DAGA_MECH_FA_01 Microhybrid Rocket

Requeriments:

DAGA_01 Experimental Micro Hybrid Rocket Longitude - 720 mm; diam. 25/33 mm (nosecone); rocket dead mass – 350 gr; motor average thrust – 12 N; motor average total impulse - 17 N*s; motor thrust time – 1.35 s; parachute system delay – 3 sec; Peak altitude - about 100 m.

The airframe of DAGA_01 experimental microhybrid rocket was fabricated from advanced composite materials. The 1 inch diameter fuselage constructed of the 3 carbon/kevlar segments connected by means the PVC bulkhead (between the motor bay and electronics bay) and the duraluminum alloy pyrotechnical device as bulkhead (between the electronics bay and parachute bay). The 3 delta form fins is made of G11 laminated fiberglass. The fins to be bonded to the fuselage using "hot glue". The nosecone is of paper/epoxy laminate construction, and has ellipticall profile with a cylintrical transition region where it interfaces with the fuselage. The fuselage tubes were manufactured by own INVAP S.E. Composite technique Machine shop.

Rocket's project: Amateurs Experimental Rocketry Group, Bariloche, Argentina

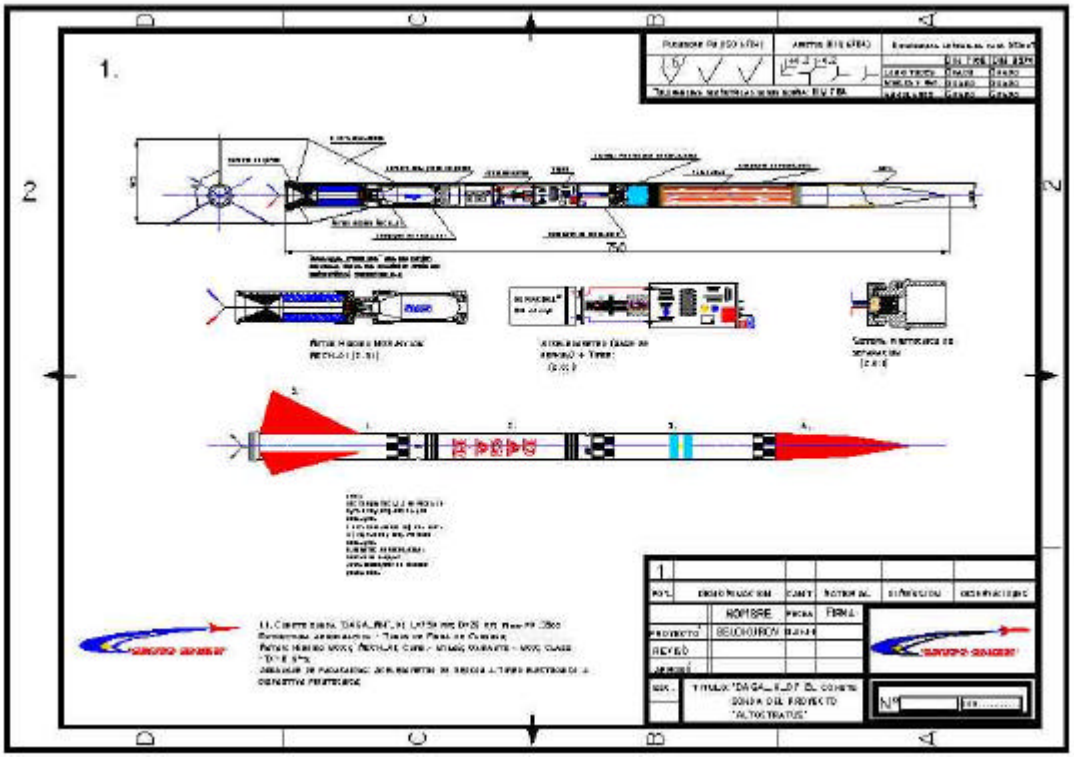

Fig.1 DAGA microhybrid rocket drawing

Photo 1. DAGA_MECH_FA_01 Microhybrid rocket on the launch pad.

Photo 2. DAGA_MECH_FA_01 Microhybrid Rocket. The rocket's parts and armed rocket presentation. Bottle (little) of Chandon Champagne is seated for scale.

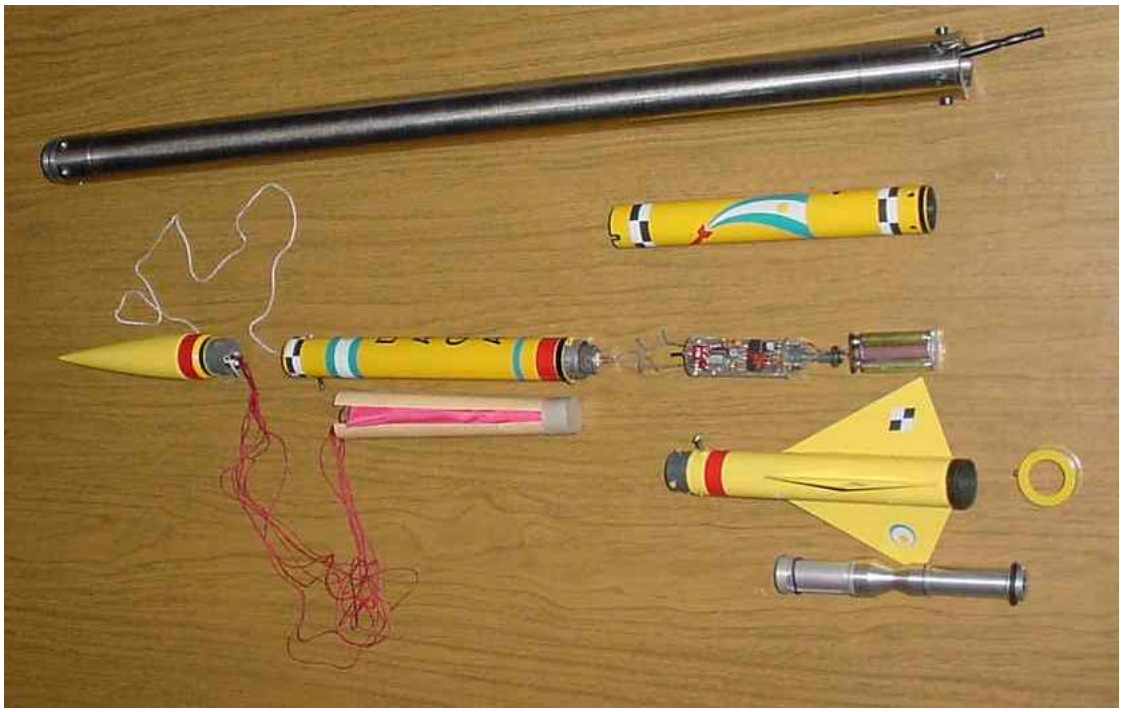

Photo 3. DAGA_MECH_FA_01 Microhybrid Rocket. After flight test 16.02.05. 38 mm - Monocock hybrid Urbansky-Colburn motor is for scale.

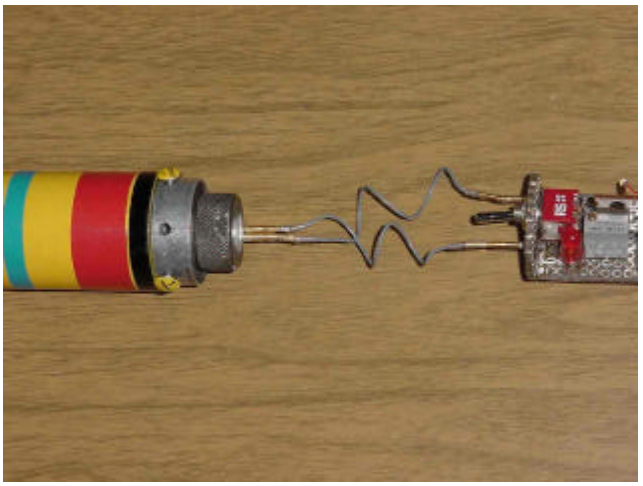

Photo 4. DAGA_MECH_FA_01 Microhybrid Rocket. The Parachute system pyrotechnical device connected to timer.

MECH_FA_01 Microhybrid Motor Requeriments:

Longitude - 140 mm; Diameter 23/19 mm (Capsula/Chamber), motor mass – 74 gr; motor average thrust $F_{avg.}$ – 12 N; motor total impulse I_t - 17 N*s; motor average thrust time – 1.4 s; motor average specific impulse Is – 210 s. Mechanical structure made of aluminum alloy. Mechanical frame mass (without capsula and polimer grain) M_m = 49 gr. Mass of N_2O – 8 gr. Grain mass (nylon grilon poliamida 6) – 4.5 gr. Oxidizer/Fuel – 7:1. Designed by Nicolas and Alexander Belokurov, Amateurs Experimental Rocketry Group (Grupo COHEX), Bariloche, Argentina.

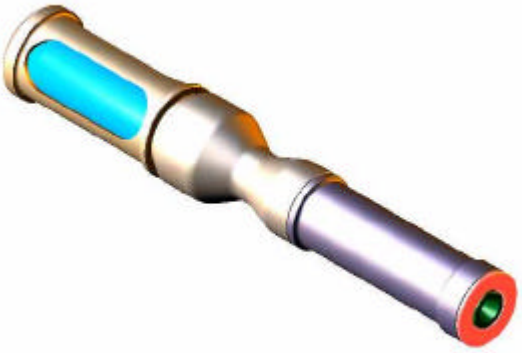

Fig.2. MECH_FA_01 3D (Solid Works) design

Photo 5. MECH_FA_01 Microhybrid motor.

Photo 6. MECH_FA_01 Microhybrid motor. The motor is presented together with 38 mm Hybrid motor for scalling.

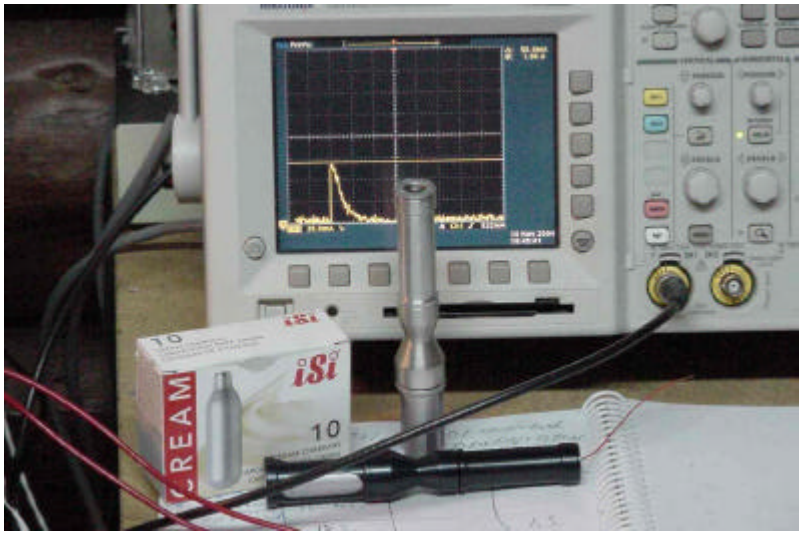

Photo 7. MECH_FA_01 Microhybrid motor. The motor is presented after the routine static -test.

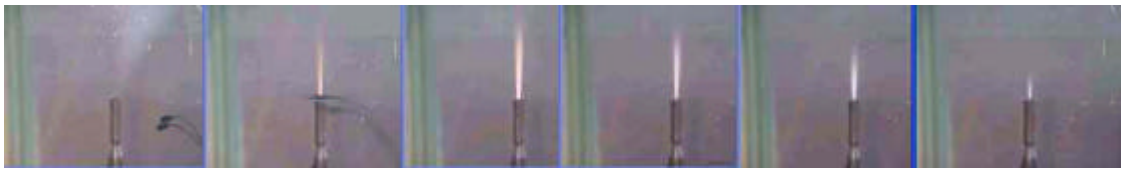

Photo 8. MECH_FA_01 Routine static test videogramme.

Photo 8. MECH_FA_01 Microhybrid motor: the photo depicts of the “mach diamonds” in the exhaust plume.

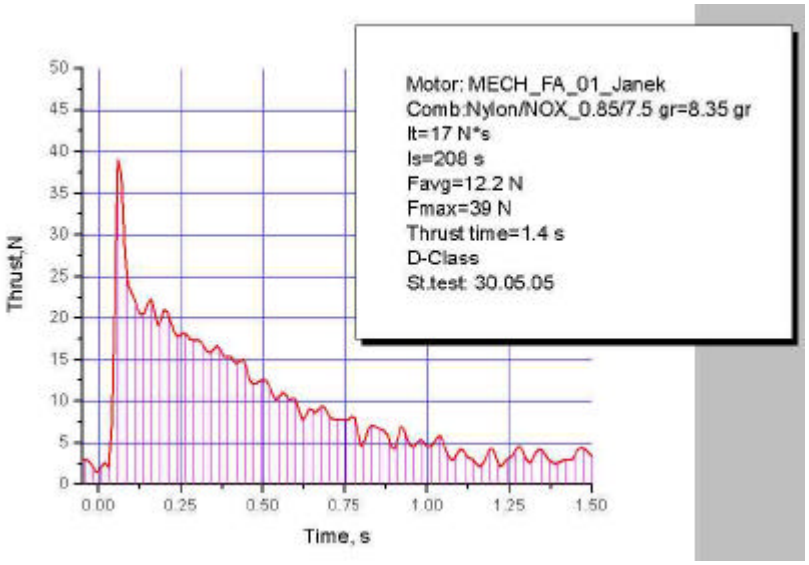

Fig. 3. The ordinary thrust curve of MECH_FA_01 microhybrid motor. The motor performance has calculated from thrust curve integral, combusted fuel mass and time of thrust.

Photo 9. For comparison: the engineering model of a microhybrid motor.

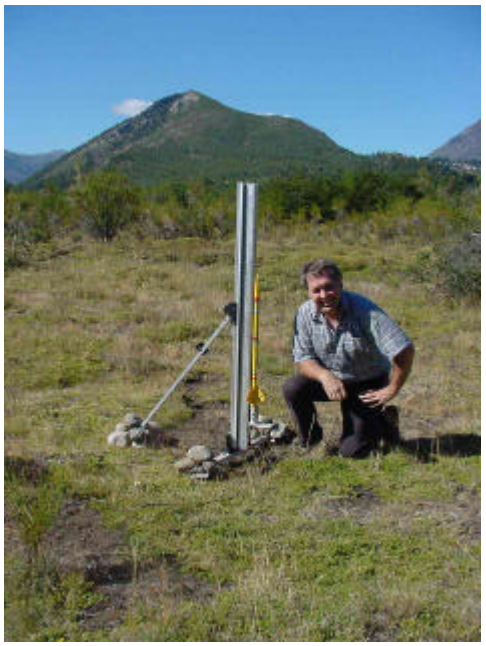

Photo 10. DAGA_MECH_FA_01 Microhybrid Rocket before launch.

Photo 11. DAGA_MECH_FA_01 Microhybrid Rocket in flight.

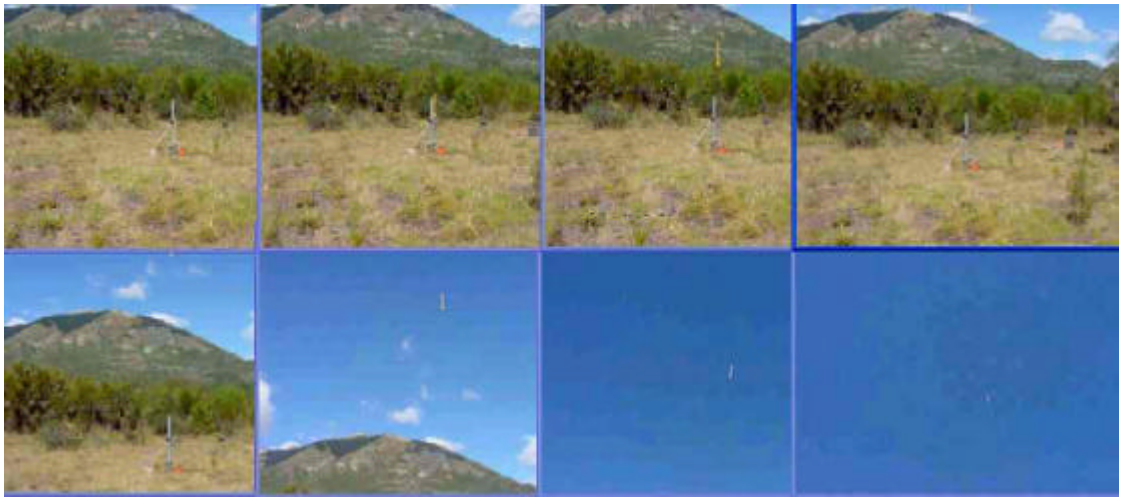

Photo 12. DAGA_MECH_FA_01 Microhybrid Rocket in flight.
Videogramme integrated from screen shots of the flight test video (16.02.05)