

Pre-project Acronym	NU-GEAR
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Pre-project Administrative Overview				
AEROPORTAL Servicing Partner	CIAO TECH	email : p.salvatore@ciaotech.it		
Thematic priorities	Research for SME			
Type of Action	Research for SMEs			
Pre-project Full Name	Development of a Autopilot System to Be Used in Ultralight Aircrafts			
Pre-project abstract				
<u>Strategic objectives addressed</u>				
<p>The market for ultralight aircrafts is a significant portion of the aeronautic market, with an amount close to the 20% of the whole civil air force. This market developed so much that ultralights production almost triplicated in the last four years. Statistics show that about the 15% of ultralights accidents are related to instrumentation problems, in general caused by inefficiencies of the servo-mechanism that controls the flaps movements. Improving the accuracy of such a system is therefore a primary objective of the ultralight vehicle manufacturers. Today the market of servo-systems is dominated by overseas manufactures, mainly from the United States.</p>				
<u>Strategic expected achievements</u>				
<p>The positive economic impact will also reflect on the regions of the partners as they are strongly involved in manufacturing and aeronautics. They may also benefit of the additional market generated by the increased competition of the aircraft producers and the consequent benefits in terms of employment and quality of life.</p>				
<u>Proposal abstract</u>				
<p>The objective of SERVO-GEAR is the development of a totally innovative autopilot system to be used in ultralight aircrafts. The small electric motors used as power sources in actuators for autopilot systems have high rotational speeds and low torque ratings. Their typical speed is between 6 and 10.000 rpm, too fast to be applied to flaps. Therefore it is necessary to use a gear reduction system that reduces the motor speed and increases its torque to the level required. The main innovation introduced in the project is the gearbox, that will be based on the NUGEAR technology, a patented gearbox system which exhibits very high compactness, precision and robustness compared to existing systems.</p> <p>Introducing the Nugear system the kinematic error of the autopilot transmission can be reduced from the current 1-3° to 0.01°. The small error and the high torsional stiffness of the NUGEAR imply great advantages in terms of stability and a strong improvement in terms of manoeuvres precision, thus increasing flight safety and comfort.</p>				
Project duration (in Months)	24	Total Eligible Cost (in Euro)	~ 1,5M€	EC Contribution requested (in Euro) ~



European Commission DG Research Project dedicated to SMEs Support Aeronautics and Space

Targets and needs of the pre-project:

There is a growing worldwide demand for both manned and unmanned ultralight aircrafts. The main use of manned ultralights is for leisure and sports. However the fast growth of the sector and the increased performances of the aircrafts are contributing to widen the scope of commercial applications that make use of ultralights as a mean to carry payloads. In this case the main demand from the market as well as from aviation authorities is to increase the flight safety.

Unmanned ultralights are used for a variety of applications including environmental monitoring, security and scientific applications. In all these cases the stability of the platform is becoming a very stringent requirement as it affects the quality of the data collected by the aircraft.

Suppliers are requested to provide safer and more reliable stability control systems to comply with the increasingly stringent performance requirements. In particular there is a request for more accurate positioning of the flaps, increased system reliability, and smaller weight and volume. These targets can be achieved using a totally innovative concept of actuator which substitutes the presently produced systems characterized by long transmission chains (including up to 10 gears).

The objective of the SERVO-GEAR project is the development of the manufacturing process for a totally innovative autopilot system be used in ultralight aircrafts. The main innovation of the autopilot system is the actuator, that will be based on the NUGEAR technology, a patented gearbox system which exhibits higher compactness, precision and robustness compared to existing systems.

The partners' complementary knowledge and competencies to research on these new technologies are expected from:

- Producers of Ultralight aircraft
- Expert in servo-systems
- Gearbox producers
- Electronic expertise

Partnership size: SME

Budget objective: 1,5 Million Euro

Duration: 24

Proposal submission: European co-funded scheme

FOR INFORMATION, PLEASE CONTACT THE AEROPORTAL SERVICING PARTNER

AeroSME and SCRATCH have merged in AeroPortal Project