



## > EXPECTED RESULTS

### a) TIMELINE & MAIN MILESTONES

In the WP1 CTEC performed a technical, contractual and financial administration of the project and guaranteed the objectives and deadline complying.

In the WP2 relative to the Design concept & architecture, UJF-G2ELAB analysed electronic architectures (several being identified in the proposal) and technologies (MOSFET vs IGBT) and presented the results in form of trade-off, allowing the GRC Consortium to select the one to develop. Mock up were developed to establish the main characteristics.

In the WP3 concerning the Detailed design & manufacturing, CTEC performed the PPSM detailed design. One PPS prototype was manufactured and tested.

### b) MATURITY OF WORKS PERFORMED

Successively, the works were performed to:

-Analyse the detailed specification of the actuation system and to elaborate a design concept and the architecture of the PPS in association with several preliminary designs. In this phase, the order of priority for the PPSM study was:

- weight and volume reduction
- cost (manufacturing and maintenance)
- efficiency

Based on the state of the art issued from the past works and the background of UJF-G2ELAB and CTEC in the field of power electronic and piezoelectricity, the most promising technologies were investigated in the field of the power amplifier for piezoelectric actuators. These works were composed of an analysis of the technical specifications to focus the work on the key points. From the works on the design concept, a preliminary performance evaluation of the PPSM was performed. Basic demonstrators were made by G2ELAB to back up the results of the preliminary performance evaluation.

- Perform the detailed design of the PPS starting from the detailed specification selected with the Cleansky GRC consortium and with the works provided from the previous tasks. First engineering iteration was performed to validate the core functions and auxiliary functions. Breadboards of the core of the DC/DC converter and the core of the amplifier were done by G2ELAB. CTEC manufactured the breadboards that interface with those two cores to obtain the first complete breadboard (non deliverable).

Modelling tasks of the electronics were performed. Those models were used to simulate and verify the expected functionality of the main functions of the PPS module. Only the core functions was modelled and simulated, the rest of the functions was verified by design, but not modelled nor simulated. This means that presently there is no complete electronic model of the PPS module available.

Finally a demonstrator of the PPS was issued to validate the power cores and a prototype was manufactured to test the electrical functionalities.

In terms of exploitable results at this stage, the know how in high power Switching Amplifier developed in PPSMPAB project has been beneficial for simpler Switching Amplifiers for piezoelectric actuators from Cedrat Technologies: Its SA75D is the highest power electronic for piezo available on the market. It generates up to 30A in the -20 +150V range, so 2.5kVA. It is simpler than the PPS because it is one level topology, but as the PPS it offers energy recovery. Dedicated oem versions for air & space applications in development will exploit even more the PPSMPAB results. This will allow for example to cover needs not only on active flaps but also in synthetic jets and pulsed jets.



<b>Acronym :</b>	<b>PPSMPAB</b>
<b>Name of proposal:</b>	<b>Piezo Power Supply Module for Piezo Actuator Bench</b>
<b>Technical domain:</b>	<b>Mechanical Actuators</b>
<b>Involved ITD</b>	<b>Green Rotorcraft Innovative blade devices</b>
<b>Grant Agreement:</b>	<b>271872</b>
<b>Instrument:</b>	<b>Clean Sky</b>
<b>Total Cost:</b>	<b>427 350 €</b>
<b>Clean Sky contribution:</b>	<b>320 512.50 €</b>
<b>Call:</b>	<b>JTI-CS-2010-03</b>
<b>Starting date:</b>	<b>01.05.2011</b>
<b>Ending date:</b>	<b>30 avril 2014</b>
<b>Duration:</b>	<b>36 months</b>
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