to pay pilot projects with public money and give evidence to operators and stakeholders about the benefits brought by e-seals, trusting in a project continuation by private funds from shipping lines, international forwarders, terminals.

Also Customs are strongly pushing them, offering Fast Corridors and pre-clearing options when e-seals would be used to identify and protect cargos.

LeghornGroup e-seals are now in use in Fast Corridors among Italy, Tunisia, and Morocco as well as to seal export trade in India.

All RFID e-seals provides the automatic identification of the truck/container's seal and can be read quickly and accurately by static gateway reading systems or by handheld devices assigned to check point personnel.



Any tampering event to the seal is permanently stored in its chip's memory.

This activates the – TAG TAMPER ALARM, which immediately provides the status of the seal TAMPERED/ NOT TAMPERED when interrogated by the readers at the gate.

The RFID chip can also be used to store further information and can be written by using the proposed RFID reader/writer devices (both fixed and handheld ones). Further added information can be password protected.

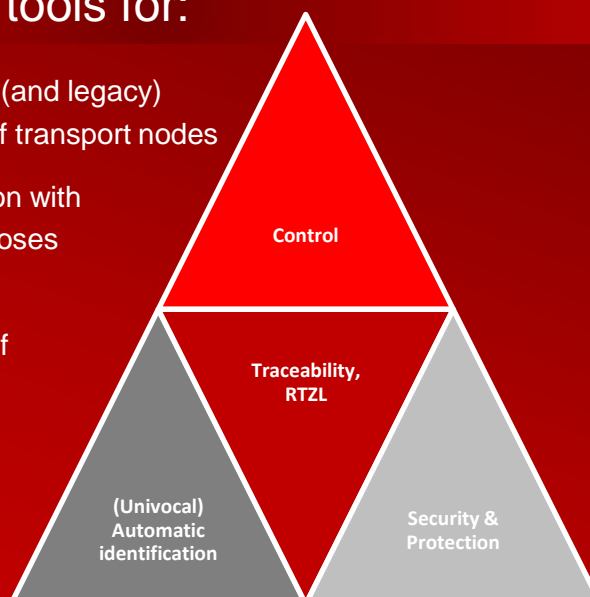
Key Features

The key pieces of information that the seal provides are:

- RFID e-seal serial number (EPC and TID);
- Date and time that reading is taken;
- Status of the seal (TAMPERED / NOT TAMPERED), for tamper evidence version only;
- Number of readings take for each RFID e-seal;
- Registration sequence in the event of 2 (or more) RFID e-seals on two containers on the same trailer.

E-Seals are informative tools for:

4. Ensuring interoperability between new (and legacy) systems and platforms for categories of transport nodes
3. Making possible the real-time interaction with the goods for control and security purposes
2. Streamlining transport processes guaranteeing a paperless traceability of goods & resources' optimization..
1. Following the goods and not only the transport means



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LeghornGroup e-seals work in accordance to RFID ISO standards - e.g. ISO18000-6 for UHF: their EPC code can be read by any reader following the same standard in the market. Read/Write operations are generally performed by using the free software that for demo purposes is provided by the reader manufacturer.



Specific application is instead required to read the tamper evidence information stored in the EPC memory of LeghornGroup e-seals.

We can offer only some middleware and applications to read the tamper evidence bit that works with the following readers:

- Middleware for Impinj Speedway Revolution R420/R220
- Application for ATID 880N, handheld reader Windows CE/Mobile
- Application for Android smartphone BT connected to CAEN RFID handheld readers (QID, QIDmini)



Our customers have also successfully used our e-seals with fixed and handheld readers from ChainWay, Zebra Technologies, and Alien Technology.

The middleware basically interfaces to upper SW level e.g. presenting data in format suitable with the customer system (database structure).



LeghornGroup can:

1. provide reader + app for the tested models. If the customer is fine with using any of the mentioned reader we provide the app for free either he buy that reader from us or he buy from different suppliers in the market.
2. suggest other reader models and guide the customer's technical team in the integration phase. Usually the reader manufacturer makes available API or even complete SDK to develop specific app
3. offer SW development turn-key service (costs depending on the customer requirements and the chosen reader).



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Radio Frequency specification

- Frequency 860 – 960 MHz – UHF EPC Global
- Reference RF Standard ISO/IEC 18000-6C
- RF Protocol EPC Class 1 Gen2 / ISO/IEC 18000-6C
- Technology Passive
- Integrated circuit NXP G2iM+

Mechanical specification

- IP Protection IP66
- Operative Temperature – 30°C / + 80 °C
- Storage Temperature – 30°C / + 80 °C
- ISO 17712:2013 yes

Electronic specification

- Reading distance by handheld reader 3 m (118" 7/64") (depending on reader)
- Reading distance by gate reader 8 m (314" 61/64") (depending on reader)
- Quality 100% performance tested
- User read / write memory Yes
- Memory size from 128 bit up to 448 bit of EPC Memory; up to 640 bit of User Memory
- Password protection Yes
- Tamper Detection Yes - on "tamper evidence" models only
- TID (tag unique identification) Yes
- S/N in memory (same of seal) Yes
- Read / write cycle 10000
- Data retention 20 year
- Integration with handheld reader OS ANDROID and WINDOWS CE commercial readers
- Integration with gate reader ISO/IEC 18000-6 commercial industrial readers

E-Seals increase security level in international freight

- Cannot be **duplicated**
- Cannot be **reactivated after tampering**
- Cannot be **emulated**
- Enable traceability
- Enable **cross checks** of controls **vs. operators**
- Are **not reusable**



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All the electronic seals of LeghornGroup are designed to prevent theft and fraud in freight transport ensuring protection, identification, control and tracking.

To achieve this goal LeghornGroup ensures:



Protection. LeghornGroup can protect your goods and assets with security seals and various products for tamper protection. The company can create bespoke, technical solutions to meet client's requirements.



Control. LeghornGroup ensures goods and people can be monitored using security products and integrated complete hardware and software solutions that allow the operator to monitor and intervene in real time, even remotely.



Identification. LeghornGroup's understanding of authentication along with their innovative technical products and solutions allow users to uniquely and securely identify, goods, vehicles, containers, animals and people.



Tracking. LeghornGroup's real time GPS tracking devices allow users to monitor location, status and movements of vehicles and people.



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