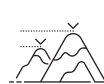


## Large Cube Drone

### The test in a nutshell



High altitude



Temperature  
ranging



Flights and  
climbs



Heavy storm

### terraXcube

terraXcube is Eurac Research's extreme climate simulation centre at the NOI Techpark in Bolzano, South Tyrol, Italy. Within its chambers, even the most extreme of all our Planet's environmental conditions can be created. By combining hypobaric and altitude technology with state-of-the-art environmental simulation, we aim to investigate the effects of extreme climate conditions on humans, ecological processes and industrial products.

The climate chambers differ in size and equipment and can accommodate people, plants and other living organisms for up to extended periods and have the space to accommodate large machines and products.

Each day our team breaks new ground with scientists and industry partners and prepares the path to gain discoveries.

### Test description

Drone flight under extreme environmental conditions! Drones can be tested in a variety of artificially reproducible scenarios, with multiple climatic stress factors: wind, heat, rain, snow, high altitude, etc. These tests can easily be controlled and reproduced with the information obtained providing useful insight for the design and development of a new, more reliable and safer drone generation.

### Main focus

Operating characterisation of the drone's propulsion system of in unconventional conditions. Analysis of the torque/ traction/ power consumption/speed rotation curves of a single rotor and whole vehicle in static conditions (hovering) when temperature and pressure change.

Examples of possible tests:

1. Propulsive system performance
  - Thrust coefficient at different altitude and/or temperatures
  - Icing on the propellers and impacts on rotor performance
2. Static tests
  - Overall performance of the vehicle on a test bench
  - Impact of climatic conditions on the autopilot/vehicle's sensors
3. Dynamic tests
  - Hovering and free flight
  - Stability and controllability tests

# Large Cube Drone

## Large Cube - General Characteristics and Environment Control

Internal dimensions	12 m x 6 m x 5 m (L x W x H)
Useful Square Footage	137 m <sup>2</sup> + 100 m <sup>2</sup> for test setup
Access to the chamber	Large sliding door: 3.6 m x 4 m (W x H)
Load Capacity	Objects and vehicles with a mass up to 40 t
Maximum simulated altitude	9,000 m $\pm$ 10 m (~ 30,000 ft)
Maximum Rate of Climb (ROC)	6 m/s (~ 1,180 ft/min); 14 m/s (~ 2,756 ft/min) in the airlock
Minimum Rate of Climb (ROC)	0.1 m/s (~ 20 ft/min)
Temperature Range <small>According to IEC 60068-3-5</small>	-40...+60°C ( $\pm$ 1°C in time $\pm$ 2°C in space)
Temperature Rate of Change <small>According to IEC 60068-3-5</small>	$\pm$ 0.5°C/min (cooling & heating)
Relative Humidity <small>T &gt; 4°C and according to IEC 60068-3-6</small>	10...95% $\pm$ 3%
Humidity Rate of Change <small>T &gt; 4°C and according to IEC 60068-3-6</small>	0.4%/ min cooling; 0.5%/ min heating
Wind	Up to 30 m/s
Precipitations	Rain: 0...60 $\pm$ 1 mm/h Snow: up to 50 mm/h

## Other Features

Power Supply	230Vac 1~ 50Hz, 400Vac 3~ 50Hz, 63A
Data-acquisition equipment Smoke/Fire detection system + Fire suppression system CC cameras	
Network connection	Gigabit-Ethernet (1000BaseT) PoE, Wi-Fi