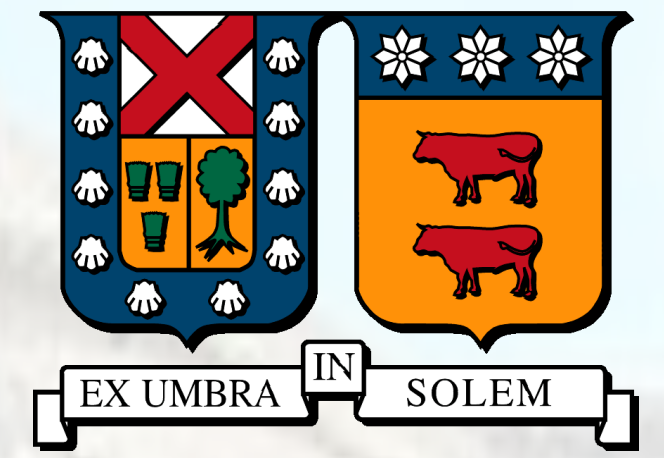


Pressure and Temperature Monitoring System for Off-Highway Truck Tires

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Introduction

Great Price of the Copper

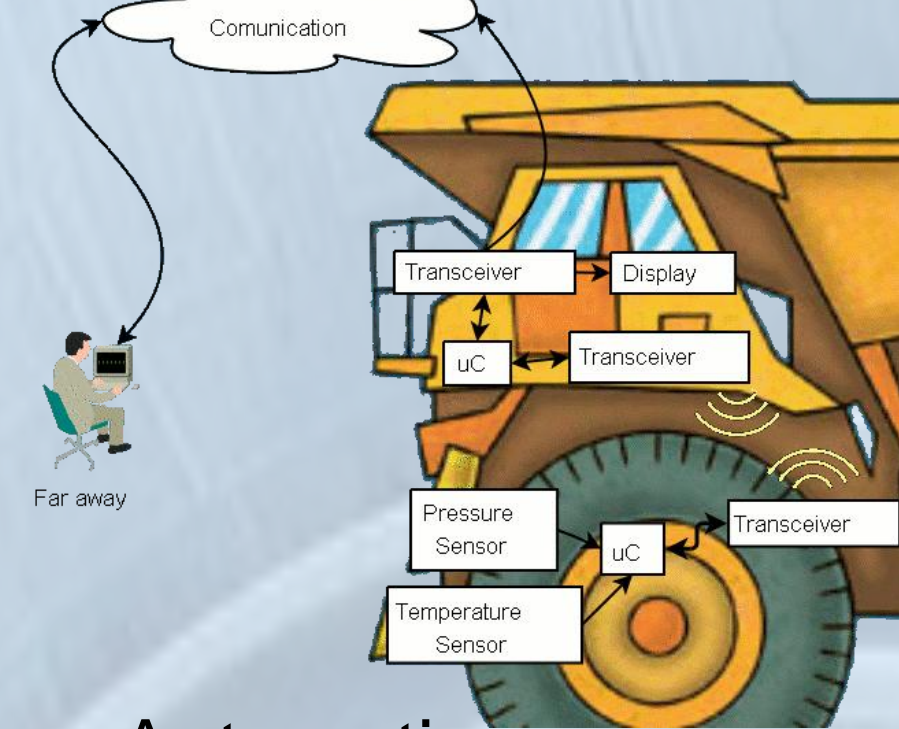
Tires = High Level Consumption Supply

At present



- Manually
- Wide margin of error
- Don't allow information online or remotely
- High cost

Proposed



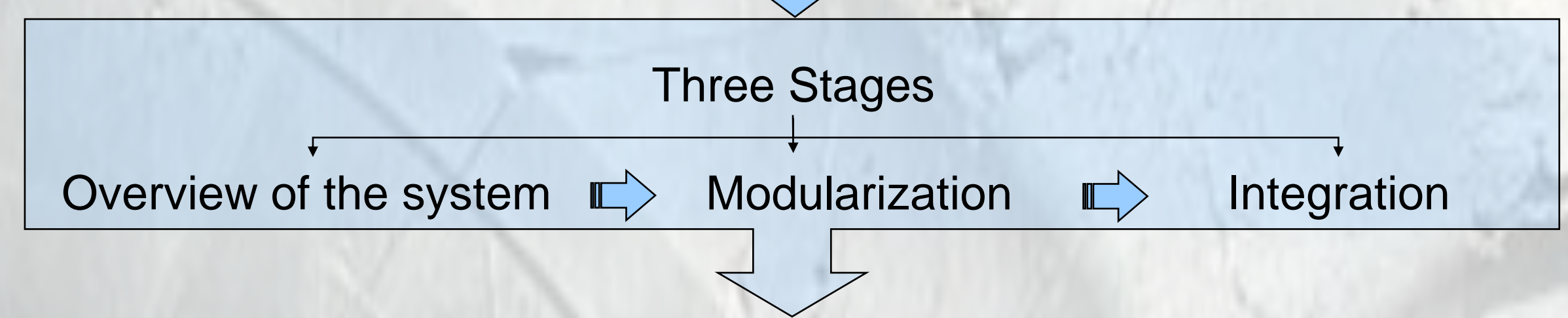
- Automatic
- Accurate
- Online and remote
- Efficient and economic
- Hardware + Software

Rise in Production Costs

Living a Mining "Boom"

Methodology

Solution as a System (Modularization)



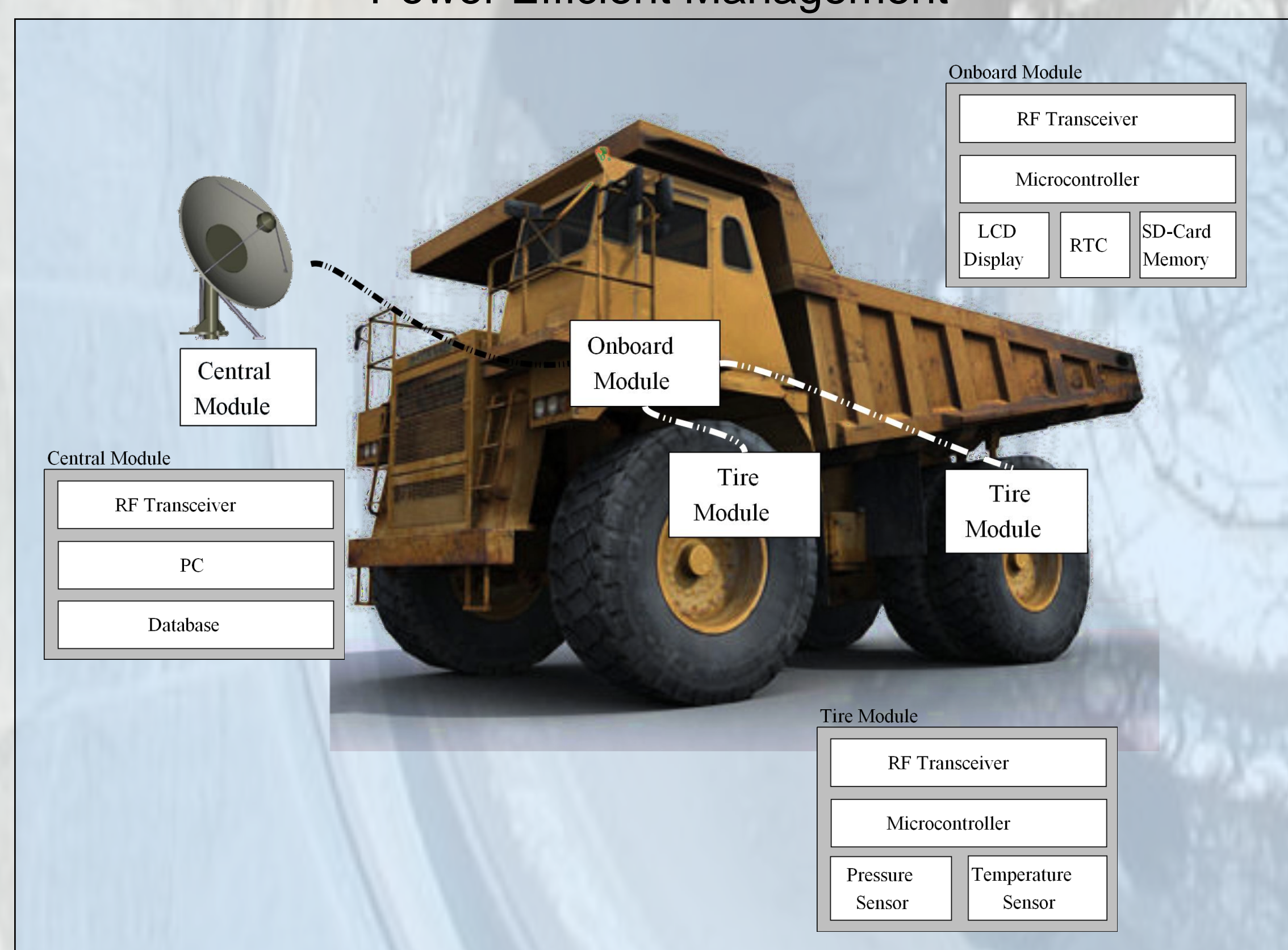
Functional Requirements:

- Measure the pressure in the tire.
- Measure the temperature in the tire.
- Have the measured information in the cab.
- Provide measured information to a central database far from the truck.
- Process the information and analyze the results automatically to accelerate and to optimize the tires management.
- Have statistical studies and comparative analysis of the tires performance under each interest factor like: manufacturer, pressure, temperature, terrain, altitude of the mine, and type of truck.
- Be capable to have training with experts, and then mix this experience with the measurements and others informations into an artificial intelligence system, like neural network and genetic algorithms, to make an *Expert System*.

Results and Discussion

Power Efficient Management

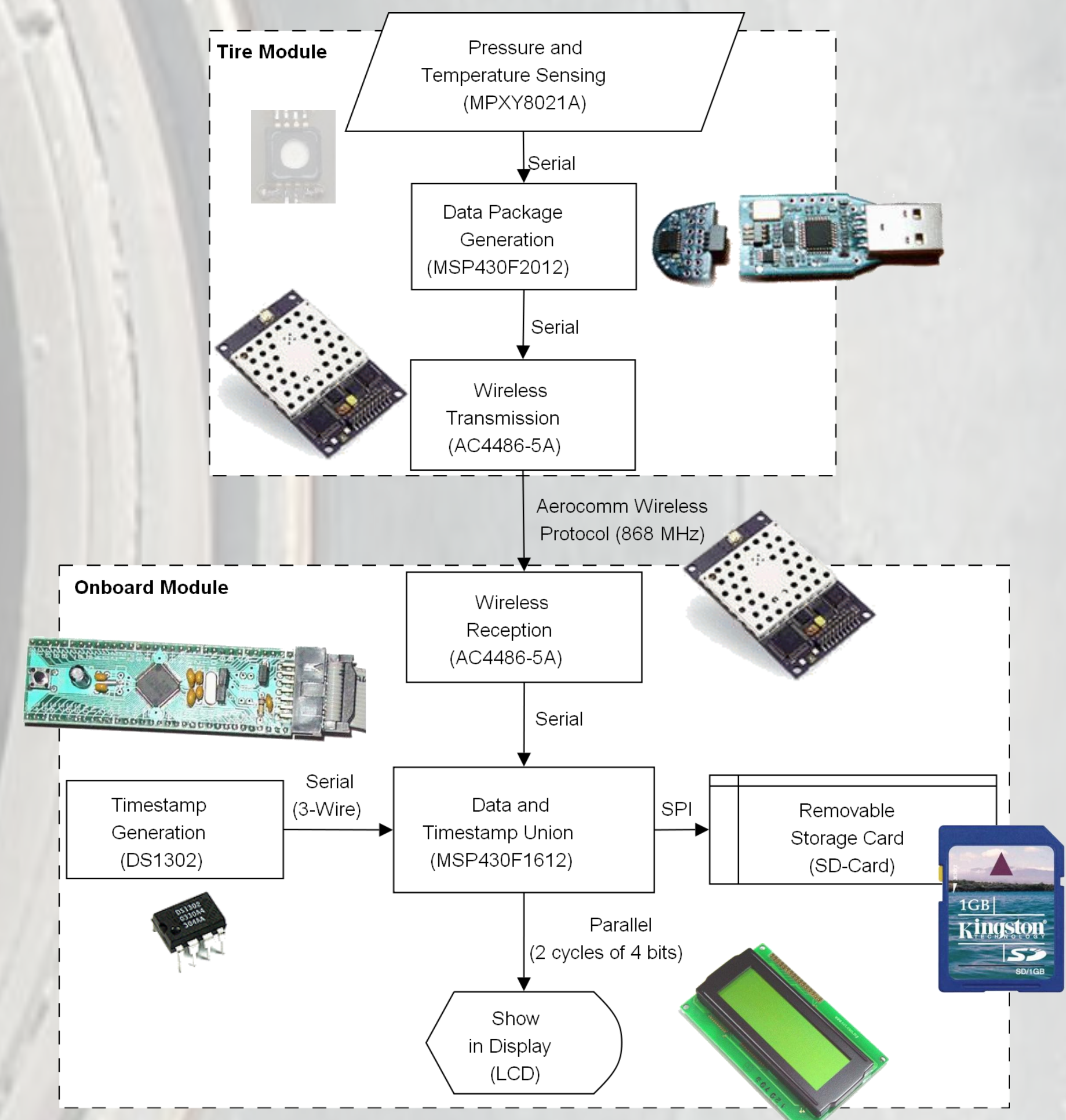
Global and Standard Wireless Communication Protocol



Accuracy of Measurements

Customizable and Programmable System

Data Flow Chart



Conclusions

The current method of monitoring tire of the Great Mining trucks is unfavourable for the optimization of resources; it does not allow the timely management of information, which prevents the reduction of costs. Existing solutions are not geared to the scale of the national mining, then, they do not work as an integral system, and then do not satisfied the necessity of manage the information remotely and with easy adaptation to the Great Mining conditions.

The solution proposed allows managing the tires remotely, in real time and with a low level inversion.

The system developed measures pressure and temperature of each tire and then sends this information to an onboard console, where the information is stored, and it can signal early warnings to the operator (driver) if any parameter has been exceeded. The information on the truck is sent wirelessly to a central unit, which analyzed the data, detecting patterns of failure, and ultimately managing remotely the tires.

References

- COCHILCO, Olivares G. y Valenzuela A., (2006). "Oportunidades de Negocios Para Proveedores de Bienes, Insumos y Servicios Mineros en Chile"
- Texas Instrument: <http://www.ti.com/>
- Aerocomm: <http://www.aerocomm.com/>
- Freescale: <http://www.freescale.com/>
- European Radiocommunications Office frequency information system: <http://www.efis.dk/>
- International Telecommunication Union (UTI) Radio Regulations: <http://www.itu.int/publ/R-REG-RR/e>

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