



RESEARCH &  
INNOVATION  
for INDUSTRY

# The Carnot Institutes network:

34 research institutes  
innovating for industry



> **Scientific excellence to prepare tomorrow's innovations,**

> **Professionalism and a commitment to high quality research partnerships with start-ups, SMEs and large companies.**



## The strength of a multidisciplinary research network

→ **EUR 2.2bn**  
annual global budget

→ **27,000**  
research professionals including  
8,000 PhD students



→ **15%**  
of the French State's  
research staff

→ **55%**  
of all contract R&D  
between French public  
laboratories and industry

→ **7,500**  
contracts with more than  
2,000 companies every year



**In 2014**

- > **20,000** peer-reviewed articles
- > **65** new start-ups created
- > **1,050** priority patents

**Carnot: a prestigious French government certification** given to public research laboratories dedicated to fostering innovation with industry

► THE CARNOT LABEL is a prestigious certification issued since 2006 by the French government to French public research laboratories and institutes with proven, high level R&I competencies dedicated to fostering innovation with industrial partners.

The Carnot institutes are selected through a competitive call for applications. They form a structured network for increased efficiency and impact with Carnot Code of Ethics and Standards, including IP protection.

Today, 34 Carnot institutes conduct basic and applied research with industrial partners in many different subjects such as ICT, health and well-being, energy, transportation, environmental issues, materials, nutrition to generate innovative solutions to major economic and societal challenges.

## SOME SUCCESS STORIES

### → The TOAP Run therapeutic game

With an ageing population and a growing incidence of chronic diseases, society currently needs clinically validated solutions for physical rehabilitation and cognitive training of patients with neurological disorders (Parkinson's disease, Alzheimer's disease, stroke, brain injuries, etc.). In this context, the **ICM Carnot Institute and the GENIOUS Group**, an SME with 200 staff, created a joint laboratory, BRAIN e-NOVATION, the first serious gaming structure in France to have substantial experience in the health field, with solid clinical validation. This laboratory has produced TOAP Run, a serious game for people with walking and balance problems. The solutions developed will enable a reduction in health costs for the society. On the other hand, the technique's versatility allows it to be adapted to more than one pathology, in areas other than neurology.

### → RSV-NanoViaSkin, an innovative vaccine for infant bronchiolitis

Respiratory syncytial virus (RSV) is the main causative agent of bronchiolitis in infants and of pneumonia in calves. There is currently no vaccine for human use, and those for cattle are not very effective. The partnership between the **ICSA Carnot Institute and DBV Technologies** (the first French biotechnology company to be listed on the New York Stock Exchange in October 2014), which specialises in epicutaneous immunotherapy, has resulted in the development of a first pediatric vaccine for bronchiolitis, which is noninvasive and adjuvant-free, and most importantly, effective when administered cutaneously. A fine entry into the vaccine market.

### → ATIS, an artificial retina and biomimetic camera

The ATIS system, a product of research carried out at the **Voir et Entendre (Seeing and Hearing) Carnot Institute, and developed in partnership with Chronocam**—a start-up and spin-off company from the Vision Institute—works in a very similar way to a natural retina. Contrary to other systems, which work with images acquired by traditional cameras at regular intervals, its biomimetic camera uses a new asynchronous sensor, in which each detector is sensitive to variations in light and not its absolute intensity. The camera's temporal resolution and sensitivity, together with its asynchronous operating principle, give the developed prototype a clear competitive advantage over anything available on the market. Data processing actually requires very little computational power, and the camera can operate in highly variable environments and be used in many domains: health, imaging, cars, aircraft, telephones, meteorology, video games, etc.

[www.instituts-carnot.eu](http://www.instituts-carnot.eu)

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