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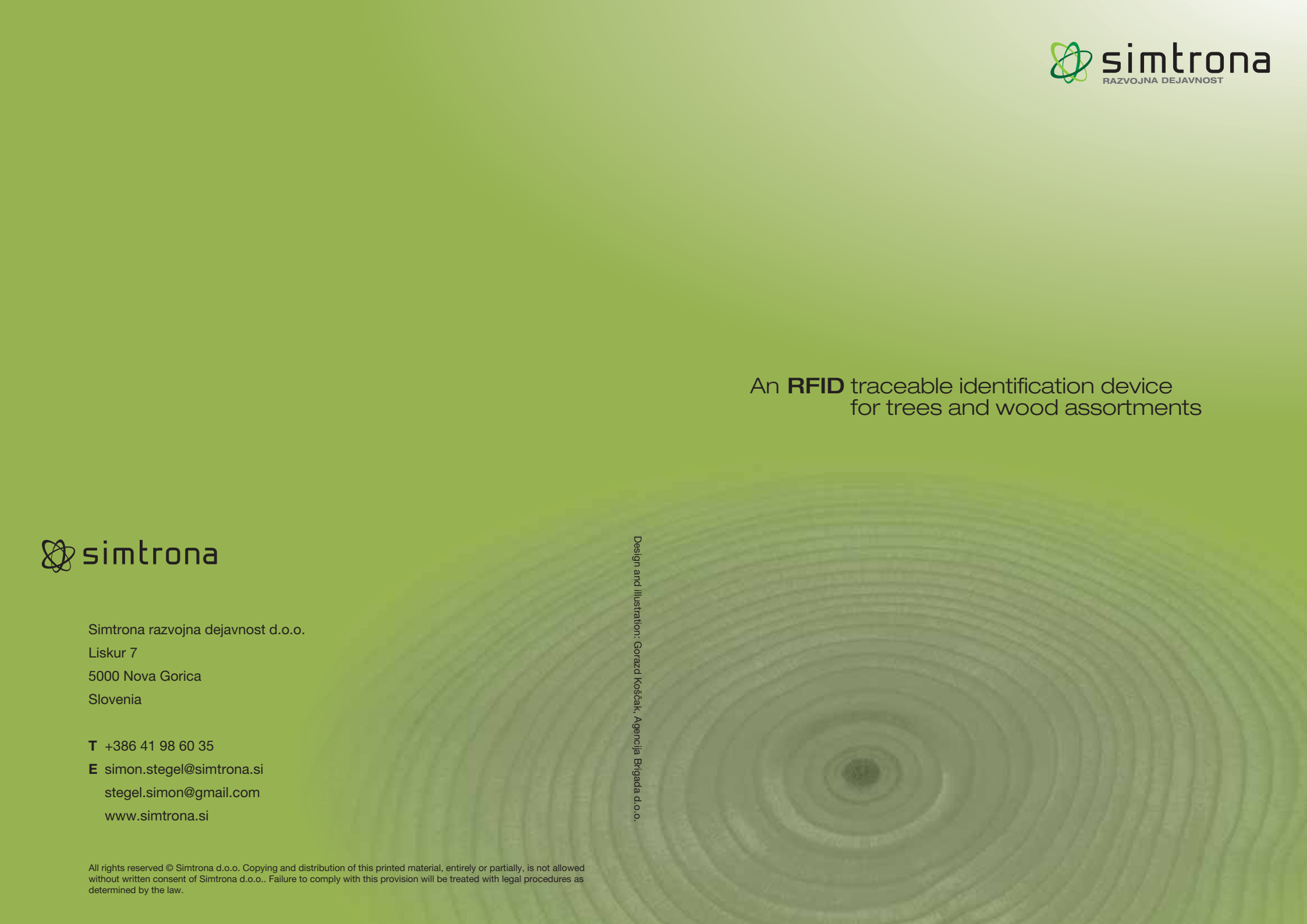
RAZVOJNA DEJAVNOST

An **RFID** traceable identification device
for trees and wood assortments



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Simtrona razvojna dejavnost d.o.o.
Liskur 7
5000 Nova Gorica
Slovenia

T +386 41 98 60 35
E simon.stegel@simtrona.si
stegel.simon@gmail.com
www.simtrona.si

Design and illustration: Gorazd Koščak, Agencija Brigada d.o.o.

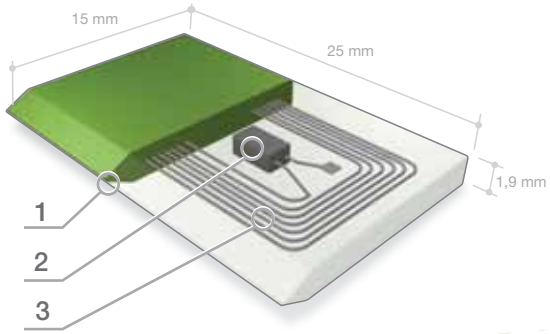
The purpose, characteristics and basic components are:

Smart Nails are designed and constructed to mark both living wood (trees) and round timber and for all kinds of wooden products and semi-products. Marking means that each wooden object gets a unique code and, if necessary, additional markings or properties which are entered.

Smart Nails are mainly made of a material similar to wood (cellulose and/or binding agent) (1). The design enables the Smart Nail to penetrate the wood along the fibres with minimal force. They contain a unique identification code and have available free memory dedicated to entering random data. They also use radio waves to communicate their identification codes and other data stored in the memory.

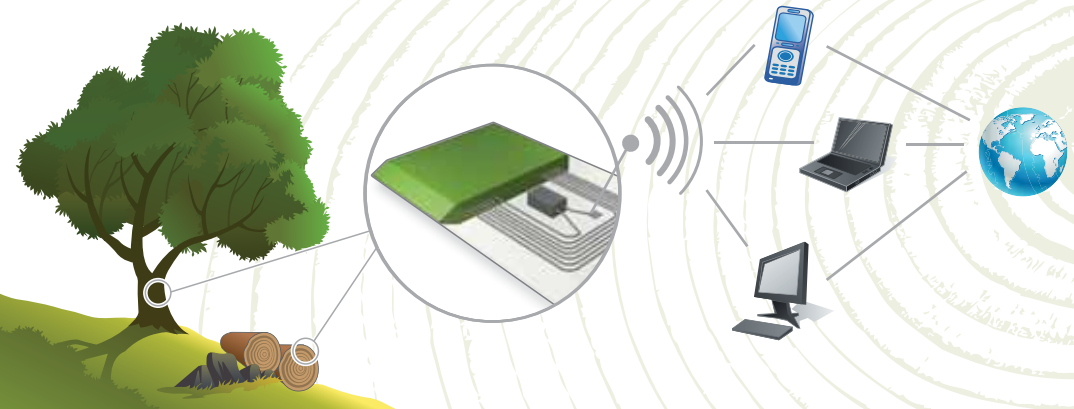
The basic components of the Smart Nail:

1. The nail body with a sharpened end
2. A Microelectronic circuit of negligible dimensions
3. An antenna made of a thin, electrically conductive coating



Principle of operation:

A microelectronics circuit, together with the antenna (2, 3) is formed by an oscillating circuit tuned to a specific frequency. The transmitter (receiver) sends the information to which the Smart Nail responds. The transmitter (receiver) then reacts appropriately (according to a given communication protocol). The electrical properties and communication protocol is specified in ISO/IEC 15693, ISO/IEC 7816-6 and ISO/IEC 18000-3.



The nailing procedure:

The body of the Smart Nail is made of a laminate consisting of cellulose and a binding agent such as phenol or epoxy resin.

The long edge is sharpened to an angle of 45° to facilitate driving the nail into the wood to be marked.

Multiple nails can be stacked on top of each other as in a magazine and lightly glued so that they can be used with a device for driving fixing elements. The nailing device can be pneumatic or mechanical. In form and function it is similar to a heavy duty staple gun.

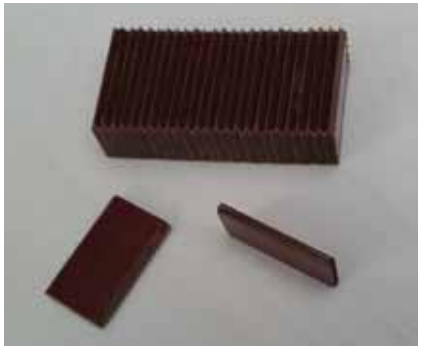
Reading/writing application:

Each nail has a previously entered unique 16-digit hexadecimal identification number ($1.8\ 10^{19}$ combinations). The content of the Smart Nail can be read by RFID readers which may be applicative (PDAs, external readers connected to a USB or COM port) or already built into certain devices (such as modern smartphones). The device must have a suitable software program installed that can work with an RFID reader.

The bar code reader works in a similar way. Application programs that already contain a bar code reader usually require only minor modifications to adapt to the RFID reader.

In addition to reading, Smart Nails also allow data entry. Various information can be entered such as the wood origin, owner, operator, wood properties, date of measurement, etc. The information can be entered with the same reader from which readings are taken from. Up to 2,5 kb of data can be entered, which is in principle suffices for most applications (more than 600 numeric or 300 alphanumeric characters).

Software designed to enter data into the Smart Nails should be adapted to use.



Applications:

- Living wood (trees) – marking to determine the increase in sample plots
- Identification of wood types – a unique code of up to sixteen digits
- Monitoring the origin of wood assortments – storing information about origin into a data-base
- Marking pallets – using nails on all types of wood and also dry beech
- Marking wooden semi-manufactures – entry of ownership, quality, etc.
- Marking wooden products – entering the manufacturer and origin of timber