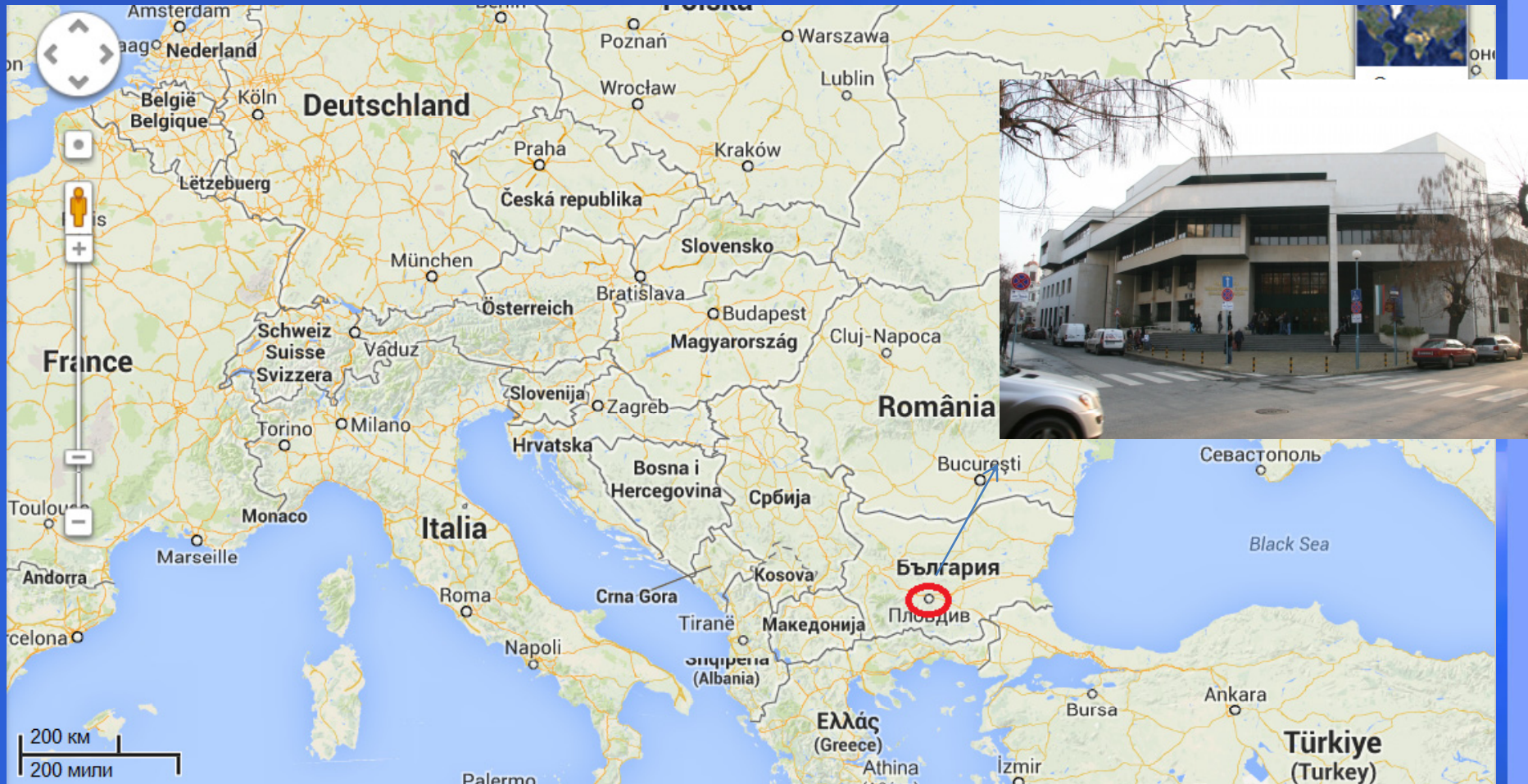


# UAV Research and Development in Technical University - Sofia

<http://ewade2013.AircraftDesign.org>  
<http://dx.doi.org/10.5281/zenodo.546431>

**Dimo Zafirov, Hristian Panayotov**  
11<sup>th</sup> EWADE, 2013  
Linköping

# Location





# Plovdiv, Bulgaria

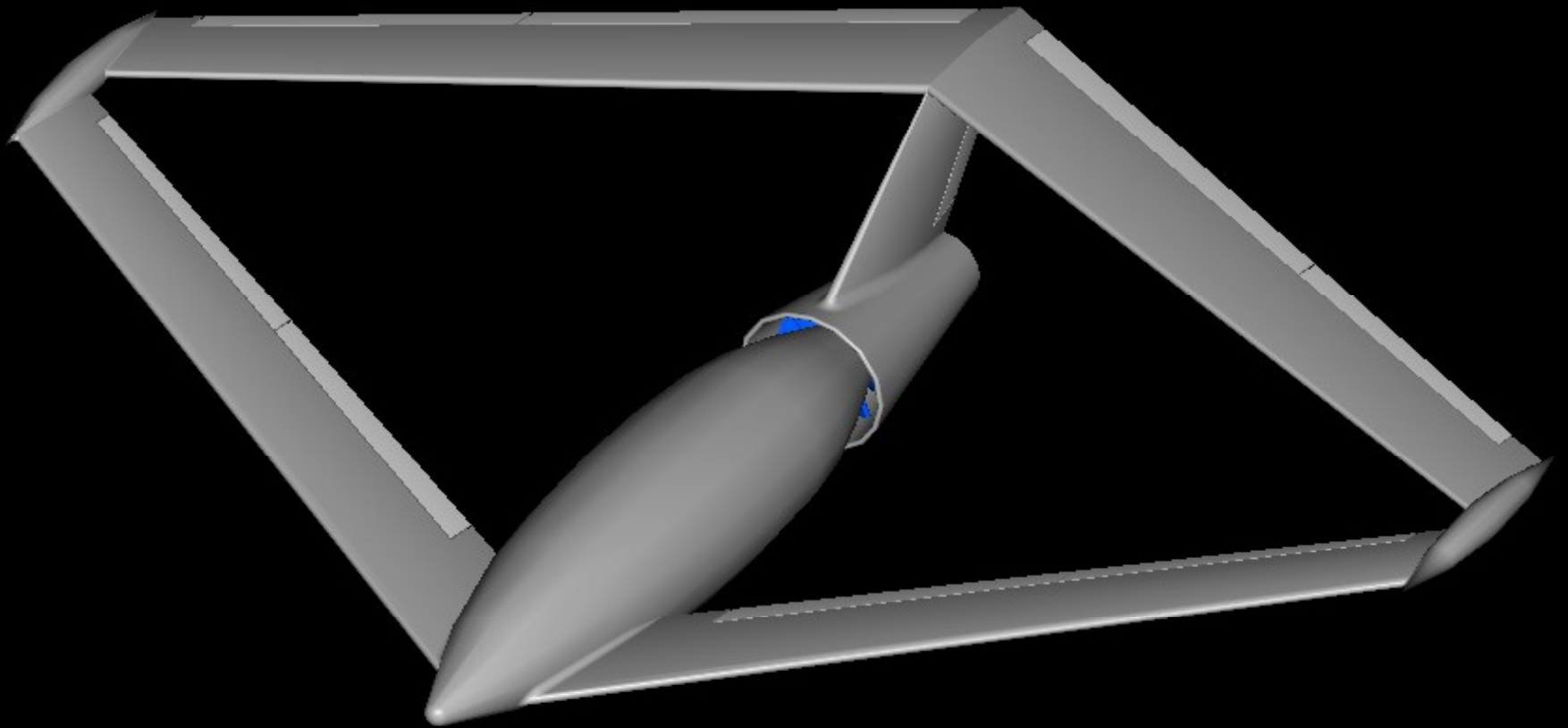


# UAV Activities in TU-Sofia Branch Plovdiv

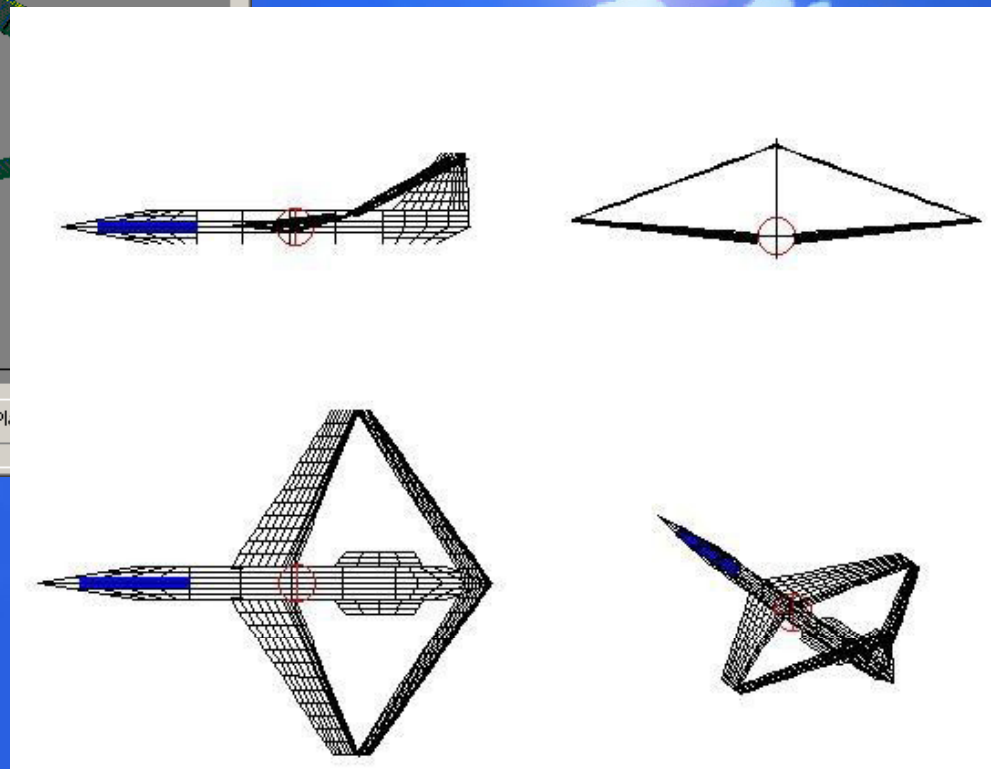
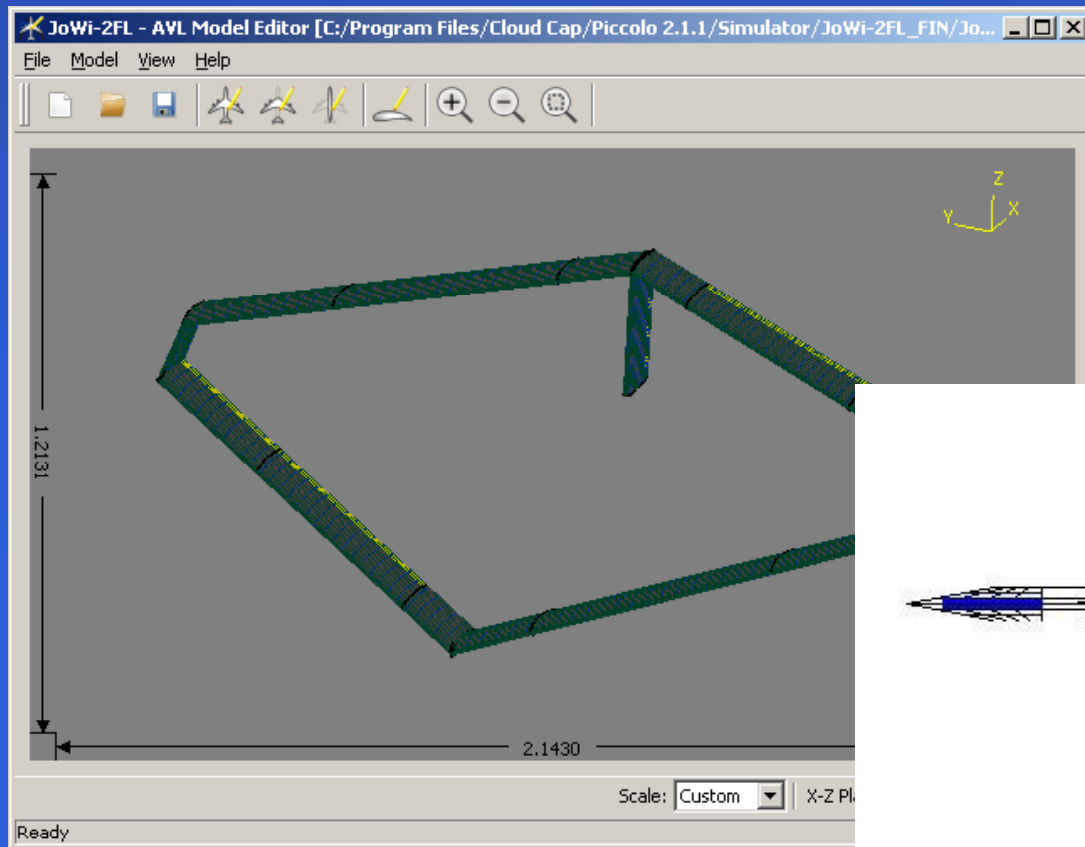
- Joined wing investigations;
  - UAVs;
  - Ducted fans;
  - Autonomous flights;
  - Vertical takeoff and landing aircraft.
- 



# Joined Wing

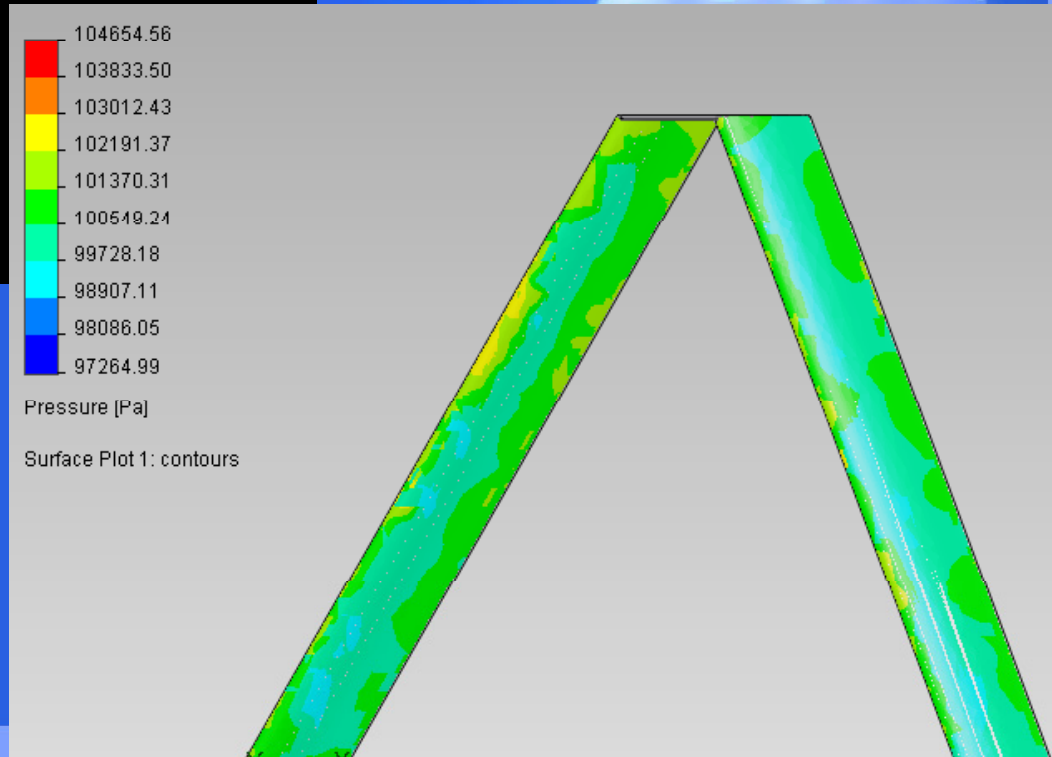
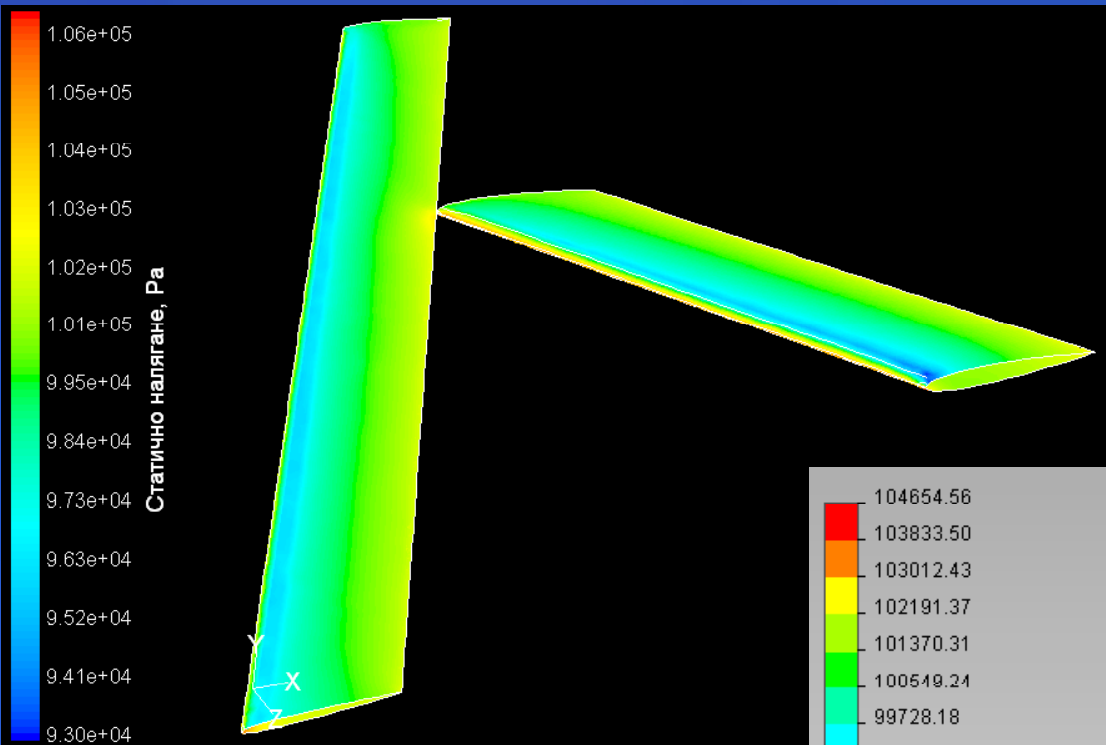


# Aerodynamics. AVL & Tornado

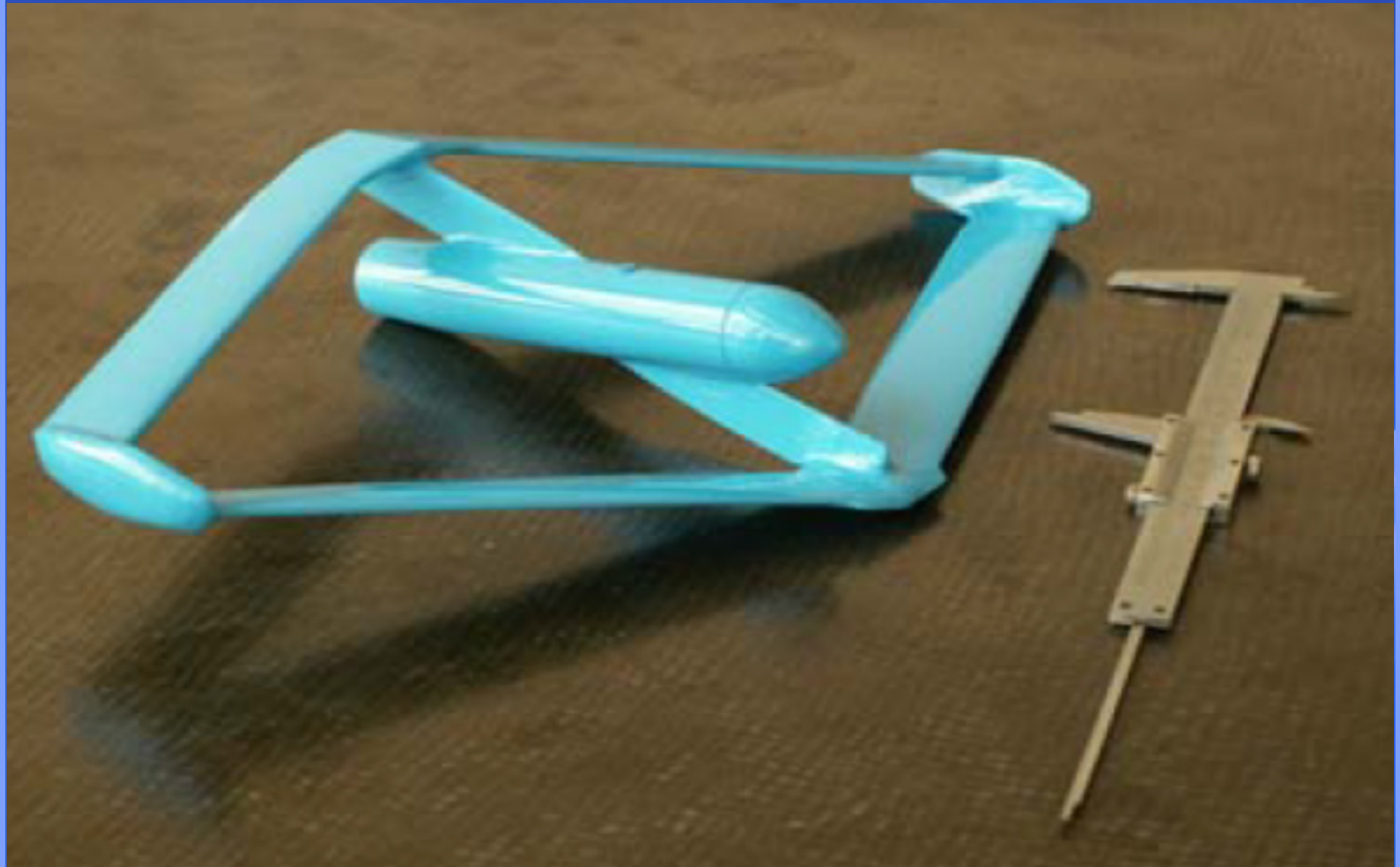




# Aerodynamics. CFD



# Tests in a wind tunnel

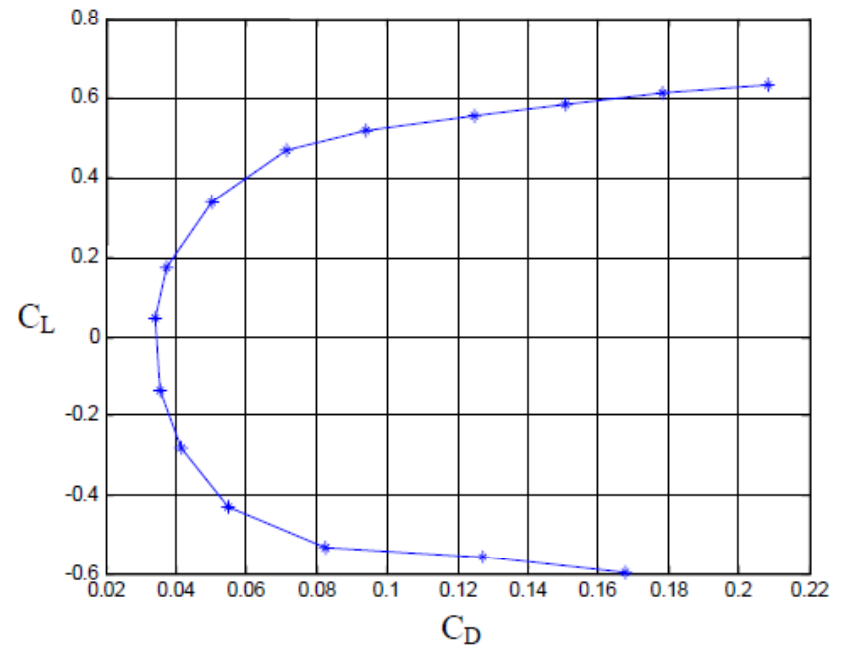
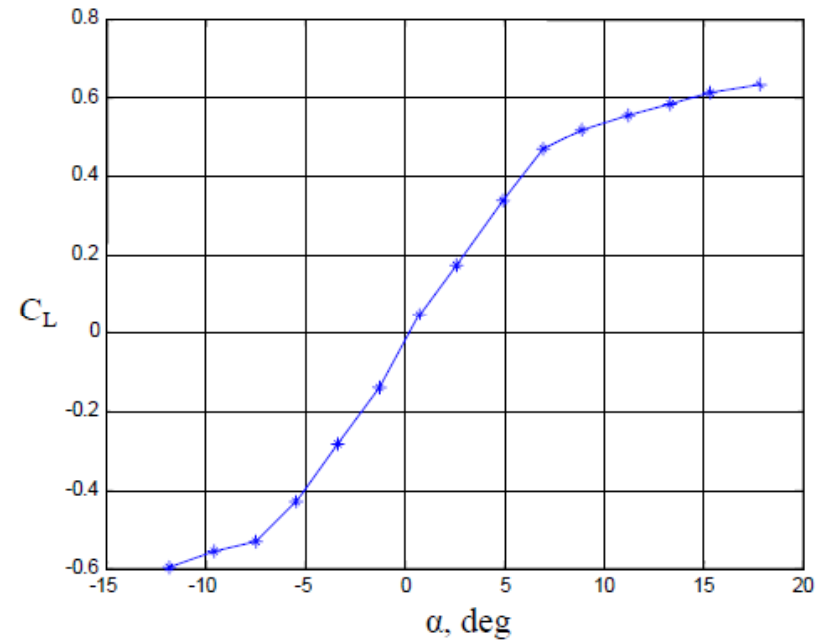
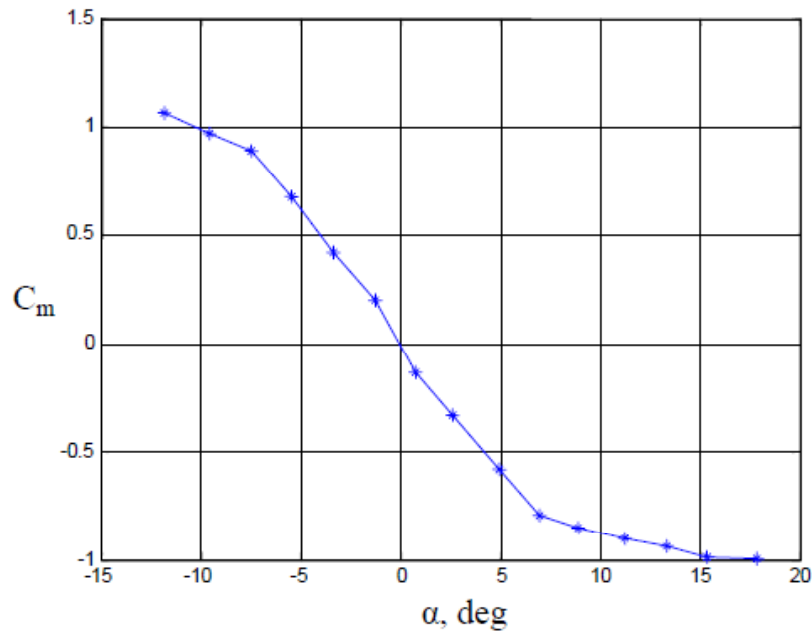




# Tests in a wind tunnel



# Tests in a wind

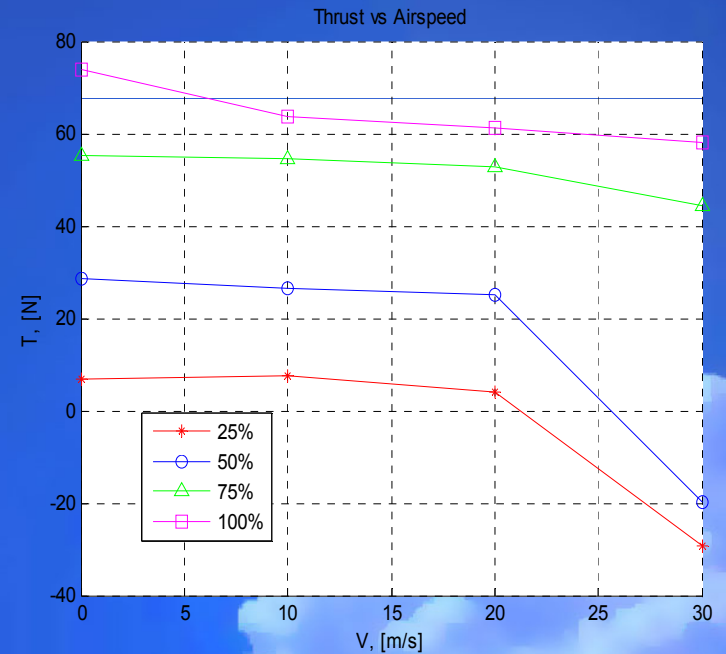
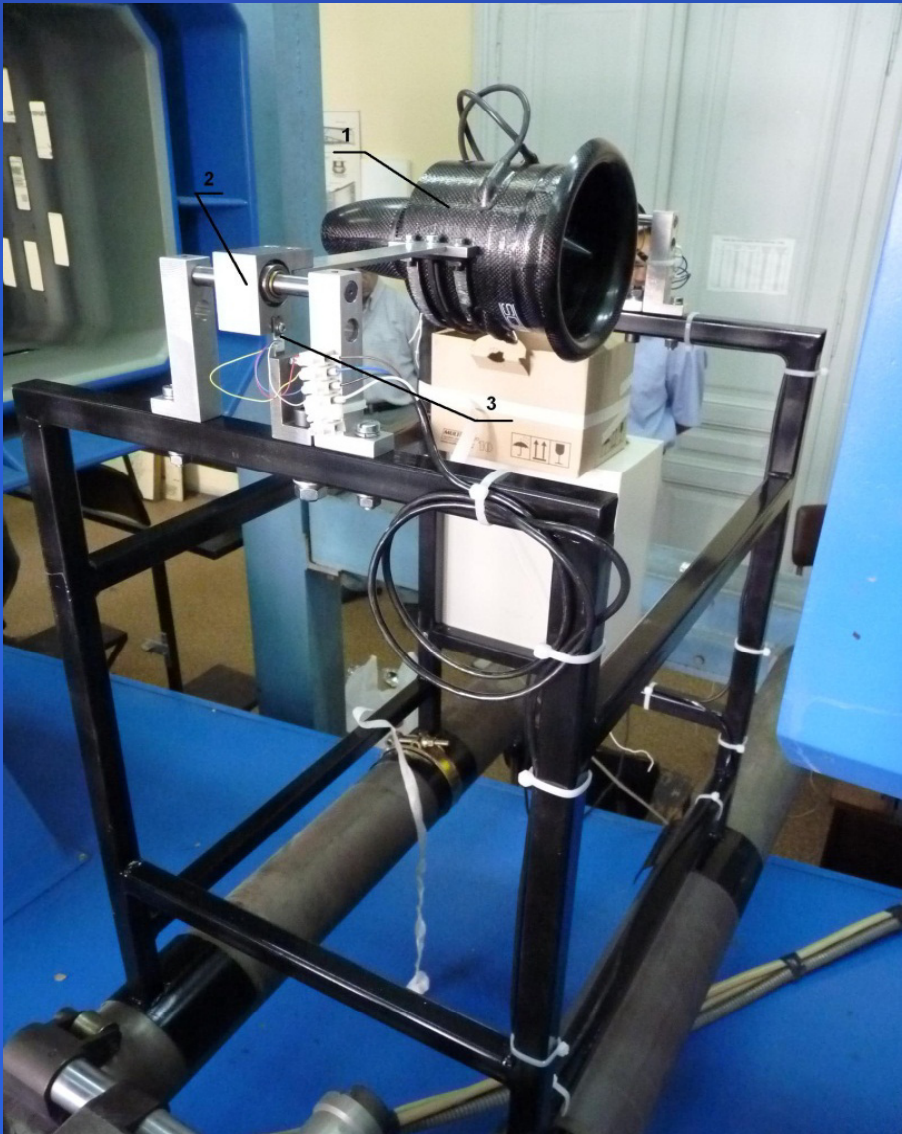




# Main Propulsion



# Tests with Ducted Fans





# Joined Wing (JoWi) 1



# Joined Wing JoWi 2





# Flight Test of JoWi 2





# Flight test with Joined Wing UAV



# Why VTOL

- PAV-NASA;
- Pplane-EU, 7 Framework Program;
- DARPA X-Plane;
- DARPA TERN Program;
- DARPA underwater launch vessel

# Auxiliary Propulsion





# Tests with ducted fans frame

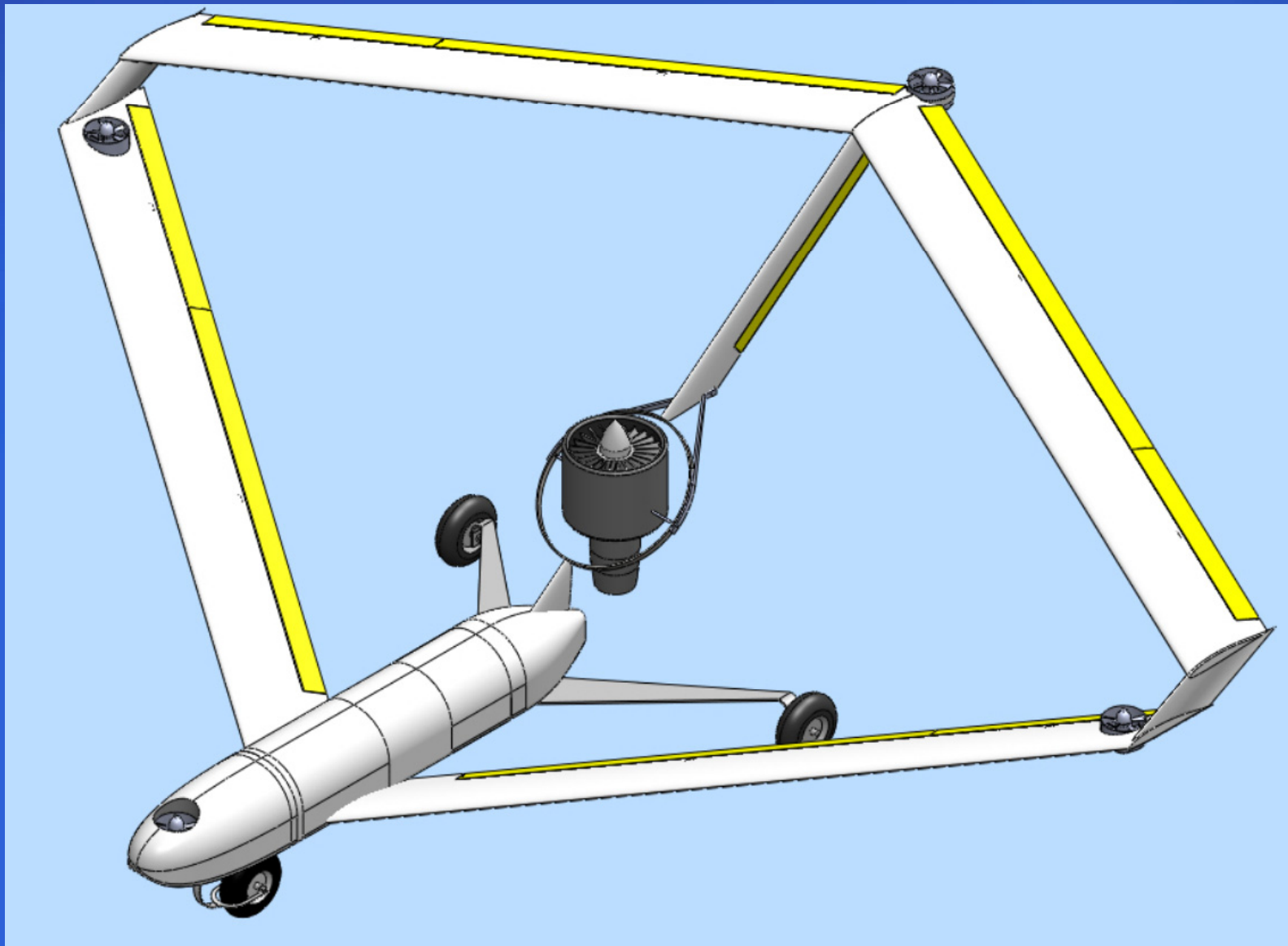


# VTOL Flight Test





# VTOL Joined Wing UAV





# Autopilot ArduPilot Mega



# Autopilot Piccolo II



# JoWi VTOL Lab Test





# An exotic VTOL variant



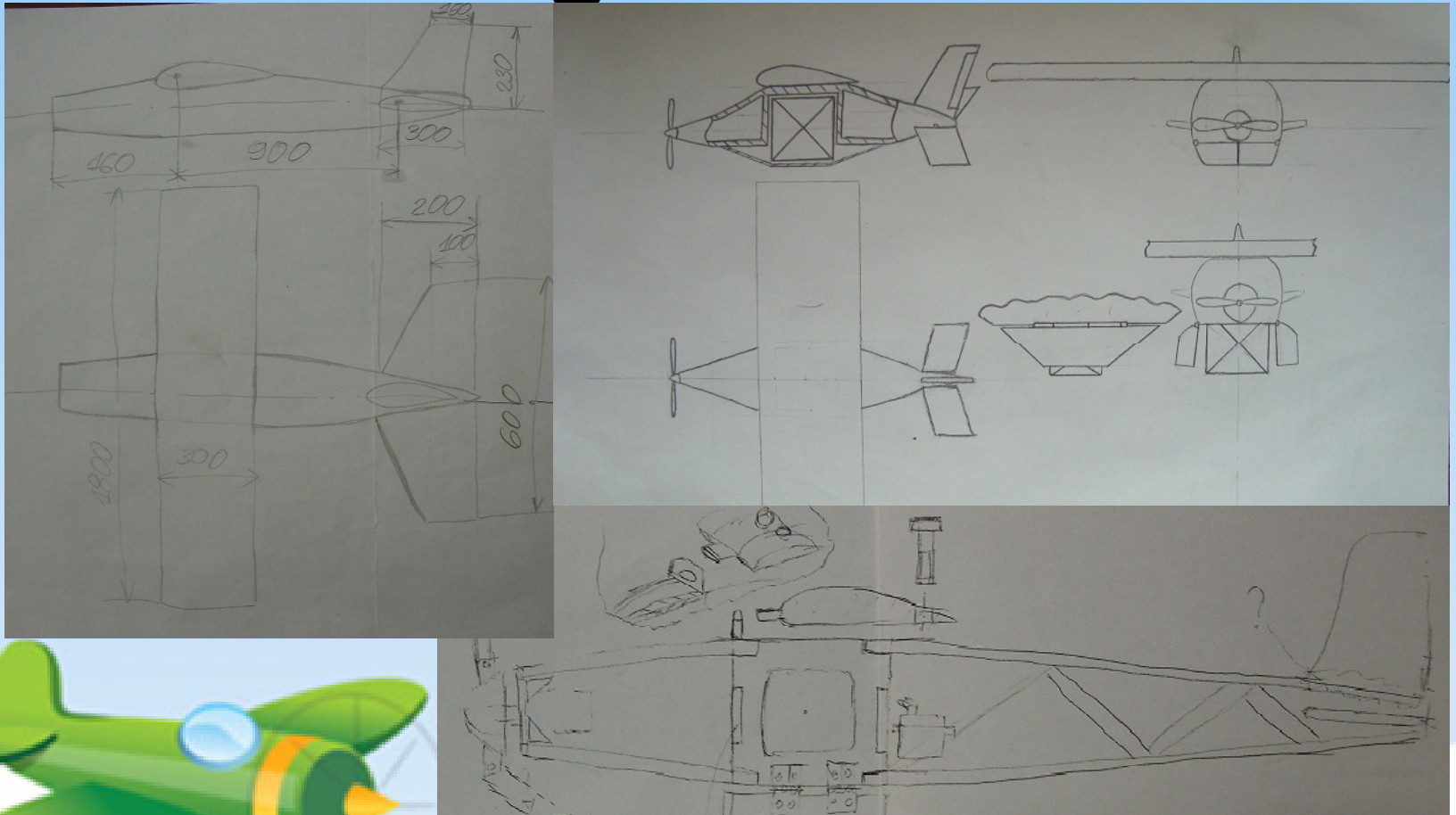


# Student's UAV contest



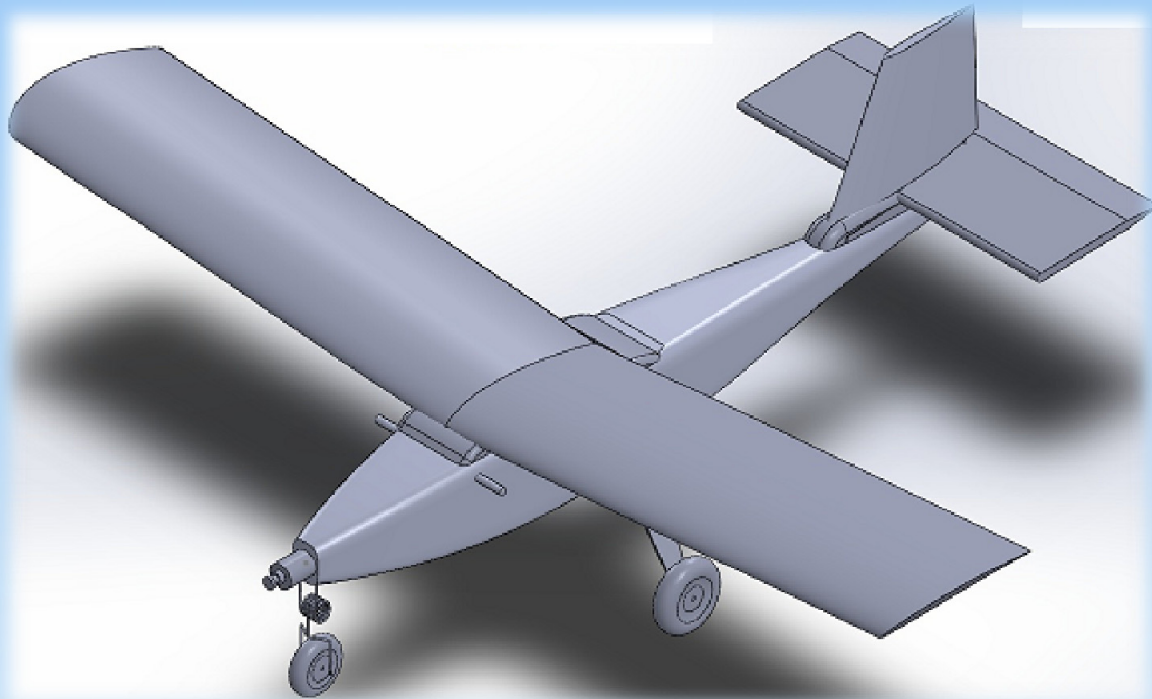


# Sketching & Generation of design variants





# Basic design











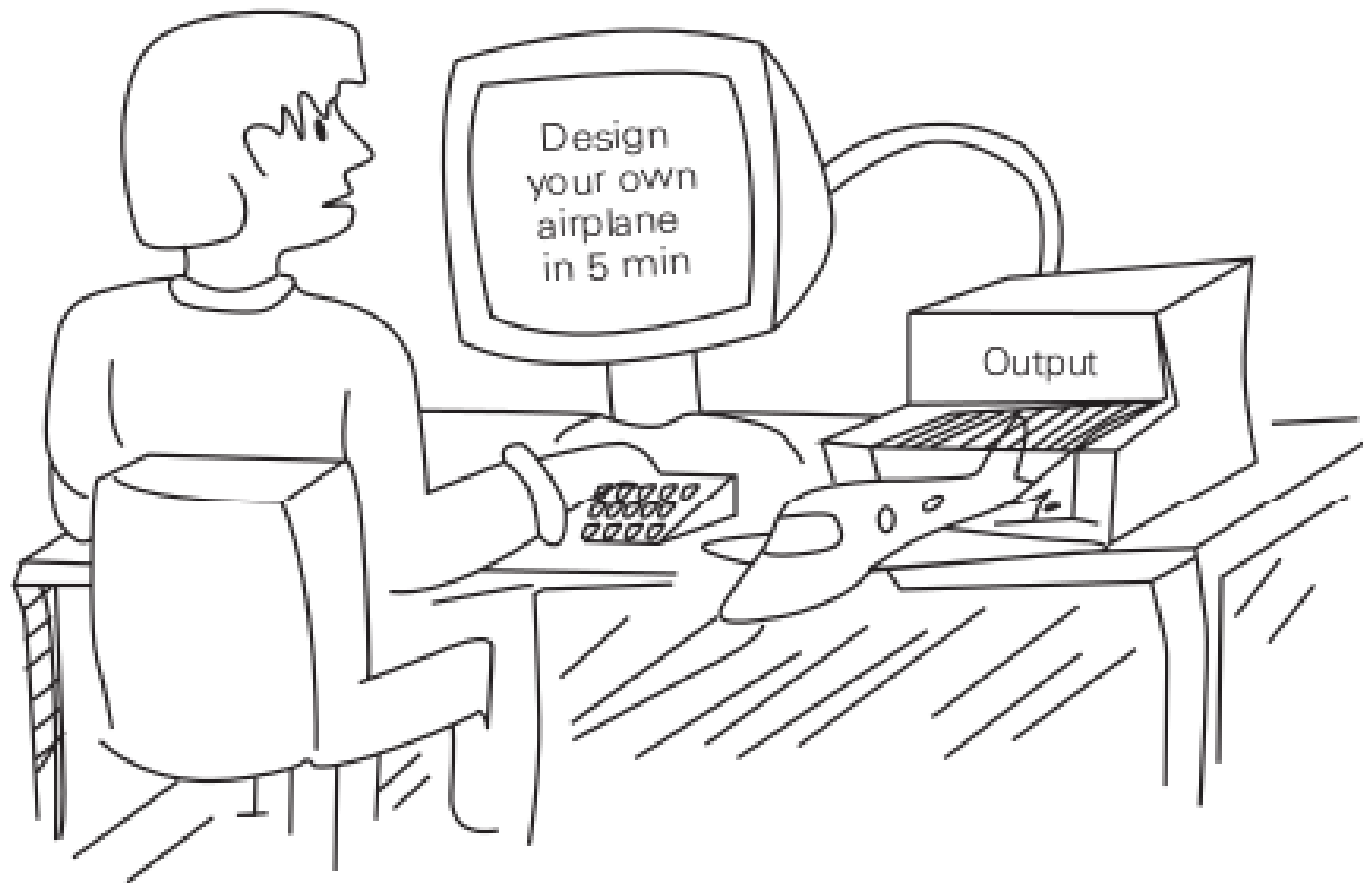
# “The winner takes it all”



# Student's UAV contest



# The lesson learned





# The lesson learned



# Cooperation





# Cooperation





# Cooperation





# Cooperation



Ракета Р-27 изстреляна от МиГ-29 на  
26.08.2011 по радиоуправляема мишена  
РУМ-Р-01 с борден номер 04,  
20 mS преди взривяване на бойната глава





The background of the slide is a photograph of a clear blue sky. A bright sun is visible in the upper right quadrant, partially obscured by a large, fluffy white cloud. The sun creates a lens flare effect. The overall scene is bright and positive.

**Thank you  
for your attention**