

Second Laureate Applied Research

- **Research Work Title:** Acquisition of know how, design and construction of skydiving simulator (vertical wind tunnel)
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Abstract:

Skydiving simulator is a vertical wind tunnel with flow velocities in the range of 200 to 250 km/h. In this wind tunnel, skydivers can experience the floating conditions during the free fall. Using the wind tunnel it is possible to train the first stage of skydiving to the trainees. This stage lasts for 30 seconds, starting from the instant the skydivers leave the airplane or the helicopter till the moment the skydiver opens his/her parachute. The training process is quite difficult and the trainers have a difficult task in the sky for training the sky diving trainees.

The vertical wind tunnel consists of main parts such as nozzle, protective net, flight chamber, diffusers and fans. The flow velocity in the tunnel can be adjusted by controlling the rotational speed of the fan. The scientific foundation of this project is fluid mechanics and aerodynamics. Different phases of this project of national importance are: feasibility study, including a detail examination of various vertical wind tunnels worldwide, conceptual study using semi-empirical relations for the design of the wind tunnel and determination of its geometry and shape, preliminary design, where the project's unknowns were experimentally investigated using scaled down wind tunnel models, detailed design, where detailed engineering drawings of the wind tunnel were prepared and the fabrication techniques were determined, procurement and fabrication of the components and parts, testing and calibration of the wind tunnel, commissioning of the completed wind tunnel.

The construction of this wind tunnel has resulted in multiple advantages, namely acquisition of technology know how pertaining to design and construction of large vertical wind tunnels.

