



# EURIPIDES FORUM in Graz June 13<sup>th</sup>-15<sup>th</sup>, 2012

# ENERPACK

Multi micro ENERgy source PACKaging

## Consortium

- 2 industrials: ERYMA (France) & ATERSA (Spain).
- 1 academic: A&M ParisTech (France).
- 2 laboratories: TECNALIA (Spain) & PIAP (Poland).

## Main objective

Packaging a new multi low-power energy source system with :

- High integration scale of multiple technologies :  
optic, silicon, mechanic, piezoelectricity, thermo engineering.
- Use of renewable energies :  
sun, wind, temperature, mechanical vibrations and pulses.
- Improvement of the global efficiency  
by closed association of the different micro sources.
- Electrical energy production :  
up to 20Wh per day.
- Wireless control.
- Substantive cost cuts in regard with the usual hardwired solutions.
- Low cost and free maintenance.



## Challenge

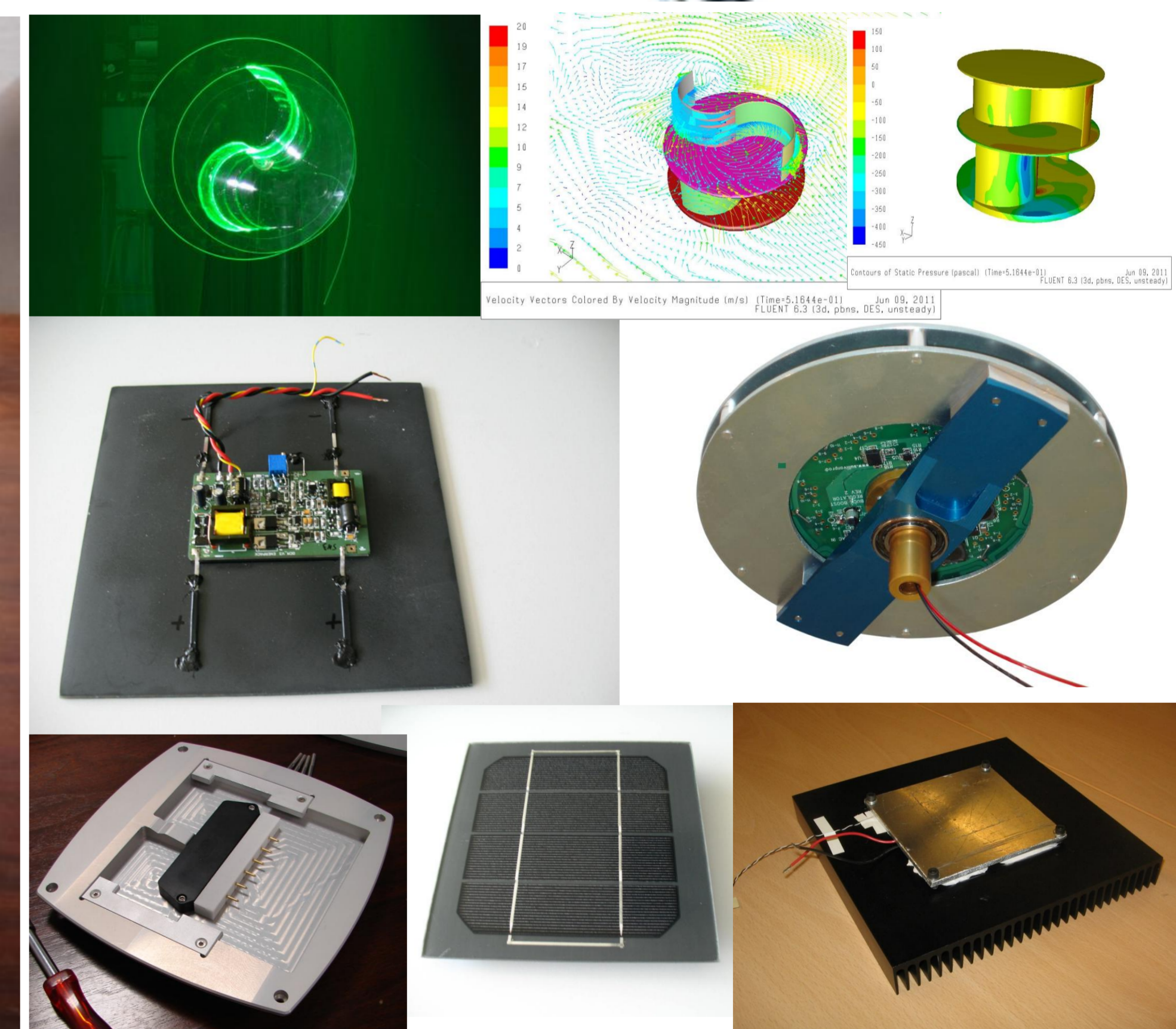
- Getting a smart and low cost package.
- Integration of all the necessary micro renewable energy transducers.
- Outdoor environmental constraint consideration.
- Regular energy production everywhere in the world.
- Multi function component and circuit interconnection.
- Embedded processing architecture.
- Research for efficient association of the micro sources.
- Research for efficient energy storage architecture.
- Use of low-power circuits and components.
- Use of CMOS technology.

## Solution and results

- Electronic core : low-power processor.
- Embedded software : Absolute Maximum Power Point Tracking algorithms.
- Complementary micro renewable energy sources : solar cells, thermopiles, micro kinetic generator, original wind turbine.
- Packaging: independent modules (1 per micro-source & 1 for the electronics) with lockable electrical interconnection.
- High density storage of energy : Li-Polymer battery.
- Standard wireless communication for sensor data and meteorological forecast data to and from a supervisor.
- Thermal integration and interconnection for increasing the temperature delta inside the package.

## Applications

- Environment monitoring: quality and toxicity surveillance of the air and water, seismic surveillance, flood sensors, great infrastructure surveillance (bridge, ...).
- Surveillance and protection of sensitive sites : nuclear plants, atomic research centers, energy distribution networks, water tanks, Seveso industrial factories, pipelines, borders, containers.
- Outdoor public area surveillance and control : crossroad, highway, airport, harbor, train station.
- Nomad smart device supplying (smart phones, laptops, play stations, GPS, ...).



Project started in December 2009 for 3 years

Contact : [dominique.jutel@eryma.com](mailto:dominique.jutel@eryma.com)

