

PROJECT

## MACAO

### Development of VOCs and ozone Micro-analysers based on microfluidic devices for Aircraft Cabin Air mOnitoring (MACAO)

**Funding:** European (Horizon 2020)

**Duration:** Feb 2016 - Jul 2019

**Status:** Complete

**Total project cost:** €436,250

**EU contribution:** €368,150



**Call for proposal:** H2020-CS2-CFP01-2014-01

[CORDIS RCN : 200128](#)

#### Objectives:

The origins of pollutants inside the aircraft cabin are various. Ozone comes from outside, particularly when the aircraft is flying at high altitudes near the stratospheric ozone layer. In addition to the materials emissions, carbonyl species can be also produced in the cabin by reaction of ozone with unsaturated VOCs.

Ozone and VOCs can cause acute respiratory problems, aggravate asthma and increase cardiopulmonary illnesses, with breathing discomfort, irritations and headaches after even short-term exposure.

None real-time instruments have been currently developed and specifically designed to meet the constraints in a aircraft, i.e. compactness, security, automatic pressure correction, the autonomy towards a large pure gas cylinder necessary for both its operating and its analytical procedure (blank).

The MACAO project aims at developing two analytical instruments to measure VOCs and ozone concentrations and based on microfluidic devices in order to address all the constraints mentioned above.

This project will be built on the experience gained in analytical development based on real-time monitoring (CNRS Strasbourg, IN'AIR SOLUTIONS), microfluidics (INSA Toulouse, CNRS Strasbourg) or in electronics and software development (TRONICO) by the partners. For instance, the micro-analyser of BTEX recently developed in Strasbourg will be updated to measure other VOCs such as ethanol or acetone.

The MACAO Project will be organised in 5 work Packages as follows:

WP1 : Project Management

WP2 : Specifications/state of the art/technological choices

WP3 : Development and validation of laboratory prototypes

WP4 : Development and validation of integrated demonstrators

WP5 : Communication & Dissemination

In addition, the start-up IN'AIR SOLUTIONS (Partner 4) being responsible for marketing the developed instruments may take advantage of technological advances in this project, for all indoor environments (aircrafts, housing, workplaces, industrial sites, public buildings, and so forth).

#### Parent Programmes:

[H2020-EU.3.4. - Horizon 2020: Smart, Green and Integrated Transport](#)

**Institute type:** Public institution

**Institute name:** European Commission

**Funding type:** Public (EU)

### **Lead Organisation:**

#### **Centre National De La Recherche Scientifique**

**Address:**

3 rue Michel-Ange  
75794 PARIS  
France

**Organisation Website:**

<http://www.cnrs.fr>

**EU Contribution:** €130,250

### **Partner Organisations:**

#### **Institut National Des Sciences Appliquées**

**Address:**

135 avenue de Ranguel  
31077 TOULOUSE  
France

**Organisation Website:**

<http://www.insa-toulouse.fr>

**EU Contribution:** €79,000

#### **In'air Solutions**

**Address:**

1 rue Blessig  
67000 Strasbourg  
France

**EU Contribution:** €14,875

#### **Electronique Industrielle De L'ouest - Tronico Sas**

**Address:**

Rue du bocage 26  
85660 Saint Philbert de Bouaine  
France

**Organisation Website:**

<http://www.tronico.com>

**EU Contribution:** €144,025

### **Technologies:**

Aircraft operations and safety  
Air quality measurements

**Development phase:** Research/Invention

**STRIA Roadmaps:** Vehicle design and manufacturing

**Transport mode:** Air transport

**Transport sectors:** Passenger transport

**Transport policies:** Safety/Security

**Geo-spatial type:** Other