

AUTOMATIC REMOTE ACQUISITION SYSTEM FOR DETERMINING THE CONFIGURATION OF AN INSTALLATION

Main Technological Area → Logistics

Keywords → RFID | Configuration management | Predictive maintenance

The patent relates to an automatic remote sensing application for system configuration, which allows to remotely detect and keeping under control the evolution of the configuration of one or more complex systems through a Configuration Control (CC) centralized database. Thus, the architecture is Cloud based and the CC database application is able to perform system polling and at the same time provides monitoring services for several fixed or mobile terminals.

A system can be seen as an aggregate of subsystems, devices and parts that can be replaced in the field, each identified as a LRU (Line Replaceable Unit) according to an intrinsically hierarchical structure, in which each element is identifiable by active or passive RFID Tags. These tags exchange data with the CC through appropriate transponders, concentrators and networks, both GSM / LTE and Internet.

TECHNICAL SPECIFICATIONS

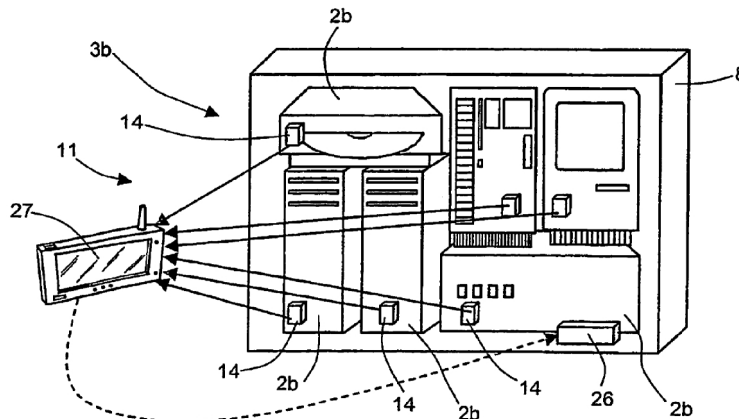


Figure 1 – RFID tags identifying replaceable units

A complex and technologically advanced system, such as an industrial plant on land or at sea (Oil & Gas platforms), a submarine, etc., represents a huge investment which needs a long-term evolutionary/corrective maintenance for its entire lifecycle. It is not unusual, for a technologically advanced installation, to continue operating well over 40 years later its setup, thanks to the continuous technological updating of the original installation structure.

Servicing an installation normally includes:

- repairs;
- spare parts supply;
- replacement and updating;
- training of installation technicians;
- integration with existing maintenance procedures and equipment.

In this context, is vital to keep track of all the servicing done on the structures, so that the exact configuration of the installation is known at all times up to the last element that can be replaced by taking from a spare parts and maintenance materials warehouse. That's the aim of the centralized database, which maintain an inventory of elementary parts and units (LRU - "Line Replaceable Unit"). Each of these units can be identified using different cataloguing systems; one of the most common is based on the use of bar codes.

In modern systems many operational disadvantages of the bar code can be eliminated with a technology based on RFId devices ("Radio Frequency Identification"), using radio frequency tags (known as "Transponders") which are applied to the elementary units for identification. In their simplest form, these TAGs are usually employed for tracking merchandise in stores and Supermarkets. Unlike barcodes, RFId technology makes it possible both to identify an elementary part or unit system with a unique code stored in its microchip and to acquire and store data in their memory; in addition, data is made available in real time and is readable/writable in any environment, e.g. in the presence of dirt, water, detergents, paints, chemical solvents, and at high temperatures.

RFId can be produced in almost any desired shape and size, and can be coated with material suitable for the operational needs; it can be reused in production or for logistics, and can support indefinite numbers of read / write operations.

The patented automatic remote sensing application for system configuration is based on the use of RFId technology (both active and passive) and can be used to (a) manage the system configuration; (b) trace the operating parameters of the system in order to implement appropriate preventive maintenance activities; (c) trace the semi-finished products along the transformation cycle; (d) manage warehouses; etc.

in addition, the system has the following features:

- Use of "open" technology to allow system scalability and maintenance
- Use of standard interface and standard connection solutions to allow integration with legacy systems and COTS installation
- Low operating cost.

INNOVATION/ADVANTAGES

Main advantages of the patented solution:

- Read/write operations, on passive and active transponders, are carried out in a substantially simultaneous way, thus allowing a rapid, automatic, remote identification, without collisions between LRU elementary units
- Applicability to any type of system, whatever it can be structured in terms of transponder combinations active and passive
- Each transponder can store the history of a subsystem, of an apparatus or of a given elementary unit (e.g. identification of the authorized maintainers, supply chain reference data, as well as technical documentation and spare parts catalogues references, which can be used to support operational personnel and staff maintenance.

FIELDS OF APPLICATION

Industrial plants	- Constant and punctual corrective/predictive maintenance service to guarantee their efficiency and availability over time
Logistics	- Large warehouses (ports, railways, airports); can be integrated with the automation of supply and withdrawal of warehouse stock - Lifecycle management of materials that are particularly sensitive to environmental conditions (e.g. carbon fibers) before their use in the production line.
Archivistics	- Elementary units consist of documentary elements or cataloged items of other nature (museum artifacts, judicial findings, etc.)

PATENT INFORMATION

Priority Date - 20/05/2005**Priority Code** – TO2005A000350**IPC Codes** – G06K17/00 | G06K19/07 | G06K19/077**Active worldwide applications**EPO - EP1886259B1; filing date: 05/08/2005; grant date: 05/10/2011

National Extensions: Italy - Germany – France – United Kingdom – Spain - Switzerland/Liechtenstein

Russia- RU2381555; filing date: 05/08/2005; grant date: 10/02/2010USA - US8215549; filing date: 27/03/2008; grant date: 10/07/2012Cina - CN 101223541; filing date: 05/08/2005; grant date: 01/09/2010**Leonardo internal code**

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