Work Plan

The work plan is organised around seven main subprojects (SP):

- SP1: Specifications for modular EMA
- SP2: Technology modules
- SP3: Method and tools
- SP4: Control and Monitoring
- SP5: Modules integration
- SP6: Validation
- SP7: Management, standardisation, dissemination and exploitation

SAFRAN Sagem Aileron EMA

Expected Results

- Standardised modules for multi platforms and multi systems
- EMA design processes supported by standard methods and tools
- Modular test bench for module and interoperability testing
- New mature EMA actuation technologies (TRL 5)
- Commonality and scalability in qualification process, enabling faster certification

Consortium

54 partners – 12 countries

GOODRICH ACTUATION SYSTEMS (FR)
ACQ INDUCOM (NL)
AIRBUS OPERATIONS GMBH (DE)
AIRBUS OPERATIONS LIMITED (UK)
AIRBUS OPERATIONS SAS (FR)
ARTTIC (FR)
BAE SYSTEMS (OPERATIONS) LTD (UK)
CENTRO ITALIANO RICERCHE AEROSPAZIALI SCPA (IT)
CENTRE D'ÉTUDES ET DE RECHERCHES POUR LES TECHNIQUES INDUSTRIELLES APPLIQUÉES SA (FR)
CISSOID S.A. (BE)
CLEMESSY SA (FR)
COMITÉ EUROPÉEN DE NORMALISATION (BE)
COMPAÑÍA ESPAÑOLA DE SISTEMAS AERONÁUTICOS (ES)
CROMPTON TECHNOLOGY GROUP (UK)
DEUTSCHES ZENTRUM FUER LUFT-UND RAUMFAHRT EV (DE)
AIRBUS DEFENCE AND SPACE GmbH (DE)
EURO HEAT PIPES SA (BE)
FOKKER LANDING GEAR BV (NL)
FUNDACIÓN TECNALIA RESEARCH & INNOVATION (ES)
FUNDACIÓN TEKNIKER (ES)
GOODRICH ACTUATION SYSTEMS (UK)
GOODRICH CONTROL SYSTEMS PRIVATE UNLIMITED COMPANY (UK)
HARMONIC DRIVE AG (DE)
HISPANO-SUIZA SA (FR)
HOTTINGER BALDWIN MESSTECHNIK GMBH (DE)
INSTITUT NATIONAL DES SCIENCES APPLIQUÉES DE TOULOUSE INSAT (FR)
LIEBHERR-AEROSPACE LINDENBERG GMBH (DE)
MAGYAR TUDOMANYOS AKADEMIA SZAMITASTECHNIKAI ES AUTOMATIZALASIKUTATOINTEZET (HU)
MEGGITT (SENSOREX) SAS (FR)
MESSIER-BUGATTI-DOWTY SA (FR)
MESSIER-DOWTY LIMITED (UK)
MICROSEMI POWER MODULE PRODUCTS (FR)
PIHER SENSORS & CONTROLS SA (ES)
OFFICE NATIONAL D'ÉTUDES ET DE RECHERCHES AÉROSPATIALES (FR)
PARAGON ANONYMH ETAIREIA MELETON EREVNAS KAI EMPORIOU PROIGMENHS TEXNOLOGIAS (GR)
PIAGGIO AERO INDUSTRIES SPA (IT)
POLITECNICO DI TORINO (IT)
RATIER FIGEAC (FR)
ROLLVIS SA (CH)
SAAB AKTIEBOLAG (SE)
SAGEM DÉFENSE SECURITÉ (FR)
SAGENTIA LIMITED (UK)
SENER INGENIERÍA Y SISTEMAS S.A (ES)
SKF AEROSPACE FRANCE (FR)
STICHTING NATIONAAL LUCHT-EN RUIMTEVAART LABORATORIUM (NL)
TECHNISCHE UNIVERSITAET HAMBURG-HARBURG (DE)
TECHNISCHE UNIVERSITAET MUENCHEN (DE)
THALES AVIONICS ELECTRICAL MOTORS SAS (FR)
THE UNIVERSITY OF NOTTINGHAM (UK)
UMBRA CUSCINETTI SPA (IT)
UNIS AS (CZ)
UNIVERSITY OF NEWCASTLE UPON TYNE (UK)
ALENIA SIA SPA (IT)
LABINAL POWER SYSTEMS (FR)

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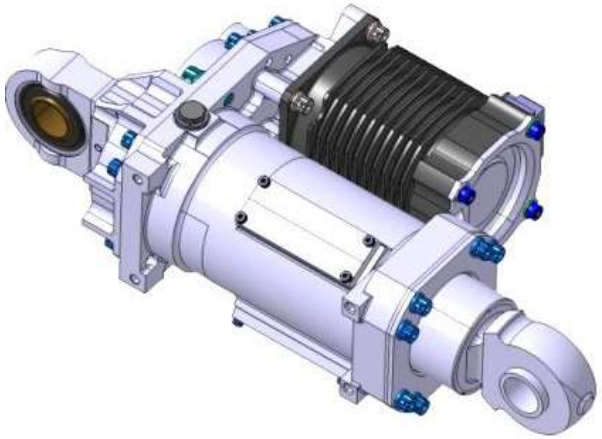
ACTUATION 2015

Modular Electro Mechanical Actuators for ACARE 2020 Aircrafts and Helicopters



UTC Aerospace Systems

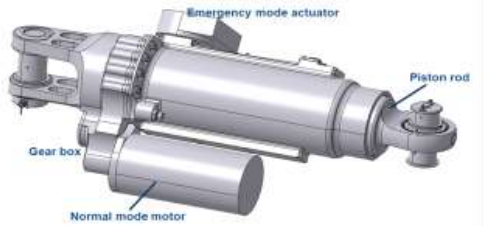
Aileron EMA

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement Nº284915.

Objectives

From More to Full Electrical Aircraft

The All-Electric Aircraft is a major target for the next generation of aircraft in order to lower consumption of non-propulsive power and thus fuel burn. To eliminate hydraulic circuits, pumps and reservoirs, Electro Mechanical Actuators (EMA) are mandatory but now need to meet cost, reliability and weight requirements from the airframers.



SAFRAN Messier-Bugatti-Dowty Jam Tolerant E/R Landing Gear EMA

ACTUATION2015 Approach

To overcome these last barriers ACTUATION 2015 partners are currently **developing** low cost electrical actuator modular technology. The modules will be **integrated** on demonstrators for **validation**.

The technical approach has been to gather detailed requirements for a complete range of aircrafts actuators and power needs. Then, a set of standard modules has been specified. **Prototypes will be manufactured** for assessment at component and actuator level via test rigs and virtual validation. In parallel, an integrated EMA design process supported by standard methods and tools has been developed.

UTC Aerospace Systems
E/R Landing Gear EMA

Actuation 2015

Considered Applications

- Primary Flight Control (PFC)
- High Lift Systems (HLS)
- Trimmable Horizontal Stabilizer (THS)
- Landing Gear System (LGS)
- Braking system (BS)
- Cargo Doors (CD)
- Thrust Reversers (TR)

UTC Aerospace Systems
Aileron EMA

Standard Modules

The level of breakdown of sub-assemblies and the definition of associated modules will be the major output of the project.

Three assemblies are targeted, each one composed of sub-modules to be developed as Shop Replaceable Units:

- **Motors**: simplex and redundant electrical motors
- **Power Drive Electronics**: Power Core Module (PCM), Control and Monitoring Module, casing and thermal management standard concepts
- **Mechanics**: screw, reducer, gear box, torque limiter, anti-rotation and lubrication standard concepts

The pre-standardization of the most relevant modules has started with the European Committee for Standardization in Brussels. It is a 12-month process open to any organizations, either partner of ACTUATION2015 or not.

Registration is free at https://www.cen.eu/news/workshops/Pages/WS-2014-012.aspx

SAFRAN Messier-Bugatti-Dowty Steering EMA