

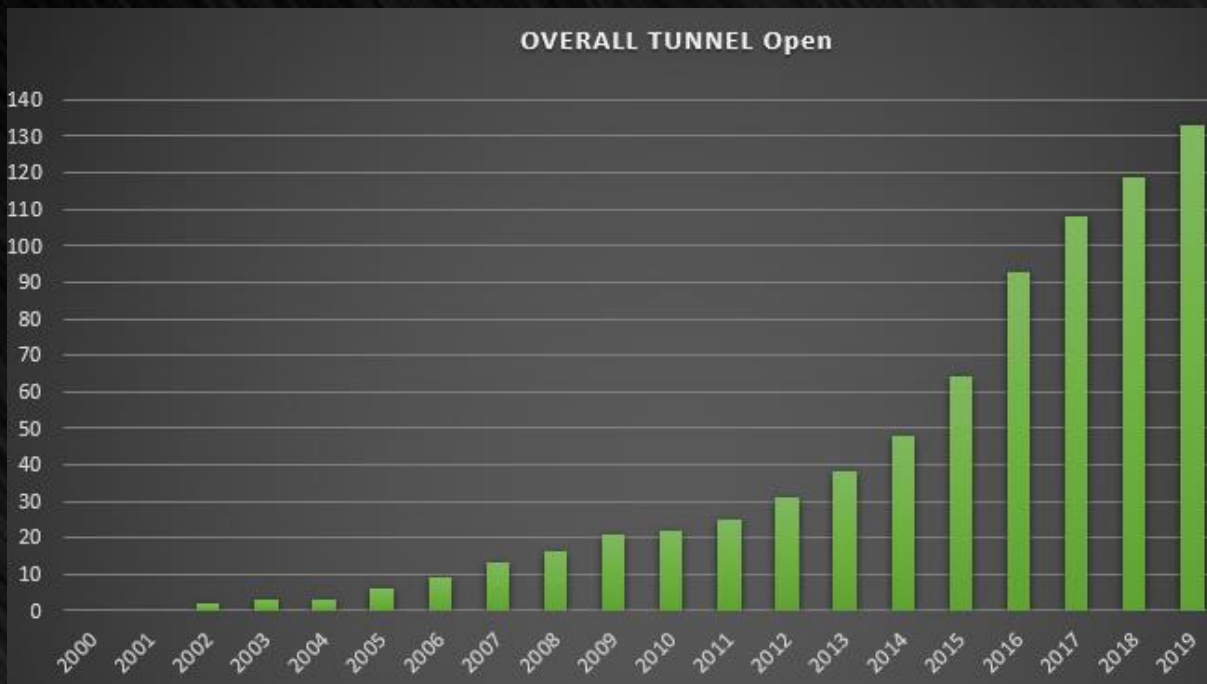
SALE KIT



VERTICAL
WIND TUNNELS

MARKET BACKGROUND

The wind tunnel industry is grown fast in the last 4 years. There are about 80 wind tunnels actually operating at the moment and around 70 coming soon in the next 2 years



Rapid growth of the vertical wind tunnel industry [q1 2016]



Distribution of the Active Wind tunnels around the world

KEY FACTOR

FUN - Millions of people from all over the world have enjoyed flying their bodies. Experience the thrill of human flight

SAFE FOR EVERYONE

Anyone older than 3 years old in good physical shape is safe to fly in the wind tunnel.

GROUPS & MORE

Indoor skydiving is great for any occasion. Makes a great gift, perfect for parties, a weekend activity, large groups, or corporate event.

PUBLIC

The real deal of the indoor skydiving industry is the entertainment or "first flight" industry. Most wind tunnel installations are aimed at locations, which see a high volume of public traffic. Events like family outings, birthday parties, dates, and even corporate events are a commonplace at wind tunnels. This is largely due to the wide range of ages allowed to fly.

SKYDIVERS


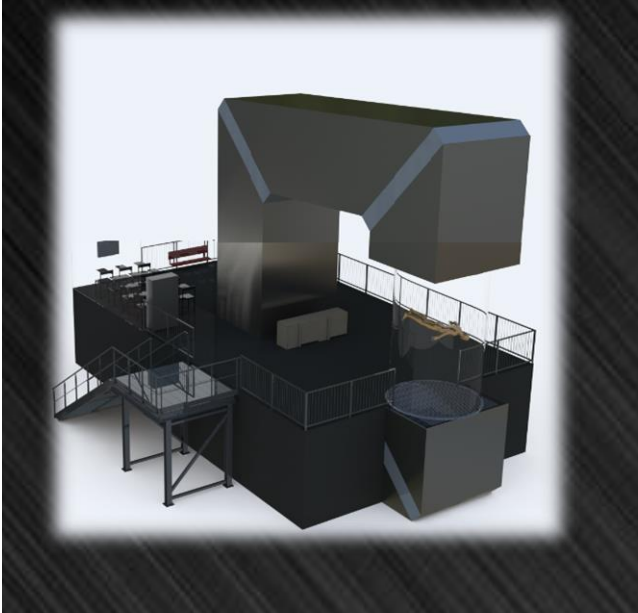
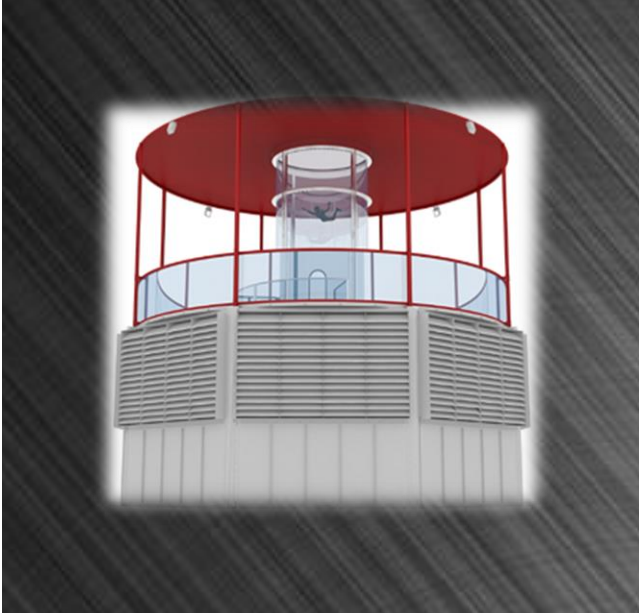
In previous years, skydivers traveled large distances to fly in the few wind tunnels available. In the recent past with wind tunnels starting to pop up so rapidly, skydivers have taken to tunnels closer to home, more convenient to travel to, or where prices are lowest. Skydivers played a large role in the development of the industry; some places, especially those close to airport or drop zone, cater a larger percentage of skydivers.

MILITARY

The military has come to embrace and accept wind tunnel use as an important part of their training regimen. All branches of the military seek tunnel time in order to better prepare and train for military applications.

WIND TUNNELS

Indoor Skydiving is the simulation of flying performed inside a vertical wind tunnel. The vertical wind tunnel devices can be grouped in 2 categories

HIGH PERFORMANCE		SMART -R		OPEN FLOW	
					
Upside	Downside	Upside	Downside	Upside	Downside
High performance Highest efficiency All year operational	Permanent construction Civil construction >7M USD	High Efficiency Free Standing Structure All year operational Lower investment All in one	No skydivers, military No Competition	OPEN-FLOW structure Low investment	Low efficiency Seasonal Not suitable for indoor
GOOD FOR Pro Flyers, Competition, Skydivers, Military		GOOD FOR Shopping mall, Drop zones, Theme Park, Private,		GOOD FOR Air show, Marketing events	

TECHNICAL CHART						
DESCRIPTION	HIGH PERFORMANCE			SMART		OPEN FLOW
	12 FEET	14 FEET	17 FEET	2.5m/8feet	3m/10 feet	2.5m/8feet
Design Speed [kmh]	>280	>280	>280	>185	>185	>185
Fans	1 or 2	1 or 4	1 or 4	1	1	1
Cooling	yes	yes	yes	yes	yes	no
Tot power required [including cooling]	>1'200 KW	>1'800 KW	>2'500 KW	>700 KW	>1'000 KW	>1'000 KW
Glass Height [m]	5 or on request					
Diffuser Height [m]	on request					n/a
OPTIONAL	Airfoil Turning Vanes Base Jumping Room			Acoustic Insulation Hospitality		Acoustic Insulation Hospitality
	MANAGEMENT START UP SUPPORT					
	Video System					
	GEARS (Students x80 - Instructors x12)					
ENGINEERING PHASE depending on the complexity of the project, local regulation and approval process.	<u>8-12 months</u>			<u>3-6 months</u>		<u>3-6 months</u>
MANUFACTURING PHASE	<u>8-12 months</u>			<u>6-10 months</u>		<u>6-10 months</u>
INSTALLATION PHASE	<u>6-10 months</u>			<u>1-2 months</u>		<u>1-2 months</u>

WHAT WE OFFER

VERTICAL is a business-to-business entity. **VERTICAL** can serve any type of investor: from those experienced in wind tunnel that only requires the wind tunnel components, to the one that requires a turnkey solution.

OPTION A - CONSULTANCY

Do you have already your plan to buy or build a wind tunnel? Would you like to have a full comprehensive business plan analysis of your location or you just need a due diligence on your project?

We can stand on your side, be your consultant for the whole process, and make you feel comfortable that you are always taking the right decision.

OPTION B - THE TECHNOLOGY

VERTICAL can design, produce, and deliver to your plot the wind tunnel components. We'll also assist you during the design of your building / structure and during the final installation / commissioning

OPTION C - THE TURNKEY

VERTICAL can provide the most demanding investor with a Turnkey solution. Just have a look at the design prospective, the tunnel specification, the cash flow and the overall business plan...if you like it, approve it, and you'll get it done.

OPTION D - CALIBRATED.

Our flexible approach can accommodate anything in between option A and B.

Do you own the wind tunnel components and you need to erect it? You have a drop zone and you want to rent an OPEN-FLOW for it? Do you have a yacht and you wish to have a custom-made wind tunnel just for your pleasure?

You name it and our team of wind tunnel expert can fit a tunnel in any location and in any format.

CONTACT US

Our Engineering and Commercial Teams are happy to answer all your question,

To provide a full comprehensive Wind Tunnel Project Cost Analysis

To prepare a preliminary business plan for your wind tunnel,

To provide you with a technical due diligence on an existing project,

To provide consultancy services for your own project,

To assist you making your idea a reality.

info@verticalwindtunnels.com

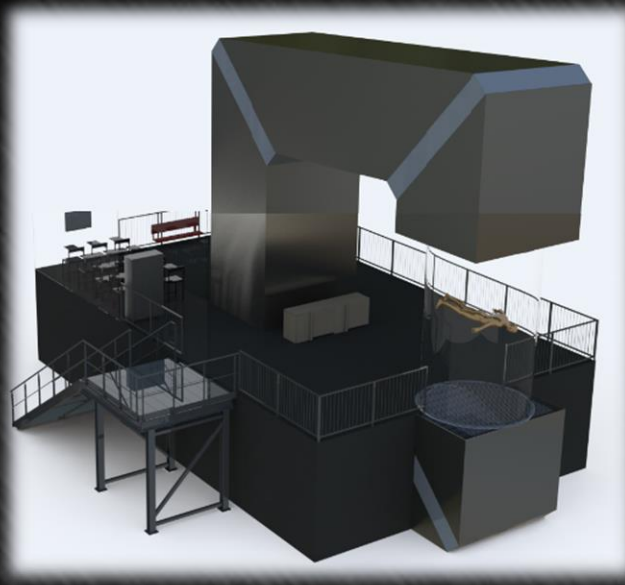
www.verticalwindtunnels.com

Tel +39 3473116821

Business Center Logistics City, Dubai Aviation City

P.O. Box: 390667, Dubai, U.A.E

THE SMART -R



All-in Version (for illustration only)

WHY SMART?

With the SMART tunnel, Vertical set a new milestone in the industry of wind tunnel.

Reinventing the wheel

The Smart (Patent granted) blends the benefit of all the wind tunnel types, in one

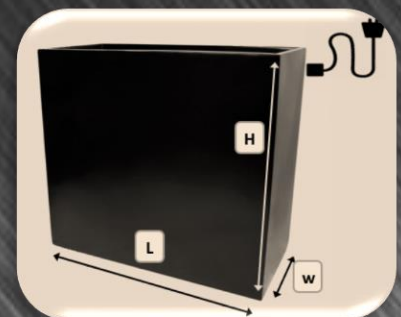
This product is for pure business, it gives its best placed in shopping mall, theme park, playground, drop zone and any other location where the target is general public or sport beginners.

Plug and Play

The special feature of the SMART is that it comes as a **plug and play**.

With the SMART – R, start doing business in the wind tunnel industry has never been as simple. The minimum requirements are

- An available volume of L **15m** W**5m** H**10m**
- Power Supply



Dimension & Performance

The Smart R is the smallest 10 feet wind tunnel.

10 feet diameter, 185 kmh, footprint 100-200m2.

The Smart -R can fit in any location and allows to position the wind tunnel in any orientation for the best visibility

Efficiency

Smart R is small yet Power efficient. The ducting round shape and the single loop layout is the way to increase efficiency, hence reducing the energy consumption at the same performance; or increase the performance at the same energy consumption

Silent

Smart R is small, power efficient yet **SILENT**

In a recirculating tunnel whatever noise goes inside the ducting stay in the tunnel.
If that's not enough our acoustic insulating panels covering the entire structure ensure that you can place the tunnel wherever your business needs.

Outdoor or Indoor

Smart R is small efficient silent and **WEATHER PROOF.**

Although its dimensions allow the Smart to be placed indoor (shopping mall or playground or else), the Smart R being a closed unit equipped with a dedicated cooling system can also be placed outdoor and no harsh sunshine, rain, sandstorm, or snow will affect the operation of the wind tunnel.

Move it

Smart R is small efficient silent weather proof and **MOVABLE.**

The Smart R is designed as a light steel structure hence forget expensive building, civil work, foundation and authority permits;

And if you have a better location? Move it.

Customized Versions: All-in Vs Essential

Smart R is small efficient silent weather proof movable and **CUSTOMIZABLE.**

All-in; Wind Tunnels + Hospitality Modules: Reception, merchandise, class room, gear room, offices)

Make a fully independent indoor skydiving attraction in one single location, the

Essential, Wind Tunnel only

You are free to set up your hospitality as per your taste and needs

Affordable

So overall this new concept of tunnel

- Is a good 10 feet tunnel yet small,
- is recirculating yet fit into a small footprint,
- is efficient, powerful yet silent,
- it works outdoor or indoor
- is movable or permanent
- is customizable

All these features yet it is **affordable**that's why we called it **SMART**

By reinventing and redesigning this wind tunnel we aimed to those investors, business man who recognize the profitability of this industry yet they need more flexibility and a quicker return on their investment.

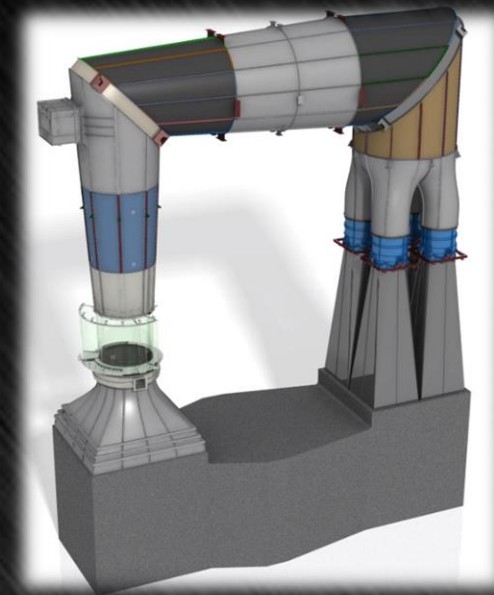
HIGH PERFORMANCE TECHNOLOGY

KEY INNOVATIONS BY VERTICAL

VERTICAL is set to deliver a totally unique indoor skydiving concept through the dynamic combination of extensive technical research and design along with several years of commercial operating experience by our partner company in Dubai. This collaboration has created a harmonized wind tunnel designed to minimize operational cost and maximize customer experience through technological innovation and stringent safety standards.

Our technologies are derived from our partnerships within leading aerospace development and manufacturing companies. Thanks to a truly comprehensive research and development program, VERTICAL is proud to present the only zero-pressure, single loop system in the world for wind tunnels of over 14ft diameter, with our technology providing for:

- The largest, totally round-shaped, flyable area by volume
- Uninterrupted access to the flight chamber
- The highest air efficiency-to-operation cost ratio
- Design criteria based on safety, efficiency and smart solutions
- Flexible smart exposure of the flying chamber.
- A reduced building footprint
- Maximum exposure and exhibition through building construction in any orientation



Single loop and zero-pressure

A single loop configuration is defined as a wind tunnel system developed in one single duct. This configuration reduces drag and energy losses, thereby increasing total efficiency compared to a multiple loop wind tunnel. Because of its geometry, the single loop system reduces the overall building footprint and the ducting surface, allowing the wind tunnel to be oriented in any position on a given plot for the best visibility.

Our zero-pressure technology means that the air pressure across the entrance doors of the flight chamber is kept equal. This condition allows flyers to enter and exit the antechamber with no need to halt operations, while simultaneously increasing the air density inside the tunnel, providing for a more powerful airflow. This allows lower power input.

DISTORTION-FREE ROUND GLASS



Our rounded glass panels are uniquely designed to work in both zero and non-zero pressure conditions. Distortion-free panels, obtained through a unique chemical toughening process, allow audiences and flyers to see through the glass without blind areas or visual interruption: the experience will be almost akin to flying without glass. The quality of pictures and videos taken through glass used in **VERTICAL**'s tunnel will be crystal clear. The staging area also takes

advantage of floor-to-ceiling glass panels for an uninterrupted view by instructors and those waiting to take their turn.

BASE JUMPING ROOM

A high raised room connected to the flying space will provide the experience of leaping into the airstream just as if from a real airplane, and lays the groundwork for a brand-new body flight discipline: indoor Base-jumping.



The room's design and operating procedures are planned and constructed to maintain safety as our highest priority.



TUNNEL DIMENSIONS

VERTICAL's 17-foot wind tunnel is, by all dimensions of flying area, the biggest wind tunnel in the world. The chamber, at 17' in diameter and almost 90' in height, is by far the biggest volume of flying space, and has been replicated nowhere else in the world.

The sheer height and size of the wind tunnel allows for the closest simulation yet to a 'real', outdoor skydiving experience, providing a vast area for dynamic flying from the net all the way up to the turning vanes.

ROUND DIFFUSER

Rigorous testing has shown that a round-shaped diffuser is the most effective solution for the reduction of airflow losses, which ultimately means that less electricity needs to be used to power the motors. For flyers, the rounded shape of the diffuser is the optimal shape to fly around, with no corners to negotiate or avoid. Flyers can enjoy a consistent space to perform tricks and aerobatics regardless of height within the chamber.

Additional safety aspects are incorporated within this design, as there are no kinks or sharp edges on any part of the diffuser.



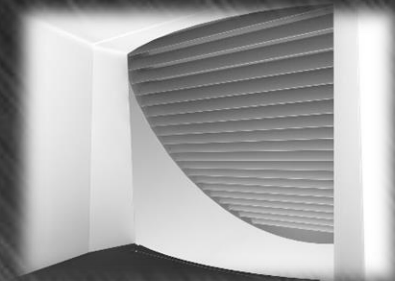
DIFFUSING CORNER



The corner above the flying area has been specifically designed and developed to diffuse the airflow throughout the corner section. Diffusion of the air through the corner allows us to restrict the overall wind tunnel dimensions and still retain a larger flying area. A diffuser without kinks acts as a natural extension of the flying space, allowing for a smoother flying experience and increasing the overall efficiency of the airflow.

BIGGER TURNING VANES

Our turning vanes are designed with the optimum chord-to-distance ratio along with an efficient airfoil profile. In all four 'corners' of the tunnel, the distances between turning vanes have been increased to allow for the reduction of aerodynamic losses and manufacturing costs while keeping flyer safety absolutely paramount. Such efficiency is also reflected in the airfoil design of the vanes, which efficiently turns the airflow through 90 degrees, minimizing energy and operation costs.

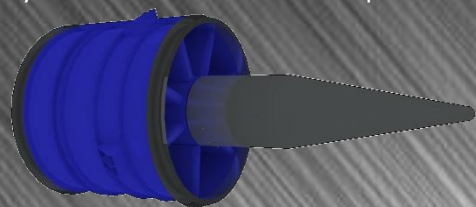


NACELLE DIMENSION

The nacelle housing, with its streamlined body, is based around the motor dimensions in order to provide a smooth airflow beyond the fan, and to significantly reduce the losses of interrupted airflow. The nacelle can fit two people standing at full height.

PERFORMANCE (HIGH WIND SPEED)

Notable improvement of aerodynamic efficiency allows the wind tunnel to reach a faster airspeed with the same energy consumption (or to reduce the energy consumption required to power the equivalent wind speed).



ACTIVE FRONT END ELECTRICAL DESIGN

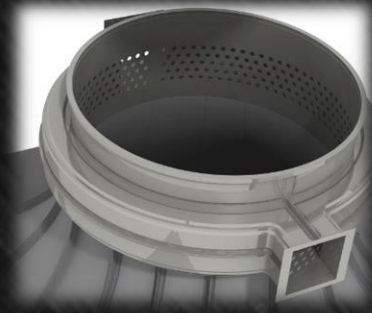
Active Front End is a new electrical design for the VERTICAL wind tunnel industry. This design provides the possibility to regenerate energy during deceleration while removing the requirement for the expensive harmonic filter. This innovation reduces complexity, cost and the size of the electrical room.

COOLING SYSTEM

The **VERTICAL** cooling systems have been comprehensively designed and tested in the harshest and most demanding environments. We can provide a fully-proofed system for every possible need.

ANNULAR RING

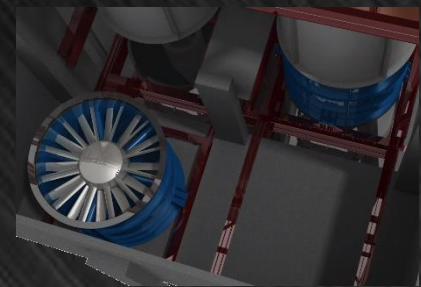
Annular ring will be used to equalize the air pressure inside the tunnel to match the outside, allowing the tunnel to work in zero-pressure conditions. Air symmetrically flows in and out of the tunnel without disturbing the main airflow of the tunnel. The ducted ring allows, if required, treatment and control of the inlet air (which could include a filter system, a cooling system, or a partial or full flow block as necessary).



MAINTENANCE

The tunnel is designed in such a way that we can guarantee high availability at low maintenance costs. Our direct involvement in the supply chain guarantees the quality and consistency of the key components and spare parts for the future.

The rendering below shows an example of smart design, where a special terrace and rails allow easy fan installation and removal.



THE BUILDING

Building a Vertical wind tunnel is a 1 to 2 years project. The main reason is that a wind tunnel can be anything in between a basic wind tunnel structure only, to a real high raise building equipped with restaurant, landscaped outdoor and side activities:



Fancy building enclosing the Vertical wind tunnel technology:

- ✓ Reception
- ✓ Offices
- ✓ Merchandising area
- ✓ Staff room
- ✓ Gear room
- ✓ Observation/Lounge area
- ✓ Restaurant / Bar
- ✓ Birthday party room
- ✓ training rooms
- ✓ class room
- ✓ conference room (for corporate event)
- ✓ Technical rooms (janitor, storages, IT, etc.)



Vertical wind tunnel Technology only: tunnel components and steel structure.

- ✓ Reception
- ✓ Offices
- ✓ Staff room
- ✓ Gear room
- ✓ training room
- ✓ class room
- ✓ Technical rooms (janitor, storages, IT, etc.)

THE LOCATION

Vertical Wind Tunnel for entertainment purpose, expresses their best commercial attitude in an environment where amusement, recreation, and new adrenaline experience is demanded. Theme parks, new residential complex, shopping mall, etc. are the best location to attract First Time Flyers.

Where the target markets are instead Military it could be instead an independent destination; for skydivers, the proximity to a Drop Zone are definitely an added value.

In all cases is always recommend to have an easy access, and exposure on main roads.

OPEN FLOW TECHNOLOGY

TUNNEL DIMENSIONS

With a 10-foot diameter and total flying height of 18 feet, this wall-to-wall wind tunnel is the biggest OPEN-FLOW wind tunnel in the world.

LARGE SPECTATOR AREA

The spectator area is set around the flight chamber, at a six-meter height from the ground, allowing spectators the very best view of the flying activity and the surrounding area. A large tarpaulin roof that connects the flight chamber and outer steel structure ring, keeps the spectators sheltered from the sun and rain.



WALL-TO-WALL GLAZING FLIGHT CHAMBER

A wall-to-wall glass chamber provides a smooth flying experience without the risk of unplanned exit from the airstream that occurs in other open tunnels. Thanks to unimpeded access to the flight chamber, the time gap between each flyer is minimized, leading to an operational cost reduction and maximizing profitability. There is no need for supplementary training of instructors who have worked in recirculating tunnels. We have retained all safety measures and instructor procedures applicable to a closed system.

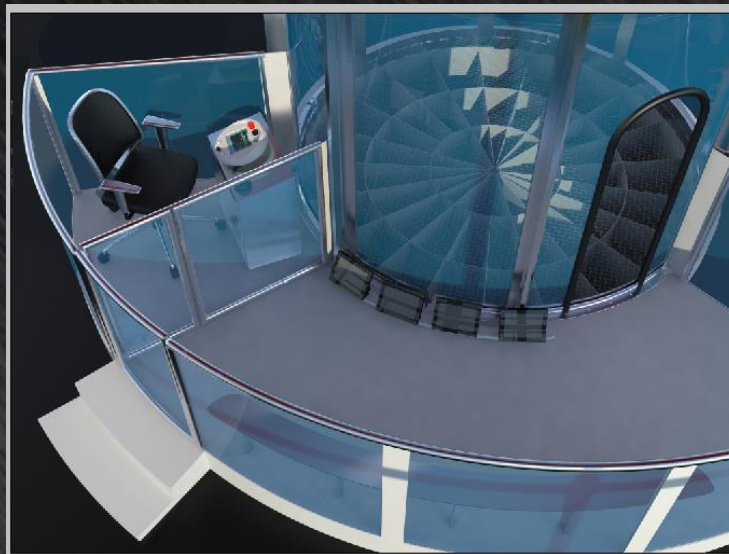
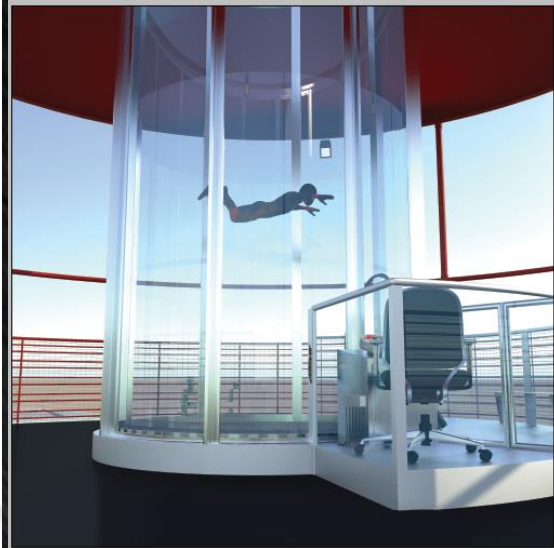
ROUND-SHAPED GLASS

Our round-shaped chamber has proven to be the most effective solution for the reduction of airflow losses. It means less electricity is needed to power the motors. For flyers, the rounded chamber is the optimal shape to fly around, with no corners to negotiate or avoid. Additional safety aspects are incorporated within this design, as there are no sharp edges in any part of the construction.

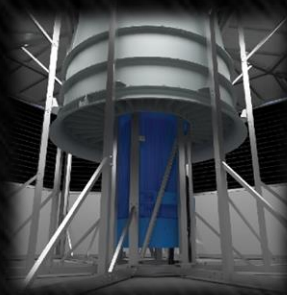
Our rounded glass panels are uniquely designed to give spectators unparalleled views of the flyers within, allowing audiences and flyers to see through the glass without any visual interruption. It is the closest experience to skydiving. Pictures and videos taken through tunnel glass will be crystal clear.

STAGING AREA

An additional structure is installed around the flight chamber to facilitate the staging area (where flyers wait their turn to jump into the airstream). Part of the staging area is reserved for the controller of the tunnel systems.



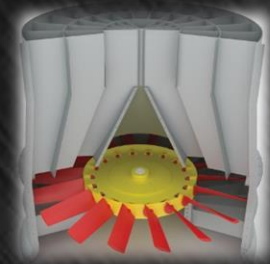
PERFORMANCE



The OPEN-FLOW wind tunnel is powered by a 1.5MW electrical motor directly connected to the fan, which pushes the air in the flight chamber to a maximum speed of 200km/h. This speed is ideal for new flyers who do not require high wind speeds while learning.

PERFECT AIR FLOW

We have carried out an in-depth CFD analysis of airflow both at fan and flight chamber level in order to perfectly optimize the airstream for a safe and smooth skydiving experience.



NOISE REDUCTION

Our flight chamber is designed to redistribute noise up and away from the spectator area. We implement and install the best soundproofing technologies in order to reduce the noise generated by the fan and motor. The sound insulation louvers retain a dual function by both reducing the sound level and allowing air intake for the fan. All our vertical sound insulation panels are interchangeable, allowing us to divert and reduce noise even further by placing the louvers only on one side of the OPEN-FLOW tunnel, away from the entrance and any areas where spectators might congregate.



SAFETY NET

A safety net is installed at the top of the flight chamber to prevent flyers exceeding height limits and exiting the airstream.

WEATHERPROOF

The singular, integral structure and sound insulation louvers are installed and orientated to ensure that the **VERTICAL** OPEN-FLOW wind tunnel is fully weatherproofed. No harsh sunshine, rain, sandstorm or snow can affect its operation. The structure has been designed to keep the fan in a completely dry and enclosed space.

EASY INSTALLATION AND MOBILITY

VERTICAL's OPEN-FLOW wind tunnel has been developed based on the necessity for easy mobility along with simple installation and dismantling onsite. All connection points between parts have been designed for easy access, easy fixing and easy maintenance.

TUNNEL CONTROLS

All our operating systems are controlled by software that is custom -made for our OPEN-FLOW wind tunnel. Based on years of wind tunnel operating experience, we have designed the control and emergency systems to be fully intuitive for the user, ensuring reliable and safe function at all times. Additional safety measures have been incorporated into the system to monitor the sensor and VFD readings, and act accordingly based on pre-programmed safety procedures.

VFD CONTAINER

All our electrical equipment required for monitoring and controlling the 1.5MW motor is integrated into a 20ft container with powerful internal AC, VFD and PLC. An optional power switch lets you choose a power source from either a generator or from an electrical grid. A connection box placed outside of the container includes all the connections needed for operations across different sites and power sources. By simply disconnecting all the cables, the VFD container is immediately ready to be shipped anywhere by road or by sea.

INTEGRAL STRUCTURE

The wind tunnel's steel structure is rigorously designed for load bearing and to connect all major parts of the OPEN-FLOW wind tunnel into one single structure. This single structure has the advantage of being integrally robust and structurally rigid to support all the loads. Our R&D is focused on structural analysis and the optimization of each part for its best performance.

