

*Light, reliable and smart electrical actuator for control systems of turbine engines*

About the project

Objective

Documents

News and Events

Partners

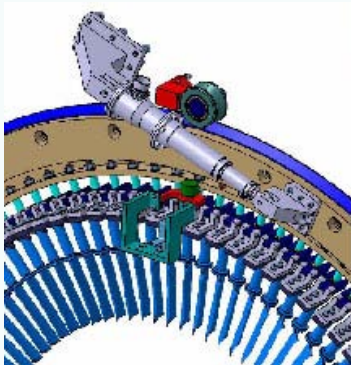
Contact

## About the project

The main topics that are being developed in this project are related to the temperature levels and environmental conditions (combustion gas, oxidation) that are the normal aero engine working conditions, and result to be highly demanding for any electromechanical system working under these conditions.

One of the major challenges in the aeronautic sector is to have electrical actuators that are light, reliable and easy to interface to a control unit, able to work under severe conditions (high temperatures mainly). In this respect, **Electro-Mechanical Actuators (EMA)** have several advantages above Electro-Hydraulic Actuators (EHA) like better efficiency or reduced maintainability improving significantly the management of operational interrupts.

So forth, the trend is to design **a more electrical aircraft**, and in consequence a more electrical engine for actuation and control. The energy from the engine is converted to electrical energy and distributed through a net to cover all the energy aircraft needs. EMA represents the next generation of actuation system for most of the commercial aircrafts and aero engines.



Details of the Variable Inlet Guide Vanes-VIGVs, developed by SENER ©  
The design and manufacturing of the mechanism and the electromechanical actuators was carried out in the OPENAER CENIT project.

This innovative concept of smart electrical actuators is based on a multi-disciplinary approach that considers mechanisms, control electronic, control software and power supply in an integrated way.



© 2013 Tecnalia, HP SMART EMA



*Light, reliable and smart electrical actuator for control systems of turbine engines*

About the project

Objective

Documents

News and Events

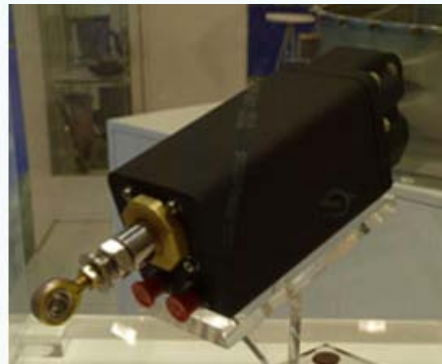
Partners

Contact

## Objective

The HP-SMART-EMA project is focused on developing and testing an innovative concept of **extremely light, reliable and smart electrical actuator for control systems of turbine engines**, capable of interfacing and connecting to the engine / turbine control unit in a plug-and-play manner.

The electrical actuator will be used to control in position the inlet flaps of a turboshaft engine for helicopter application, replacing the current hydraulic actuators.



© SENER Ingeniería y Sistemas S.A

Left: Micro-EMA detail of the mechatronic design. Right: Le Bourget (2009)



The partners of the HP-SMART-EMA project will develop an **innovative electrical actuator of high power density that will feature the following innovations:**

1. Development and design of an **electronic architecture** that will be able to work properly **in aero-engines and turbines** which means in severe temperature and vibration conditions. Electronic design shall be done considering the actuator as a flight critical actuation system
2. **EMAs** in engines for replacing current hydraulic systems.
3. **Optimised control interface** with current aero-engines control systems, and even with the aircraft flight control system.
4. A **Failure analysis** and safety assessment will be applied to **all stages** of the actuator development: design, manufacturing, assembly and testing.



*Light, reliable and smart electrical actuator for control systems of turbine engines*

[About the project](#)[Objective](#)[Documents](#)[News and Events](#)[Partners](#)[Contact](#)

## Documents

 [Biennial Spanish Machine Tool.pdf](#) [248.58K]

Biennial Spanish Machine Tool - Edition: 27 th (the 1st edition was held in 1961)

Dates: 28 May / June 2, 2012

Project poster presentation at TECNALIA stand

 [LE BOURGET AIR SHOW.pdf](#) [62.78K]

LE BOURGET AIR SHOW 2011 - HP SMART EMA prototype available



© 2013 Tecnalia, HP SMART EMA

*Light, reliable and smart electrical actuator for control systems of turbine engines*

[About the project](#)

[Objective](#)

[Documents](#)

[News and Events](#)

[Partners](#)

[Contact](#)

## News

### [HP SMART EMA - CDR](#)

25/05/2011

### [PDR in SENER in December 2010](#)

15/12/2010

### [Kick off of the HP Smart Ema project](#)

07/04/2010

## Events

### [Poster presentation at Biennial Spanish Machine Tool](#)

28/05/2012

### [LE BOURGET AIR SHOW - HP SMART EMA prototype available](#)

20/06/2011



© 2013 Tecnalia, HP SMART EMA

*Light, reliable and smart electrical actuator for control systems of turbine engines*

[About the project](#)

[Objective](#)

[Documents](#)

[News and Events](#)

[Partners](#)

[Contact](#)

## Partners



*Tecnalia Research & Innovation.*



*Engineering, consultancy and systems integration company.*



*Aeronautical subassembly.*



*Aeronautical Technologies Centre.*



© 2013 Tecnalia, HP SMART EMA

*Light, reliable and smart electrical actuator for control systems of turbine engines*

About the project

Objective

Documents

News and Events

Partners

Contact

## Contact

**Javier Viñals**

*Structures & Mechanisms / Division Bilbao*

[javier.vinals@sener.es](mailto:javier.vinals@sener.es)

Avenida Zugazarte 56

48930 Getxo - Vizcaya (Spain)

Phone.: +00 34 944 817 768

Fax: +00 34 944 817 632

[www.sener.es](http://www.sener.es)



© 2013 Tecnalia, HP SMART EMA