

Executive Summary

The Technology Watch report "**ACTUATORS FOR THE AERONAUTICAL SECTOR**" was made by the 'Círculo de Innovación en Materiales, Tecnología Aeroespacial y Nanotecnología' (CIMTAN) at the request of the 'Asociación Española de Constructores de Material Aeroespacial' (ATECMA). In order to draw up this report personnel of CIMTAN received assessment and collaboration from the companies SENER and CESA (belonging to ATECMA), as well as from several researchers of the 'Instituto Nacional de Técnica Aeroespacial' (INTA) and other institutions which have contributed their commentaries and revised the texts and conclusions.

The object of the report is to reflect the current situation and future tendencies of actuators in the aeronautical sector, thus providing an answer to the preoccupations concerning this theme shown by the representatives of the companies interested in the subject.

It consists of two complimentary parts: the report on paper, of 67 pages, and the CD enclosed which contains all the documentation compiled on actuators in the aeronautical sector, and which allows the inquirer to move around the information easily thanks to the links generated between the report and the documentation..

The information shown in the report proceeds from the results found in specialised databases following specific search strategies tailored to the theme that is the object of the study. Broadly speaking, the content has been organised in the following way: in the first place concepts found are classified and developed, then the results were analysed according to different criteria (by content, year, country, etc), and lastly, a short summary and some conclusions were added..

The aeronautical sector is currently immersed in an evolution of the different systems of aircraft towards electric systems, and even towards the integration of all of them in a single electric system thus giving rise to an all electric aircraft. The traditional actuator system of aircraft is a hydraulic system, with actuators of the same type. Substituting the aforementioned hydraulic system for an electric one involves the search for new electric actuators. This report presents the current panorama in electric actuator Technologies, referring both to those who, though they are very new, are already being used in commercial aircraft, and those which are still in the in research phase. Examples such as electromechanical actuators, electro-hydraulic, piezoelectric, polymeric and shape memory actuators, etc. it also analyses other non-electric technologies which could be used in some cases, such as thermal actuators.

Apart from the use of electric actuators for the traditional movements made in aircraft (flight control surfaces, etc.), other new aeronautical functionalities are analysed which required the presence of actuators, such as flow control, intelligent structures and morphing.