ITU-T

International Telecommunication Union

RFID for telecommunication network maintenance

Edoardo Cottino

CTO

Sirti SpA, Milan (Italy)

ITU-T Workshop "Networked RFID: Systems and Services"
Geneva, 14-15 February 2006

TRANSMAP system: The Idea

The *TRANSponder MAPping* system comes from the idea of using an established efficient new technology

TRANSPONDER RFID (Radio Frequency IDentification)

For cataloguing, servicing, cartography and maintenance of telecommunication networks

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TRANSMAP system: Goal

The system, developed and patented by Sirti as a support of network operations, allows to:

- Take a census of any network element
- Geo-reference the network element (if possible)
- Affix a tag containing all useful information to the network element
- Create a database containing network elements history
- Create geo-referenced maps of network elements
- Update tag data in the field after each operation on the network element
- Remotely update database and maps at the end of operations
- Associate a traceable, legal responsibility with each field operation

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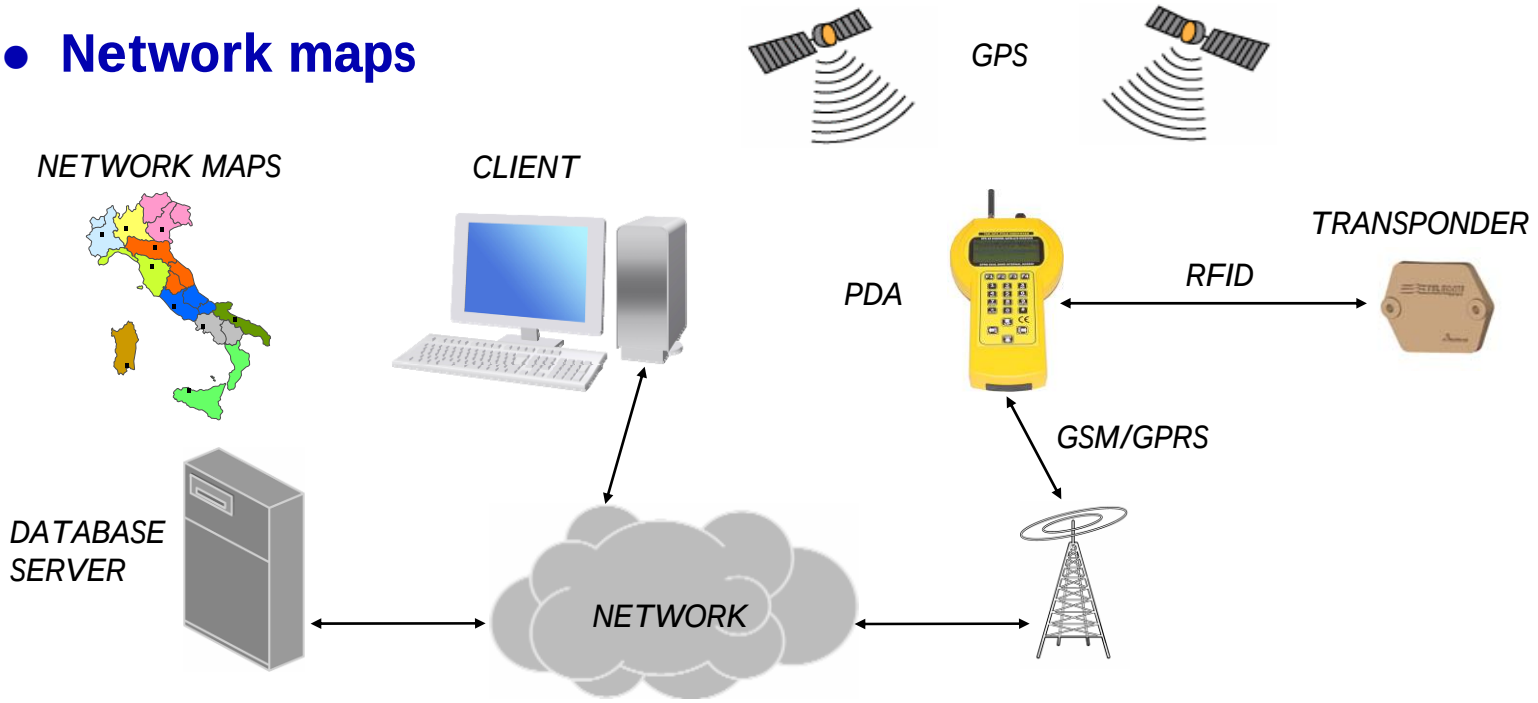
TRANSMAP system: Scenario

Patent Pending

- Transponder (RFID tag)
- PDA (Personal Digital Assistant)
- Central database
- Network maps



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TRANSMAP system: Sirti PDA

Patent Pending

- Front-end RFID for transponder
- GPS Receiver
- GSM/GPRS modem
- MMC Memory Card
- USB Port
- Graphical display
- Alphanumeric keyboard with function keys
- Rechargeable Li-ION battery
- Remote upgradeable software

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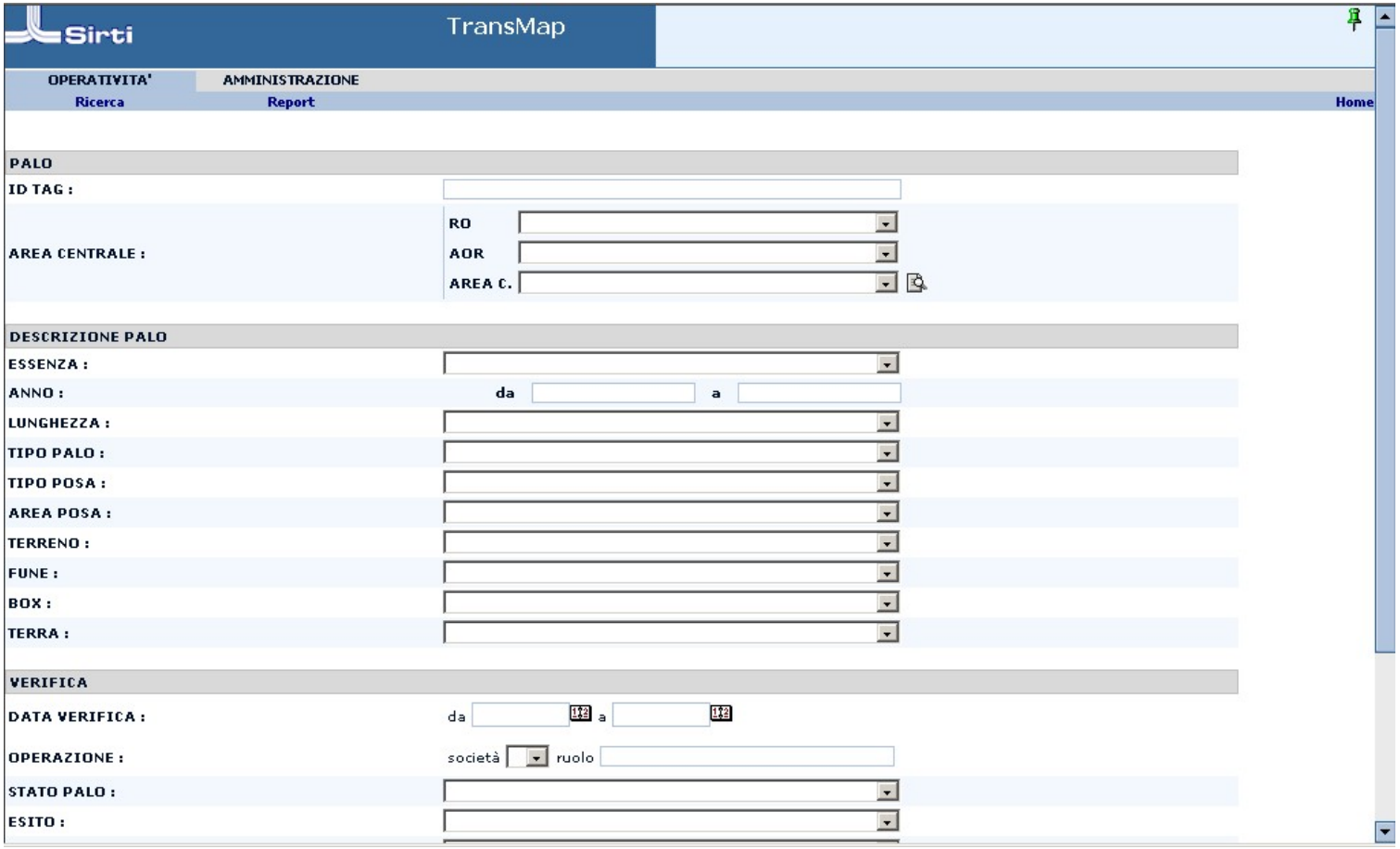
TRANSMAP system: Web-based user interface



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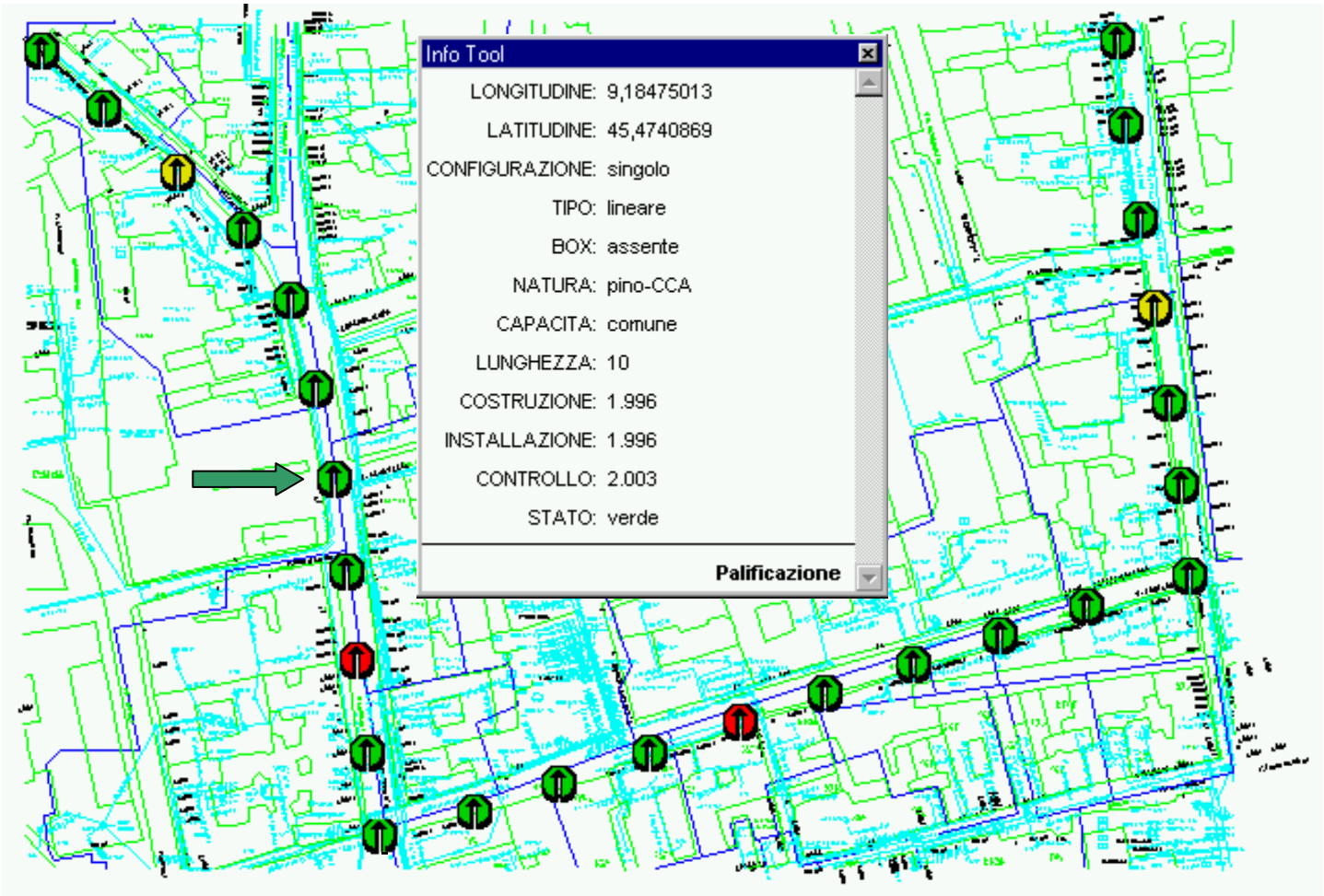
TRANSMAP system: Cartography



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TRANSMAP field trial: Telecom Italia access network

- **Poles in copper cable access network need periodical maintenance**
- **The near totality are wooden poles subject to turnover**
- **Scope:**
  - *To collect additional information about network pole status*
  - *To certify in-field maintenance actions in the field*
  - *To certify network quality*
- **Field trial details:**
  - *Number of checked poles: approx 42,000*
  - *Number of technicians/PDAs employed: 30*
  - *Period: January-June 2005*

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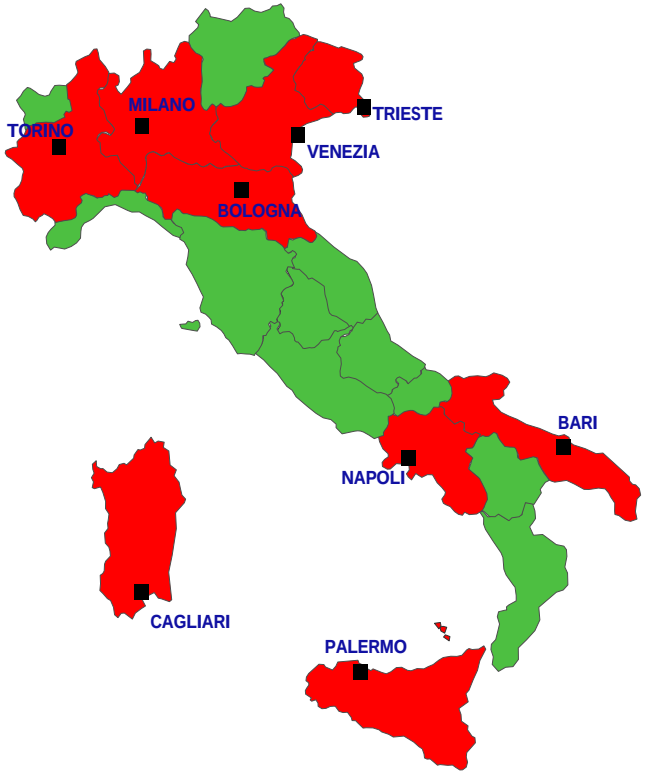
TRANSMAP field trial: Geographical Regions involved

Region	N° of censed poles
Piemonte	3,450
Lombardia	2,700
Veneto	2,200
Friuli Venezia-Giulia	2,050
Emilia Romagna	5,350
Sardegna	9,500
Campania	3,950
Puglia	2,950
Sicilia	9,000
Total	**41,150**



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TRANSMAP field trial: RFID transponder by Sirti

- **Solution specifically designed for telephony poles**
- **Technical Features**
  - *Frequency: 13,56 MHz (ISO 14443)*
  - *Memory: 4kbit*
  - *Programming cycles: 100.000*
  - *Data retention: >30 years*
  - *Operational temperature: from -25°C to 70°C*
  - *UV radiation proof case*
  - *Case protection class: IP67*
  - *Passive transponder*

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TRANSMAP field trial: Collected data

Site	Geographical coordinates
	Network area
Pole characteristics	Production year
	Type
	Length
	Capacity

Installation Characteristics	Type
	Area
	Ground tipology
	Presence of hanging strand
	Presence of any box
	Presence of grounding system
Check	State of the pole
	Result
	Maintenance actions
	Date
	Operator

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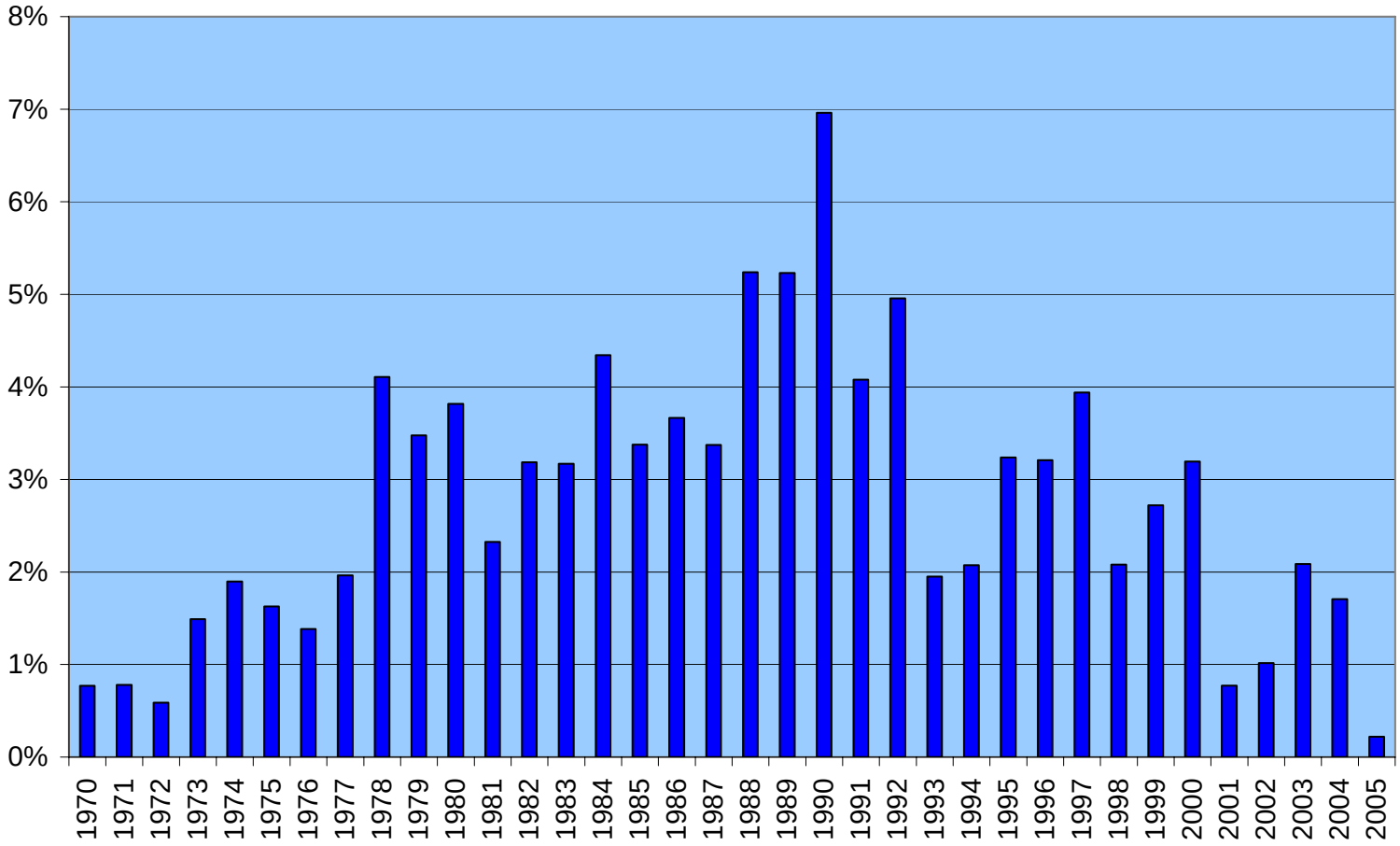
TRANSMAP field trial: Age distribution of the poles



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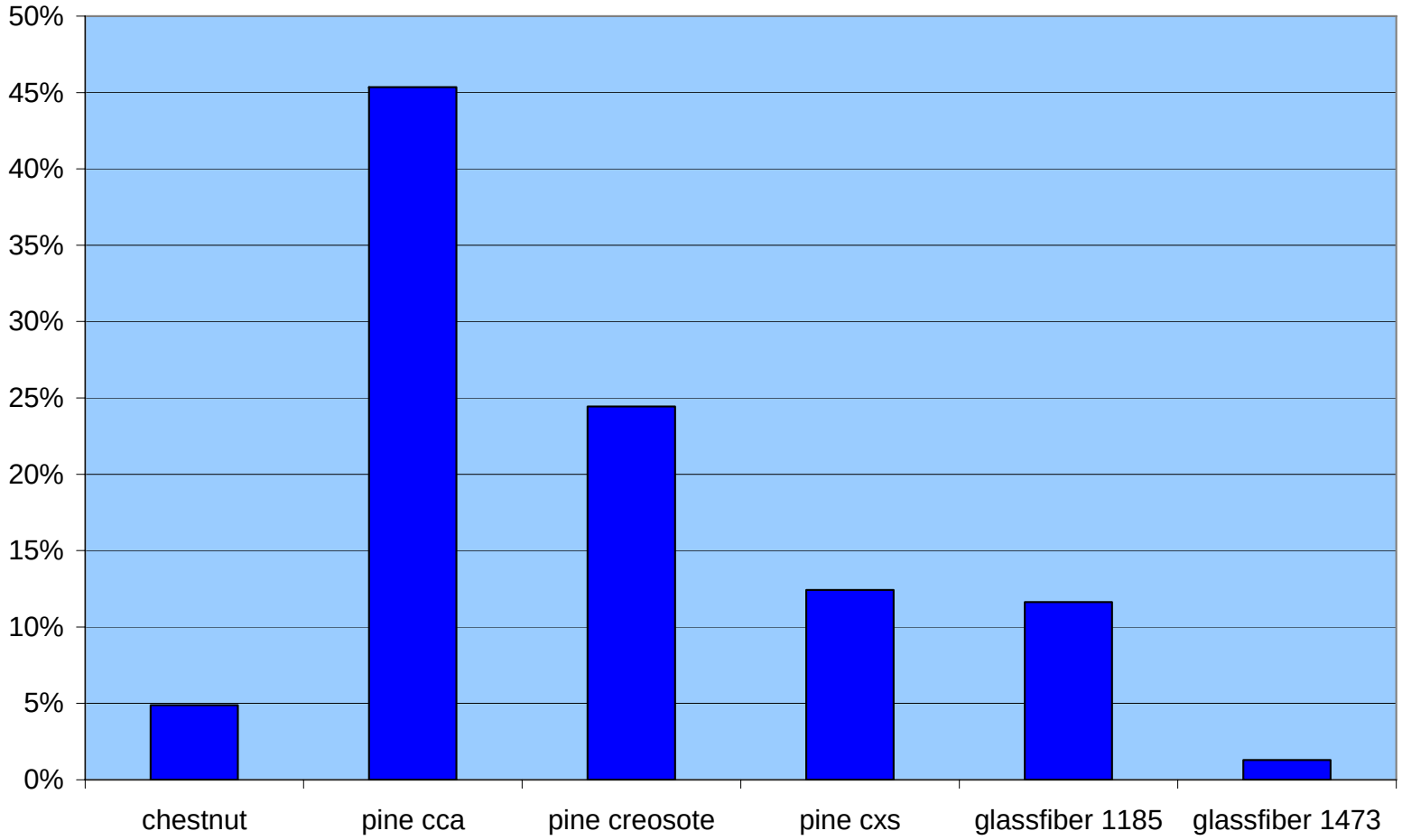
TRANSMAP field trial: Type distribution of the poles



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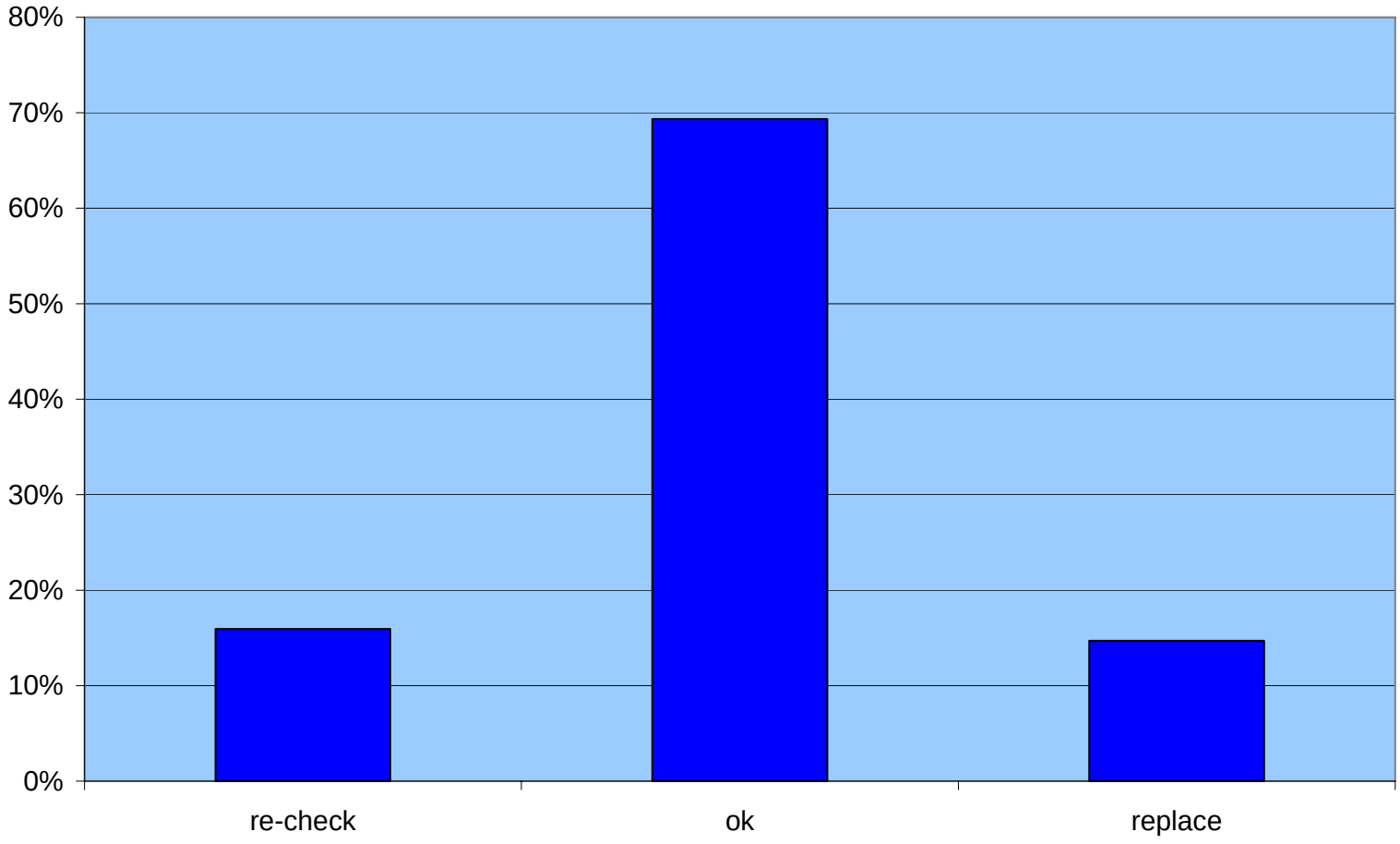
TRANSMAP field trial: Check results distribution



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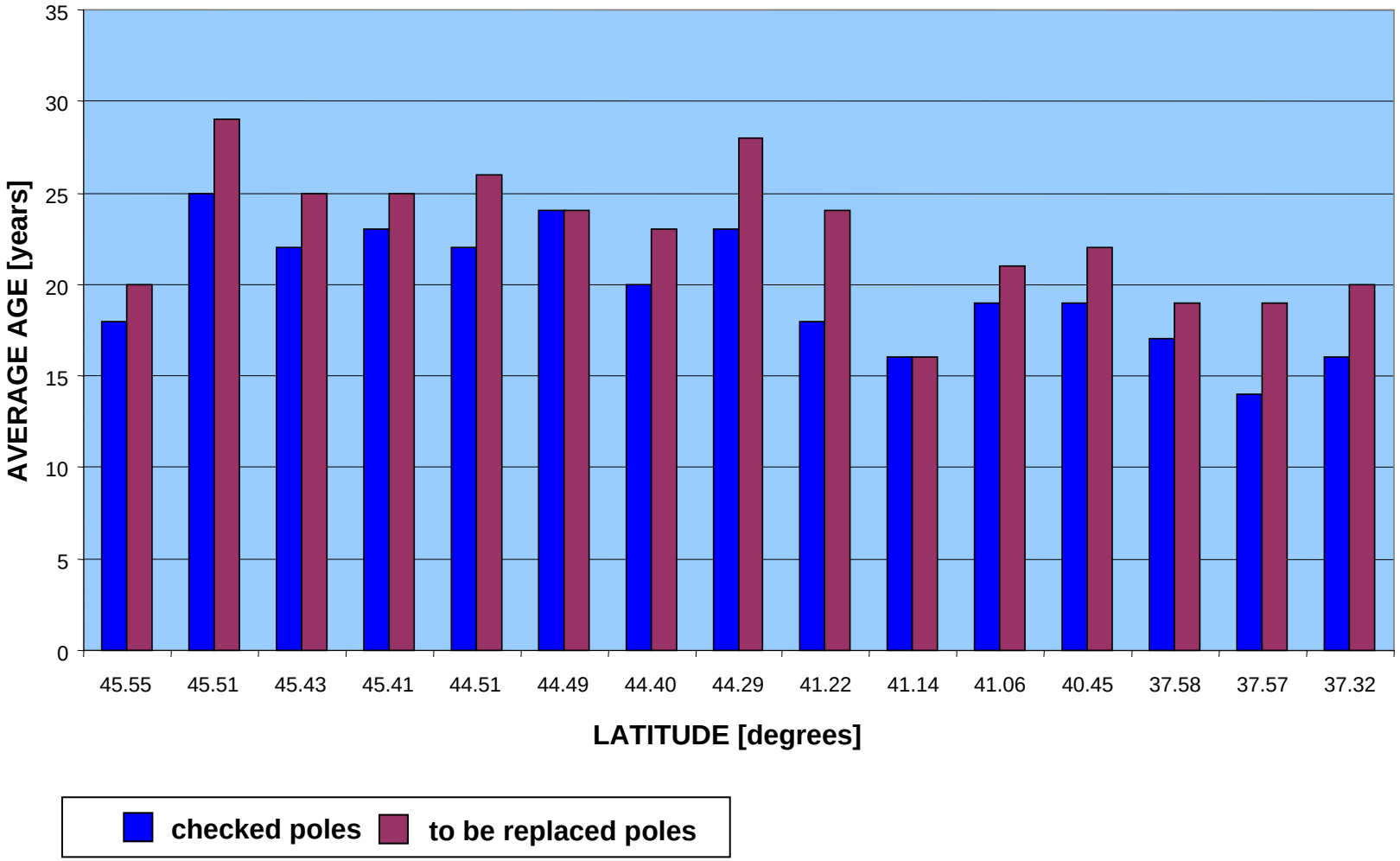
TRANSMAP field trial: Average pole age distribution



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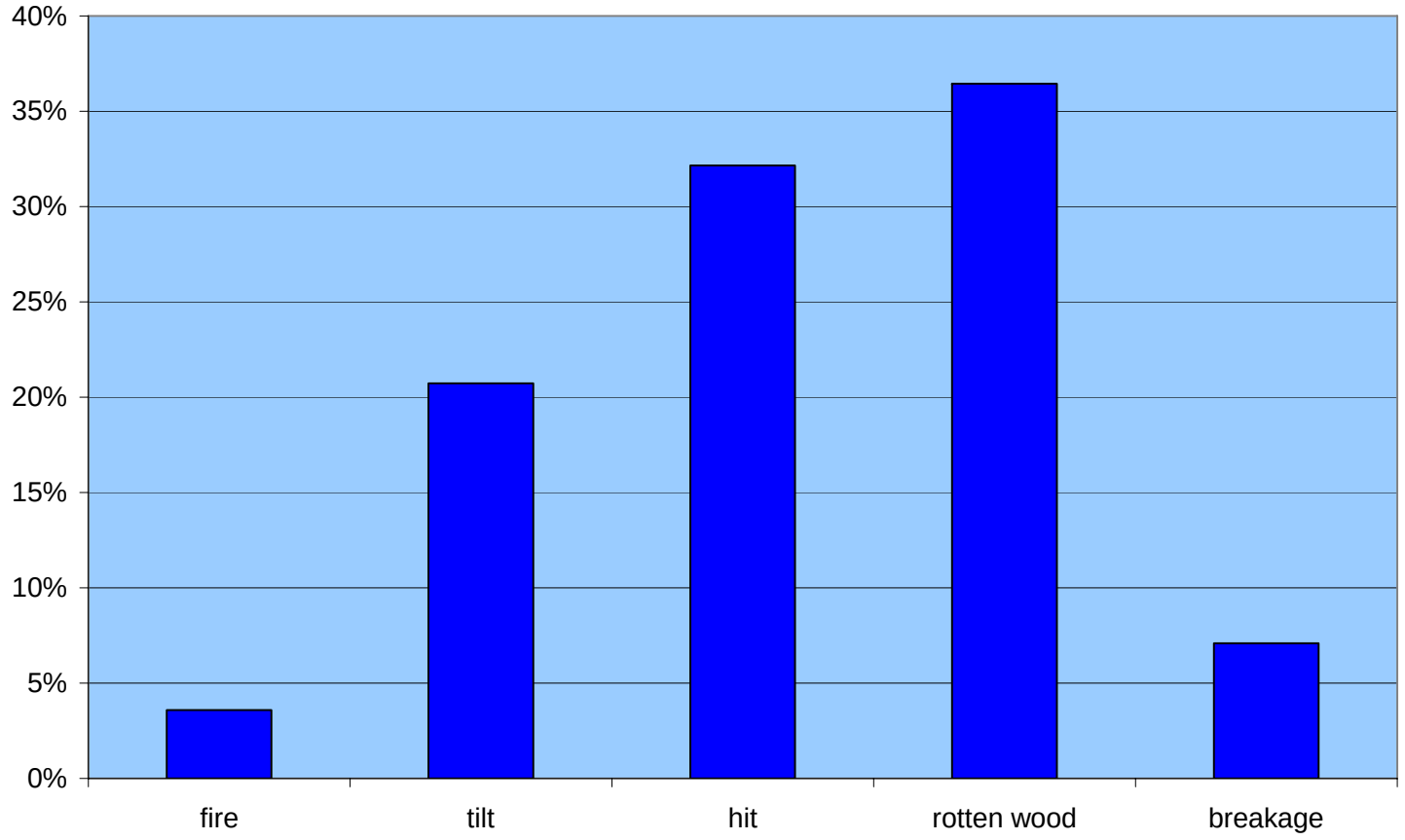
TRANSMAP field trial: Failure analysis



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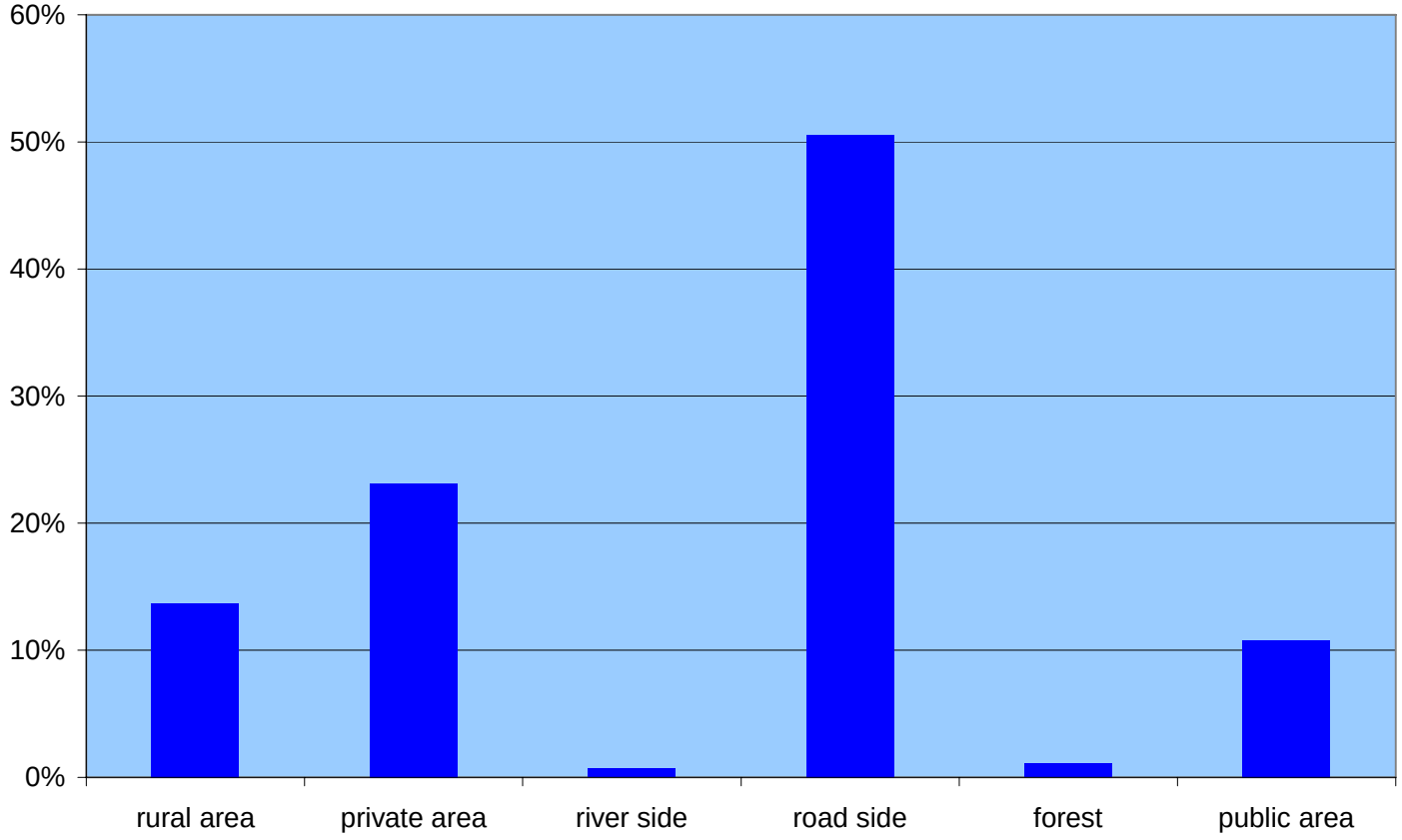
TRANSMAP field trial: Failure area distribution



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TRANSMAP field trial: Benefit of the system

- Automatic creation of network elements database directly from field collected data
- No manual data entry for map population
- Upload maps on GPS device instead of printing maps
- Optimization of the pole maintenance system by means of selection algorithms based on “fault tree analysis”
- Best planning of re-check and/or replace pole operation
- Substantial savings on purchasing thanks to precision in needed quantities and warehouse reduction
- Availability of updated database for network expansion
- Possibility to trace and certify replacement of potentially dangerous network elements (old poles) as required by local laws

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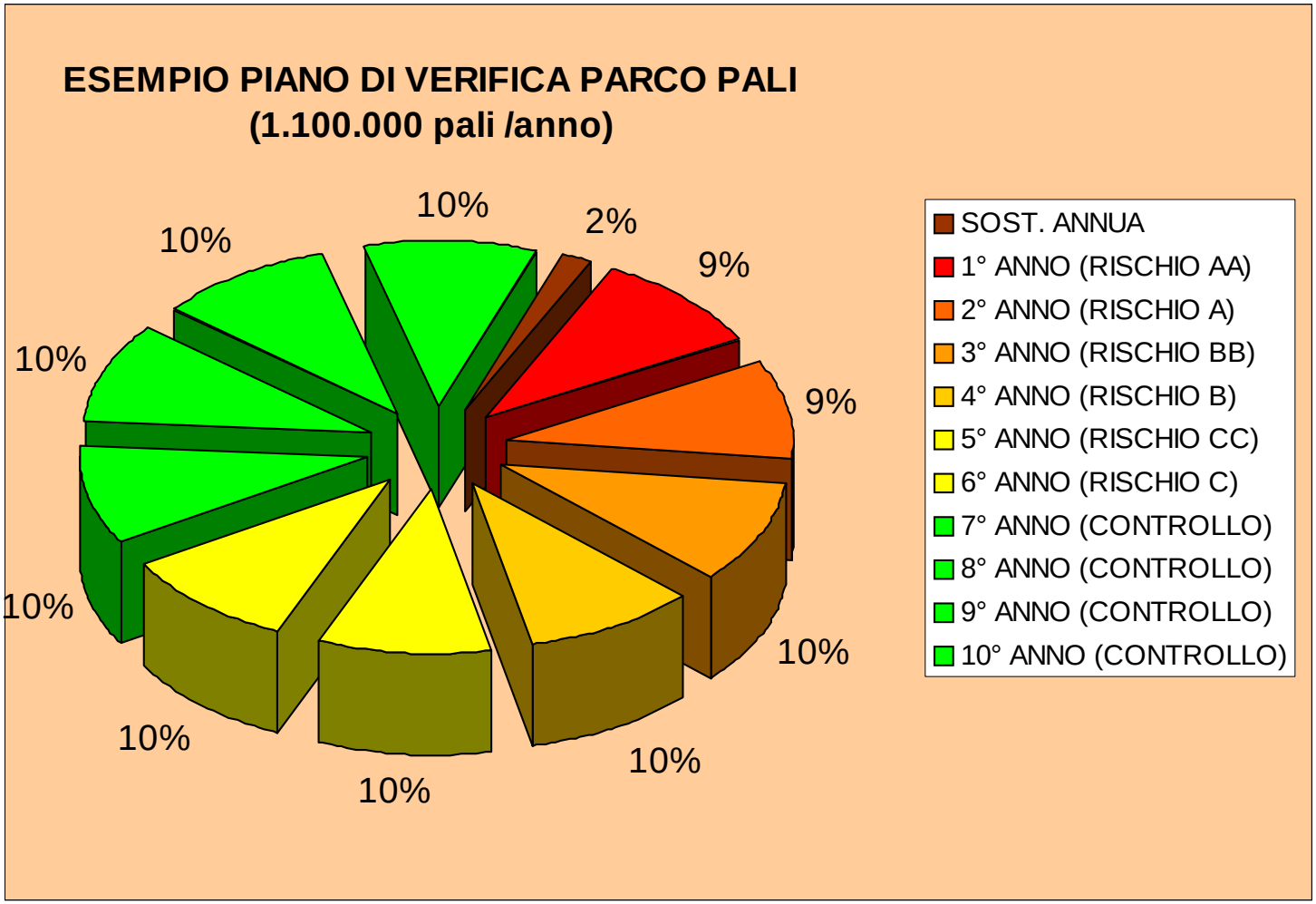
TRANSMAP system: Example of check planning



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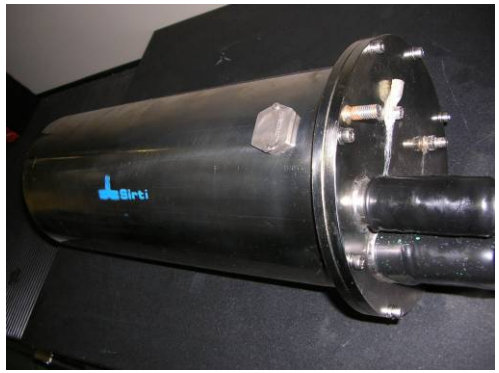
TRANSMAP system: Other possible applications

- **Indoor**
  - *Racks*
  - *Subracks*
  - *ODFs*
  - *Equipment cards*
  - *Batteries*
- **Outdoor**
  - *Cabinets*
  - *Closures*
  - *Boxes*
  - *Public phones*
  - *Mobile BTSs*



In principle on any degradable/traceable network element

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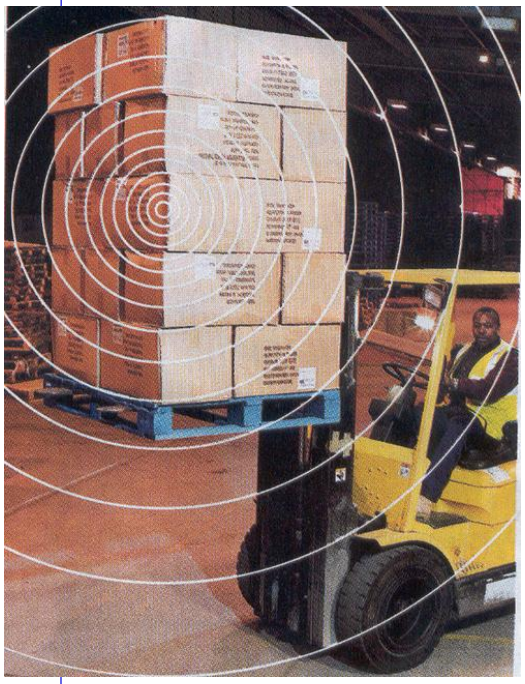

Thank you !!

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