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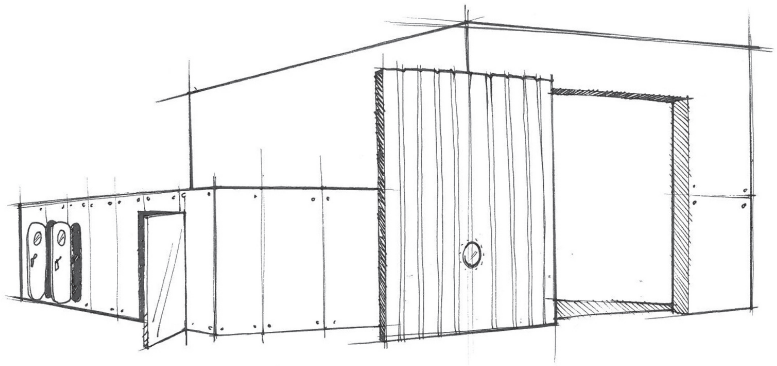
terraXcube



Large cube

Design	Functional rooms: 1. Test chamber 2. Ambulatory room 3. Control room 4. Airlock & Toilet
Useful Square Footage	137 m^2
Access for vehicles	Large sliding door: 3.6 m × 4 m (W × H)
Load Capacity	Objects and vehicles with a mass up to 40 t
Combination of the Parameters	In the rooms all the environmental parameters can be simultaneously combined together to simulate complex multi-factorial scenarios
Pressure Control	Test room, ambulatory room and airlock can have three different levels of pressure and they are connected by pressure-tight doors

1. Test chamber

General Characteristics and Environment Control

Useful Internal Dimensions	12m × 6m × 5m (L × W × H)	
Feature	**Value**	**Precision**
Maximum Altitude	9,000 m ~ 30,000 ft	± 10 m equivalent
Maximum Rate of Climb (ROC)	6 m/s ~ 1,180 ft/min	
Minimum Rate of Climb (ROC)	0,1 m/s ~ 20ft/min	
Temperature Range According to IEC 60068-3-5	-40°C / +60°C	± 1 K in time ± 2 K in space
Temperature Rate of Change According to IEC 60068-3-5	± 0.5 K/min cooling & heating	
Relative Humidity T > 4°C and according to IEC 60068-3-6	10% / 95%	± 3%
Humidity Rate of Change T > 4°C and according to IEC 60068-3-6	0.4%/ min cooling 0.5%/ min heating	
Wind	30 m/s	Laminar in front of fans
Precipitations	Rain: 0-60 l/m^2 × min Snow: 5 cm in 1 hour	± 1 l/m^2 × min
Light	Day/night simulation at 1,000 lux	
O_2 % Control	From 20.93% to 6% eq. to 0 – 9,000 meters asl	± 0.1% Not simultaneously with absolute pressure control
Gas Exhaust Extraction System	1,100 m^3/h	

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Medical Studies: human reactions to extreme environmental conditions

Number of study participants / Capacity	Up to 12 participants and 3 investigators
Duration of the Study	Up to 45 days without interruption
Medical Monitoring System	Full medical monitoring system for both test subjects and investigators during medical studies: – Portable harness for test subjects and investigators – Wi-Fi signals transmission within the chamber – Real time medical monitoring and medical data acquisition – Continuous data recording for: • ECG • SpO2 • Blood pressure • Core temperature – Medical parameters and environmental parameters stored together and tied by the same time-stamp – Integrated alarms
Available Equipment	Climbing wall Treadmills and cycle ergometers Audio & video projection system

2. Ambulatory Room

General Characteristics	It can be used for the test of small objects and for simple medical studies with persons without the need to use the test chamber. The ambulatory equipment and medical devices operate at milder conditions with respect to those of the test chamber. The room is connected to the control room via a pressure-proof window.

Feature	Value	Precision
Maximum Altitude	9,000 m ~ 30,000 ft	± 10 m equivalent
Maximum Rate of Climb (ROC)	6 m/s ~ 1,180 ft/min	
Minimum Rate of Climb (ROC)	0.1 m/s ~ 20 ft/min	
Temperature	+25°C / +30°C	± 1°C
O_2% Control	From 20.93% to 6% eq. to 0 – 9,000 meters asl	± 0.1% Not simultaneously with absolute pressure control
Relative Humidity	40%	± 3%

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3. Control Room

General Characteristics	The control room hosts the whole supervision, control and safety system of the chamber. It executes automatic and combined temperature and pressure profiles vs time according to the test design. The control system records all climatic parameters. The room hosts the industrial and medical data acquisition system to acquire, process and store the signals coming from specific applications requested by different clients and collaborators. A pass through to the test chamber allows the exchange of small objects (blood samples, etc.).

4. Airlock & Toilet

General Characteristics	The airlock and the toilet always display the same absolute pressure (the two rooms are connected through a normal door). The usage of the toilet is allowed without interrupting the experiment at high altitude. Toilet equipment: sink, shower & WC.	
Feature	**Value**	**Precision**
Max Altitude	9,000 m ~ 30,000 ft	± 10 m equivalent
Maximum Rate of Climb ROC	14 m/s ~ 2,750 ft/min	ROC: High rate of climb for simulation of high mountain rescue missions
Minimum Rate of Climb ROC	0.1 m/s ~ 20 ft/min	
Temperature	+25°C / +30°C	± 1°C
O_2% Control	From 20.93% to 6% eq. to 0 – 9,000 meters asl	± 0.1% Not simultaneously with absolute pressure control
Relative Humidity	40%	± 3%

Support services offered

- Data security management: the system guarantees the integrity of data and makes sure that the data acquired are not accessible by unauthorized parties.
- Data-acquisition system
- Support during the whole testing chain: from experimental design to test execution and reporting