

Negative Pressure MOBILE MEDICAL FACILITY



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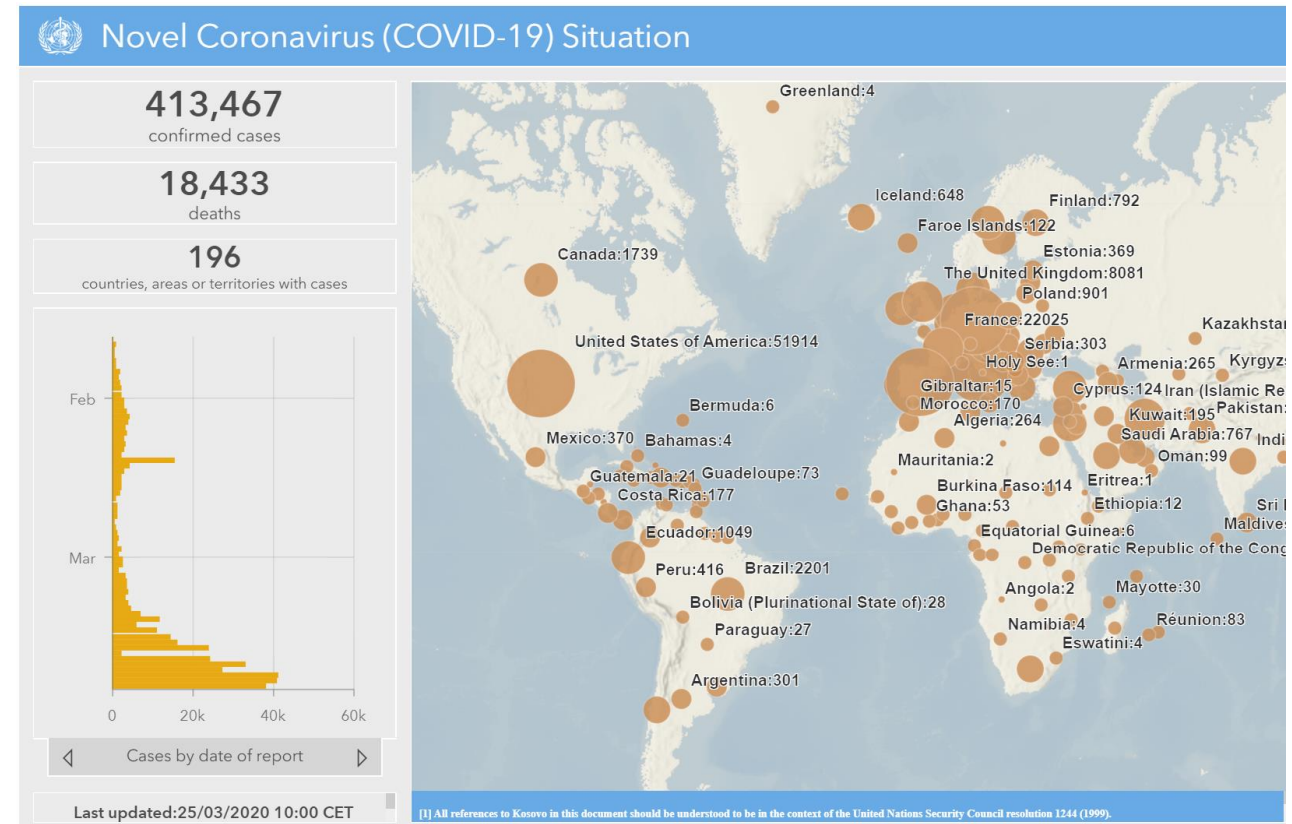


MOBILE MEDICAL FACILITY DEVELOPMENT



➤ Summary

As of March 25th, 2020, the total amount of confirmed cases for COVID-19 in worldwide is over **413,000** with nearly **52,000** in the US. With cases continuing to escalate, hospitals are dangerously close to being overwhelmed. To help meet this demand, Broadwell has worked tirelessly on designing a new, negative pressure mobile medical facility, which can be fabricated and deployed quickly. Along with our traditional air domes, this offers a second option to offset the need for medical structures to accommodate additional beds.



Broadwell offers two mobile hospital solutions:

1. Modular Hospital (Newly Developed)
2. Open-Span Air Dome Hospital



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CHAPTER 1

MOBILE HOSPITAL OPTIONS

1. Modular Antiviral Hospital (Newly Developed)

2. Open-Span Air Dome Hospital



MEDICAL FACILITY

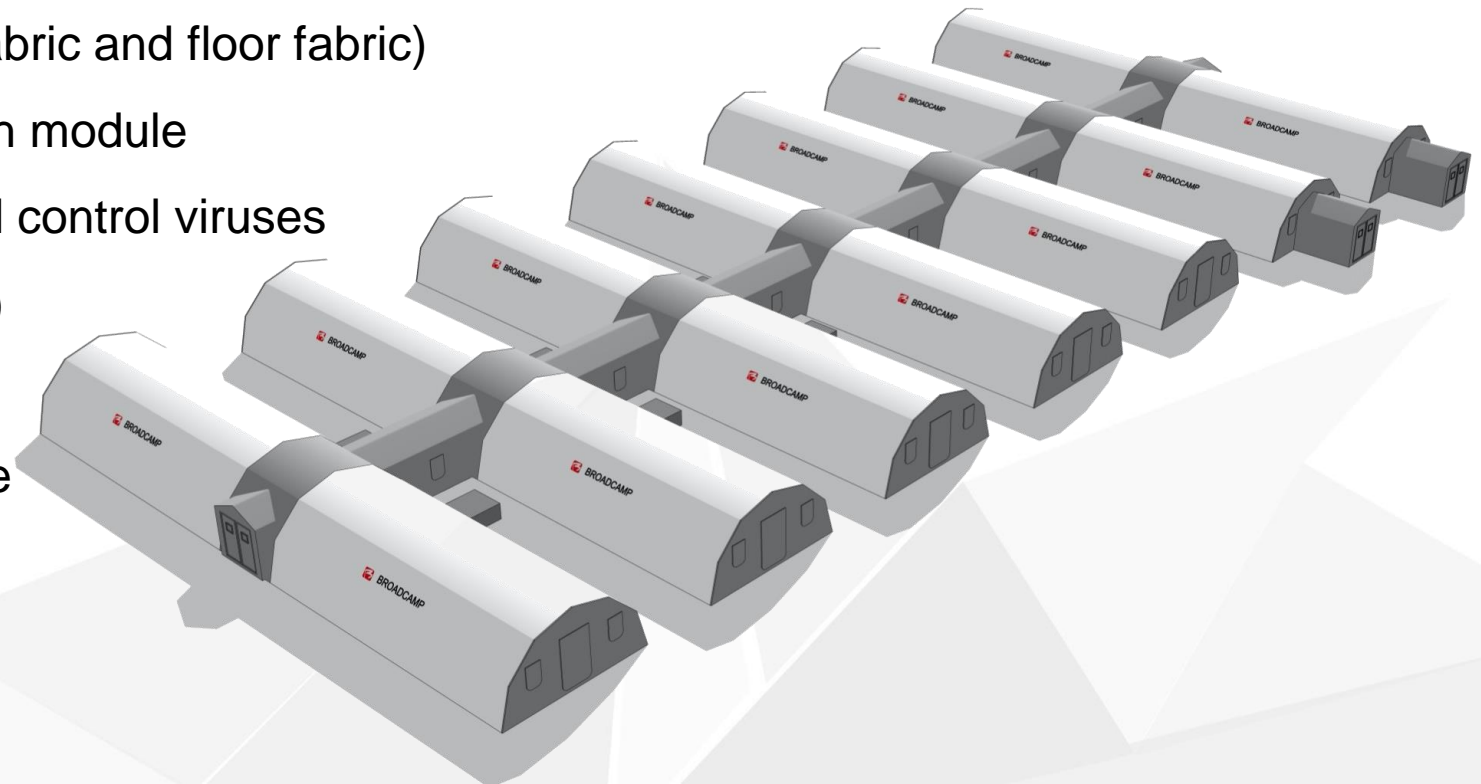


➤ ALL MODULES ARE NEGATIVE PRESSURE

- ❖ 14 total modules (more can be added)
- ❖ 107 bed capacity (including 7-bed ICU)
- ❖ Modules for office, lab and pharmacy, and warehouse.
- ❖ Fully enclosed fabric envelope system supported by aluminum frame (outer fabric, **antibacterial** inner fabric and floor fabric)
- ❖ AHU system – negative pressure for each module
 - triple filter air purification to remove and control viruses
 - built by Haier (acquired GE Appliances)
 - heat and cooling
 - capable of negative or positive pressure
- ❖ 32 LED lights
- ❖ Toilets and sinks for 12 modules

**FAST FABRICATION: 3-4 weeks from
from Order to Delivery**

FAST INSTALLATION: 48 hours



MEDICAL FACILITY

➤ Quickly Assembled Module Antiviral Hospital

The multi-modular design provides independent spaces for different functional requirements of medical facilities, including office space, warehousing, lab and radiology, etc.



LAYOUT OF STANDARD PACKAGE

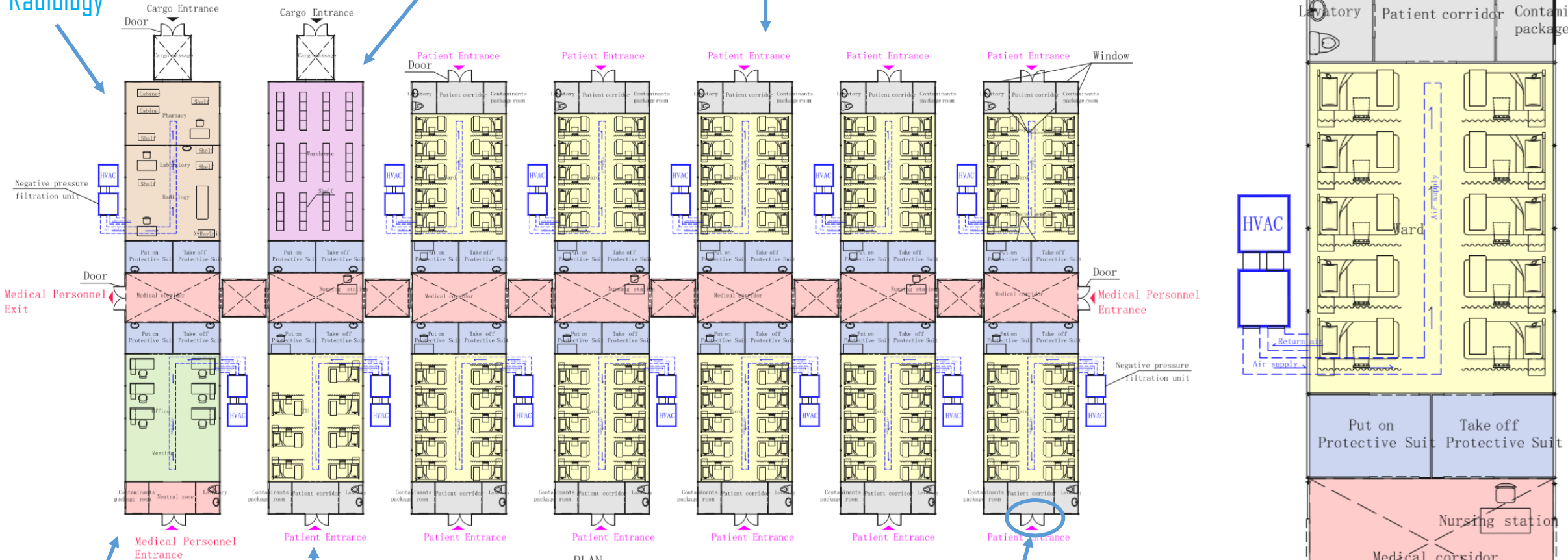
Laboratory,
Pharmacy,
Radiology

Warehouse/Storage

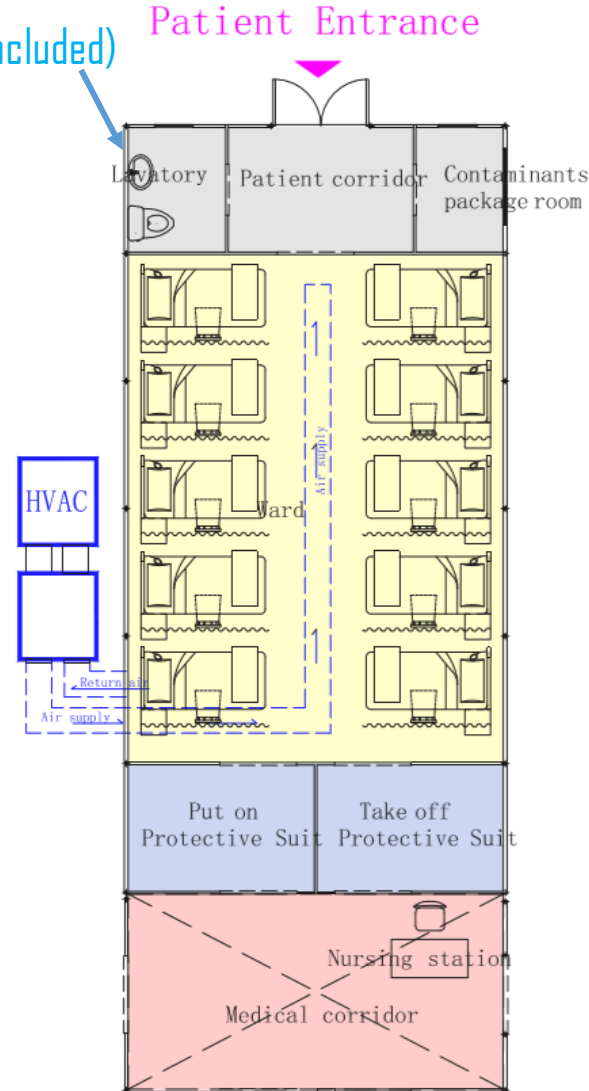
10 bed ward

(toilet and sink included)

Patient Entrance



PLAN



WARD PLAN

Offices

7 bed ICU

Zipper doors can be substituted with double doors

MEDICAL FACILITY



➤ Quickly Assembled Module Antiviral Hospital

Client Requirements:

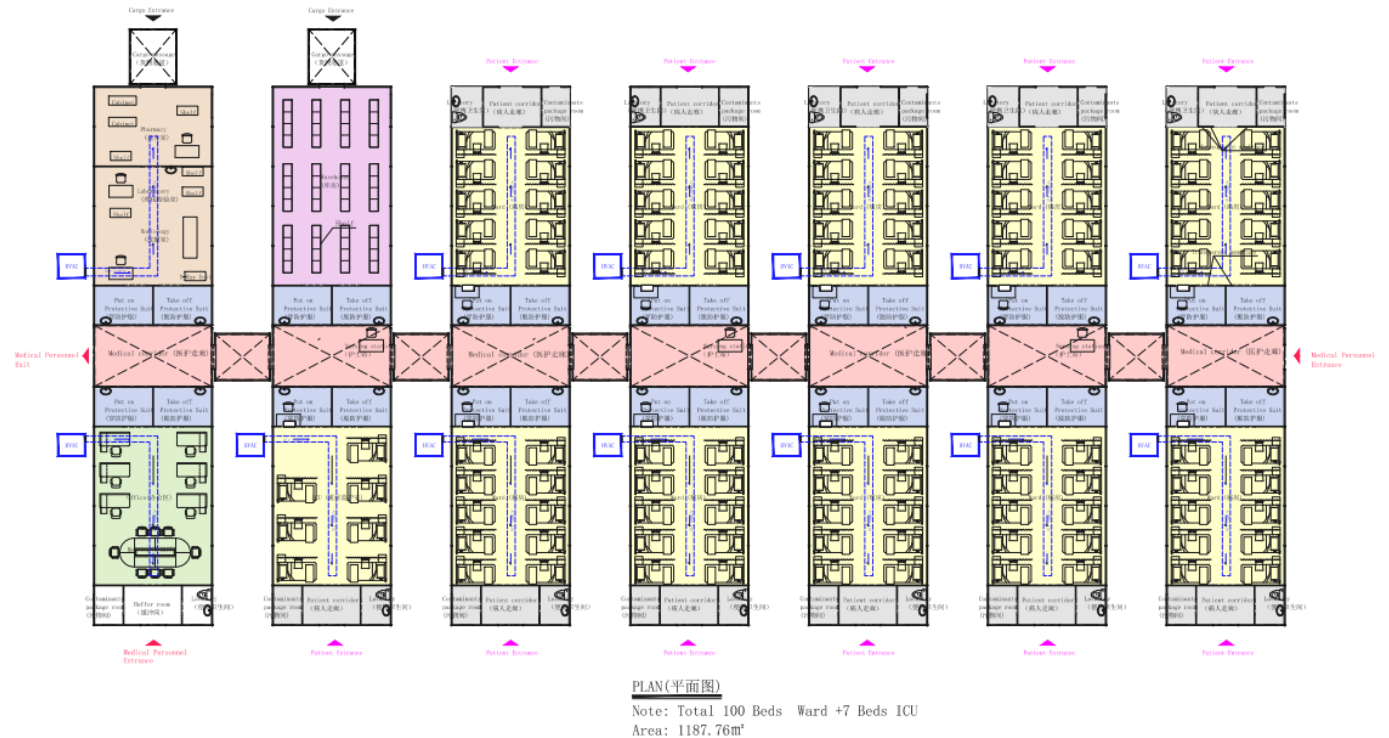
Space - One 14 module hospital is 12795sq.ft. A space of approximately 230' x 120' is needed.

Electricity – 150kw are needed to power the AHU units and LED lights.

Additional Options:

Each module unit comes with zipper doors, but double-doors can be substituted.

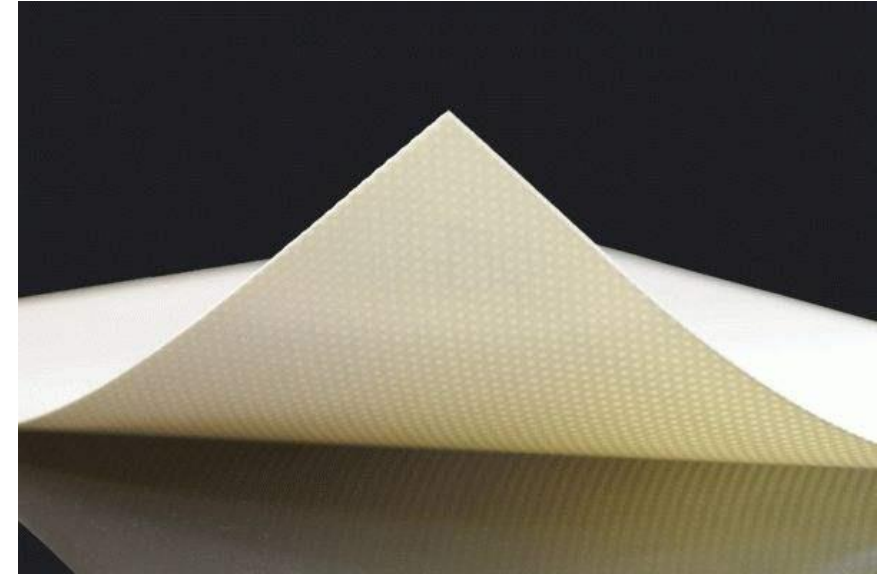
Additional modules can be added.



➤ Quickly Assembled Module Antiviral Hospital

New antimicrobial material

The module hospital uses a **ClearStrong®** membrane for the interior fabric and floor fabric. This membrane contains fluoride which **inhibits the growth and reproduction of disease-causing microorganisms**. It also contains metal ions which can penetrate into the microbial cell membrane and destroy the protein activity of microorganisms and disabling its ability to reproduce. It exhibits **strong corrosion resistance, pollution resistance and is has self-cleaning properties**



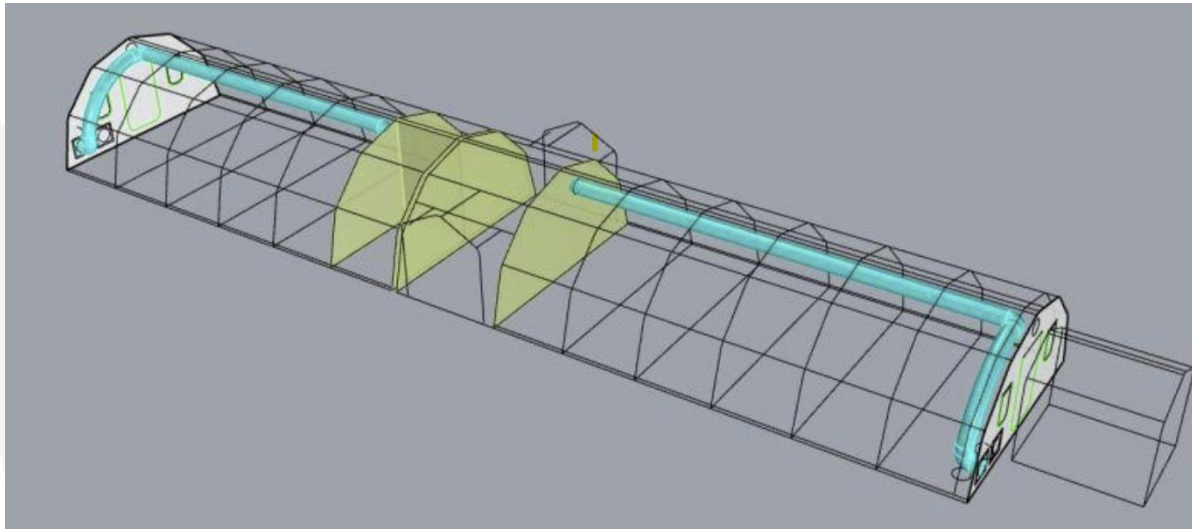
Test strains – ClearStrong fabric test	Inoculum concentration CFU/ml	The number of viable bacteria directly obtained without processing sample CFU/cm ²	The number of viable bacteria cultured for 24 hours after inoculation of non processed sample CFU/cm ²	The number of viable bacteria in 24 hours after inoculation of sterile sample CFU/cm ²	Bacteriostatic activity value (R)	Antibacterial Evaluation
Staphylococcus aureus ATCC6538	6.8X10 ⁵	1.6X10 ⁴	1.5X10 ⁵	<0.63	>4.4	Effective
Escherichia coli ATCC8739	4.8X10 ⁵	8.1X10 ³	7.5X10 ⁴	<0.63	>6.1	Effective

➤ Quickly Assembled Module Antiviral Hospital



Integrated AHU unit – produced by Haier

- Each module has its own unit.
- Provides the interior with a very **comfortable environment**.
- **Purification efficiency higher than 0.1 μ m 99.995%.**
- Capable to supply air either in **positive or negative pressure** mode as in needed.



Integrated purification unit specification:

Cooling Load: 18kW

Heating Load: 18kW

Re-Heating Load: 6kW

Input Air Capacity: 3000cbm/h, overbottom pressure: 200-500pa

Recycle/Output Air Capacity: 3000cbm/h, overbottom pressure:
120-420pa

Input power: 12kW

➤ Quickly Assembled Module Antiviral Hospital - Anchorage



MEDICAL FACILITY



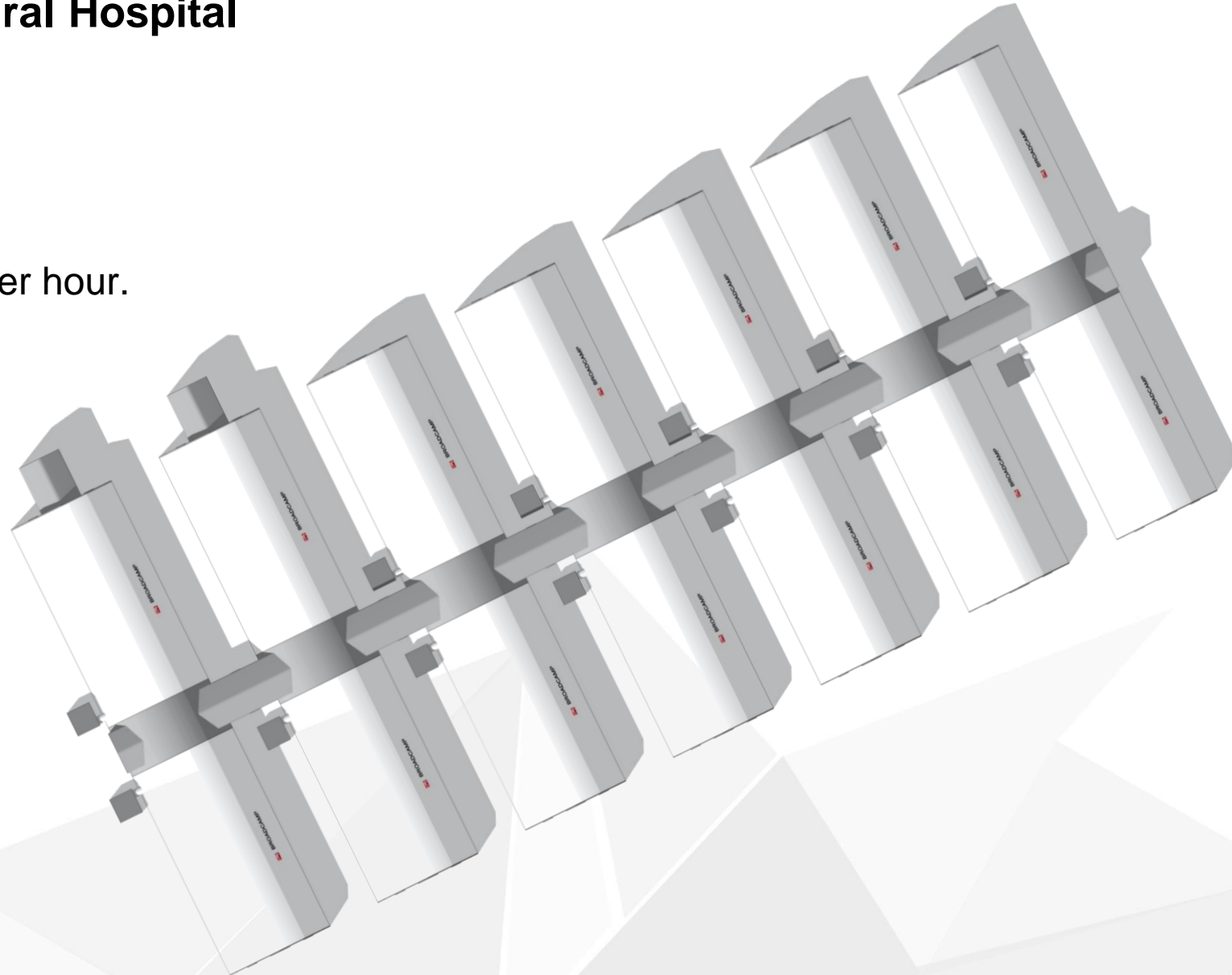
➤ Quickly Assembled Module Antiviral Hospital

Weather Resistance

- Temperature: -20 °C to 45 °C
- Withstand wind load of max 100 miles per hour.
- Withstand snow load of max 1.0 kN/m².

Warranty

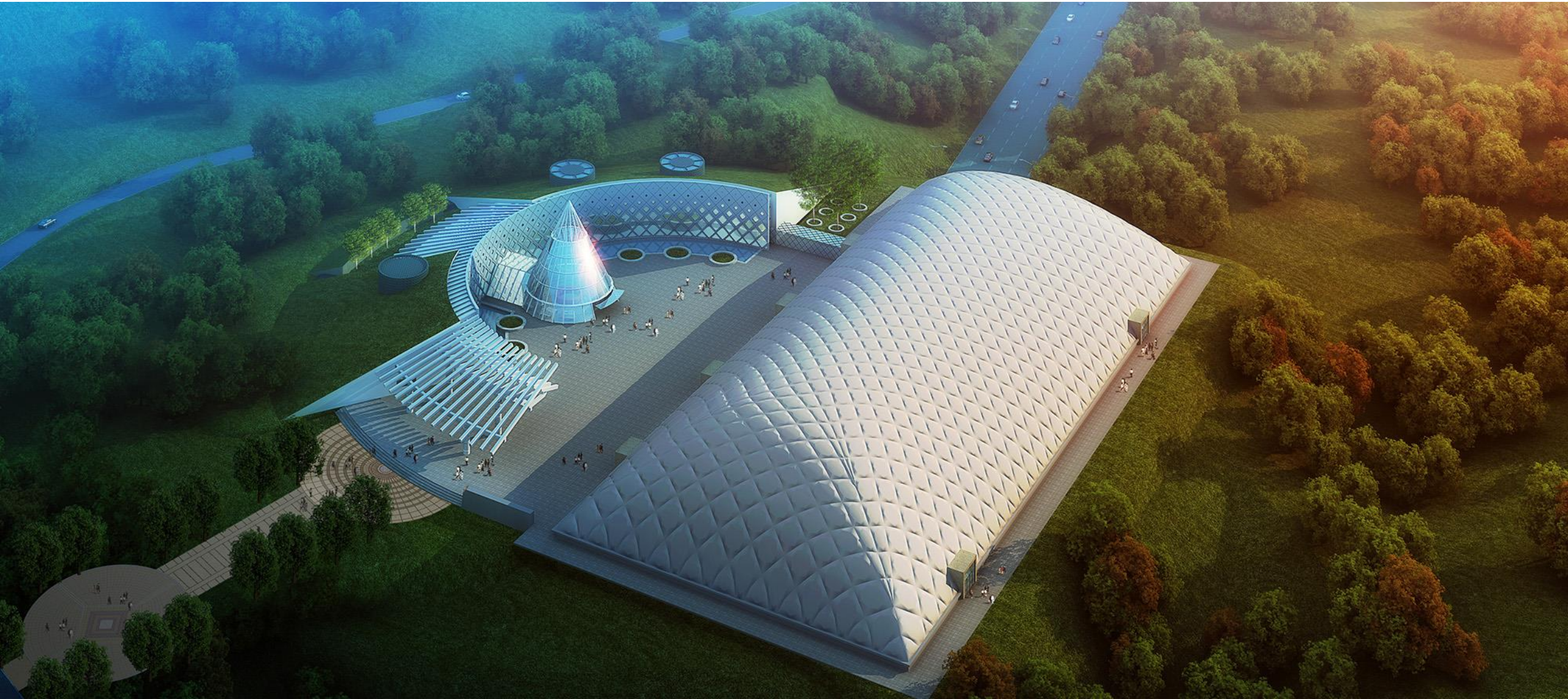
- 15 year exterior fabric
- 20 year interior fabric



MEDICAL FACILITY



➤ Open-Span Air Dome Hospital



MEDICAL FACILITY

➤ Open-Span Air Dome Hospital – Inside

Our Open-Span Air Dome Hospital can be made virtually any size, and in many shapes. They typically include the components below:

1. Fabric envelope system,
2. Cable harness system,
3. Door system,
4. Lighting system,
5. HVAC system,
6. Intelligence control and remote monitoring system,
7. Anchorage system.



MEDICAL FACILITY

➤ Open-Span Air Dome Hospital – Features

Large Space

With huge clear space inside, without any pillar or beams needed for support, we can make the domes up to 390ft in width and limitless length. Easy to accommodate many beds, with no layout limitations.

Fast Setup

Site installation takes only 7-10 days, enabling fast deployment during an epidemic. The dome can be easily relocated. There is no special requirement for terrain; it can be built on dirt, grass, sand, parking lots, etc.



Totally Enclosed

The air dome is a total enclosed structure that can be fully climate controlled.

Energy Saving

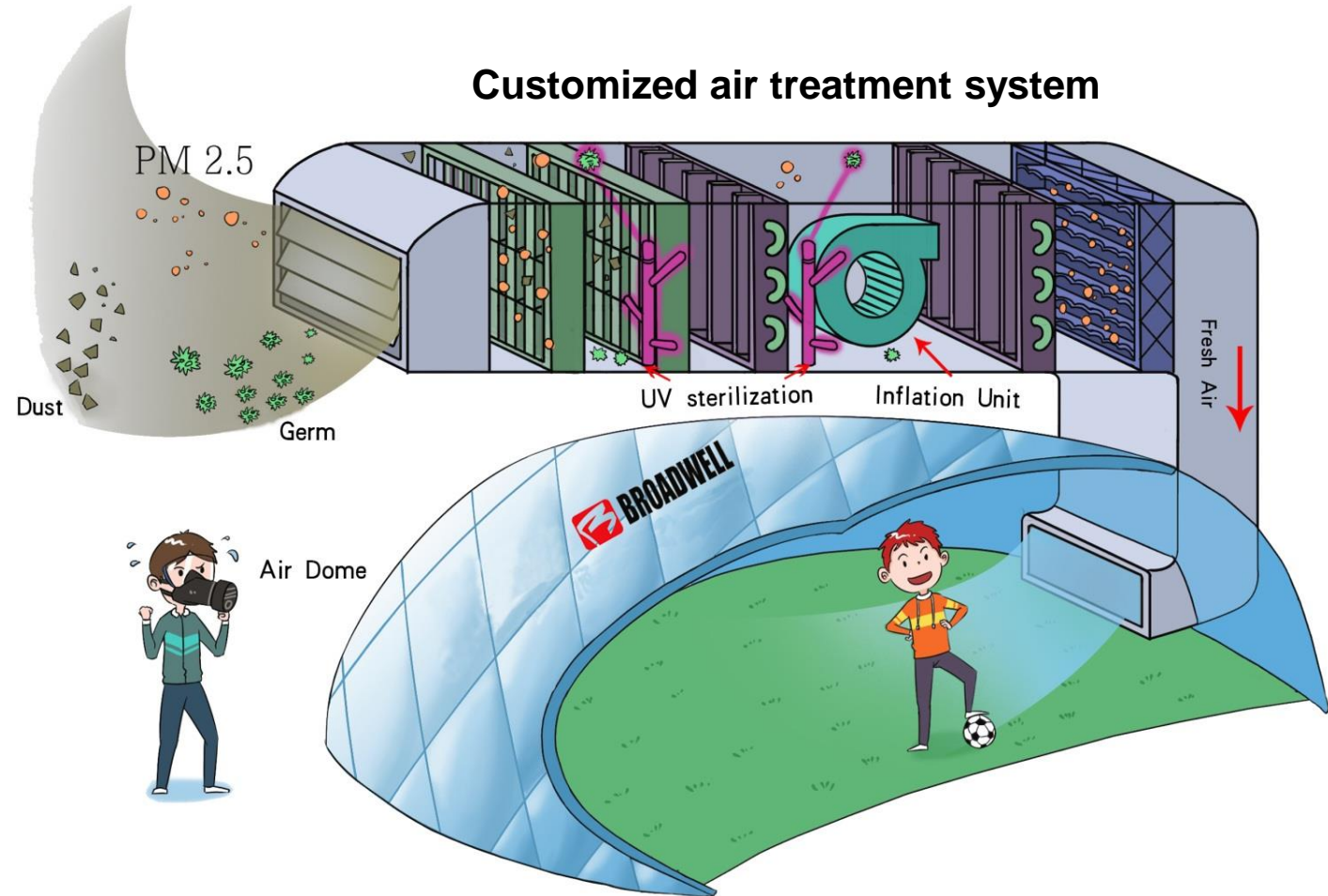
Our domes use only 60% of the energy of traditional structures.

Weather Resistance

Withstands heavy snow (up to 50psf) and strong wind loads of up to 150 miles per hour.

➤ Open-Span Air Dome Hospital – Features

1. Our air dome can provide a huge enclosed space, with constant temperature, air quality and humidity control. This creates a year-round environment for sports and warehousing.
2. The air purification system can filter dust and filter out than 90% of PM2.5 particles. Our customized air treatment system, can also kill mold, germs, viruses, and other microbes.
3. Our air circulation systems accommodate fresh air exchange requirements. We can also install custom sensors to monitor the real-time air quality inside the dome.



CHAPTER 2

OVERVIEW OF A BROADWELL AIR DOME



ABOUT BROADWELL AIR DOME



➤ Air Dome System



ABOUT BROADWELL AIR DOME



➤ Unique Bias Harness Cable Net System

- ☆ Unique patented bias-harness cable net system with aesthetic design
- ☆ Completely covers the outer membrane, greatly reducing the stress of the membrane material which extends the useful life of the dome.
- ☆ Force transfer path is clear:
Fabric → Cable net → Anchoring system → Anchorage → Foundation
- ☆ Allows domes to be designed to withstand up to 150 miles per hour wind load (level 16 typhoon) and up to 50 psf of snow load.
- ☆ Deformation with a cable harness is very small—less than 8 inches. Without a cable harness, the dome can deflect nearly 7 feet.
- ☆ Under storm conditions, with high wind and snow, the cable harness allows the dome to be pressurized to more than 2.4 inches wc



Force Load on the fabric of air dome without cable harness system

跨度/宽	高度	半径	长度	锚固荷载		膜材荷载			膜材负荷
				实际	设计	径向	纬向	综合荷载	
M	M	M	M	KG/M	KG/M	KG/M	KG/M	KG/M	KG/M
12.192	6.096	6.096	24.384	479.6	959	46.6	703.9	649.7	703.9
15.24	7.62	7.62	45.72	600.3	1201	57.4	981.8	920.7	983.1
18.288	9.144	9.144	60.96	719.5	1440	68.9	1209.6	1153.3	1209.6
21.336	9.144	10.795	91.44	749.3	1500	83.8	1512.9	1416.4	1512.9
24.384	9.753	12.496	91.44	817.8	1634	98.7	1847.7	2066.3	2066.3
30.48	10.363	16.388	91.44	920.6	1841	141.4	2015.9	2414.8	2414.8
35.906	12.192	19.359	91.44	1084.4	2169	167	2188.6	2574.5	2574.5
45.72	18.288	23.432	152.4	1532.8	3064	185.1	3071	3486.3	3486.3

Force Load on the fabric of air dome with cable harness system

宽/跨度	高度	压力	风速	锚固荷载		钢缆荷载		膜材挠度	膜材负荷
				实际	设计	实际	设计		
M	M	Pa	KM/小时	KG/M	KG/M	KG	KG	M	KG/M
17.68	8.53	375	120.7	678	1356	1239.4	2479	0.156	109.9
17.68	8.53	750	160.9	1244	2488	2275	4549	0.168	196.4
30.48	11.58	375	120.7	988	1975	1805	3611	0.126	104.7
30.48	11.58	750	160.9	1834	3667	3354	6708	0.139	187.7
35.97	13.41	375	120.7	1150	2300	2104	4209	0.12	102.8
35.97	13.41	750	160.9	2141	4281	3913	7827	0.133	186.6
60.96	18.29	375	120.7	1714	3429	3135	6270	0.106	101.4
60.96	18.29	750	160.9	3228	6456	5903	11807	0.119	181.6

ABOUT BROADWELL AIR DOME



➤ Our Projects in Strong Wind and Heavy Snow Regions

The best evidence of safety is seeing how domes perform in strong typhoons and heavy snow regions. Despite having dozens of domes in the path of multiple typhoons and heavy snow storms, we have a **perfect safety record**. **None of our domes have ever had a catastrophic failure.**



Hainan, Canton, Zhejiang (Strong typhoon and High temperature Region)



Minnesota(USA), Xingjiang, Inner Mongolia, NorthEast (Cold, Ultra-low temperature and Strong winds Region)

ABOUT BROADWELL AIR DOME



➤ Unique Remote Monitoring System

Remote monitoring interface on mobile device - APP



BROADWELL Air Dome buildings adopt PLC (**supplied by SIEMENS**) intelligent control system. Through a RS485 interface clients connect via PC or through smart device application to remotely live monitor the dome operations including: **mechanical system operation status, lighting, temperature, humidity, wind speed, snow pressure, air quality, etc.** Data is kept for 5 years. Our control system is equipped with an alarm system, which can alert you if severe weather is imminent or if monitored conditions of the dome go outside predefined thresholds.

CHAPTER 3

ABOUT BROADWELL



ABOUT BROADWELL



Broadwell is the worldwide leader of air supported structures (also known as “air domes”). Founded in 2003, we focus on air dome design, manufacturing, and R&D. We have 120 employees, 1/3 are R&D experts, and about 100 more independent contractors.

Our business covers China, Russia, North America, the Middle East, Japan, South Korea, Southeast Asia, etc. Our air domes are applied in sports, entertainment, industrial warehousing and manufacturing, logistics, environmental protection, tourism, archaeology, agriculture, business, biochemistry, petrochemical, military, etc.



ABOUT BROADWELL



➤ World's Largest Manufacturing Center

Broadwell manufacturing center was completed in 2016, with total area of **more than 355 thousand square feet**. It consists of an office building and two air dome dust-free factories.

Our manufacturing **annual capacity is up to 50 million sq.ft**, using state-of-the-art RF welding machinery and strict quality control standards.

We can produce our domes in as little as 14 days after design and engineering are completed. Installation of the domes can take as few as 5 days for small domes, and several weeks for large domes.

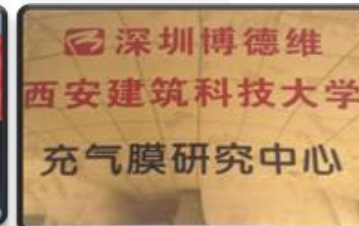
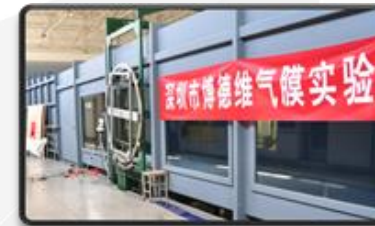
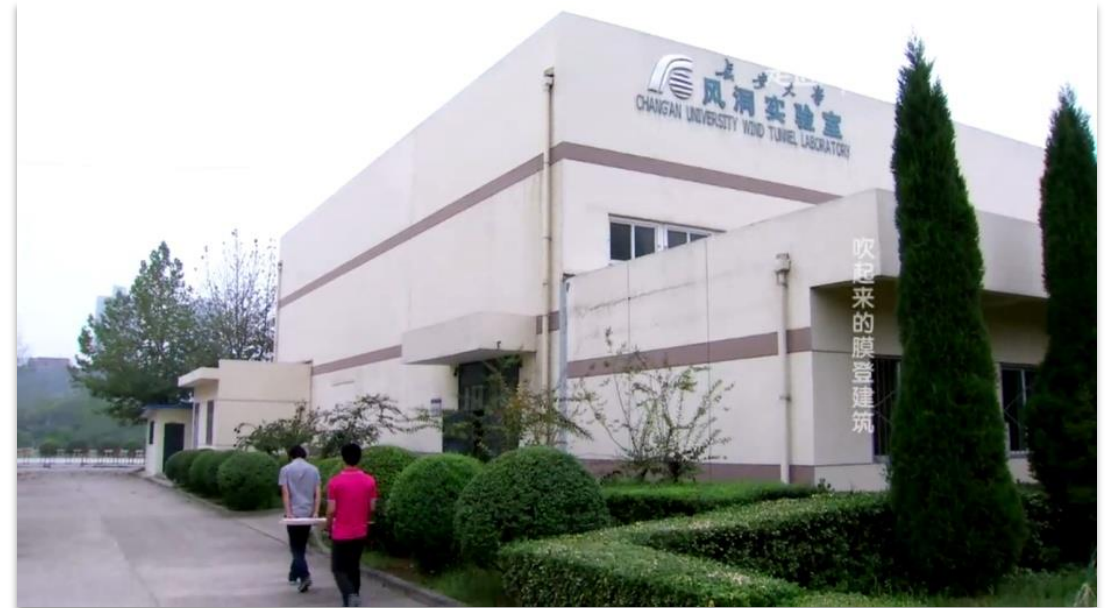
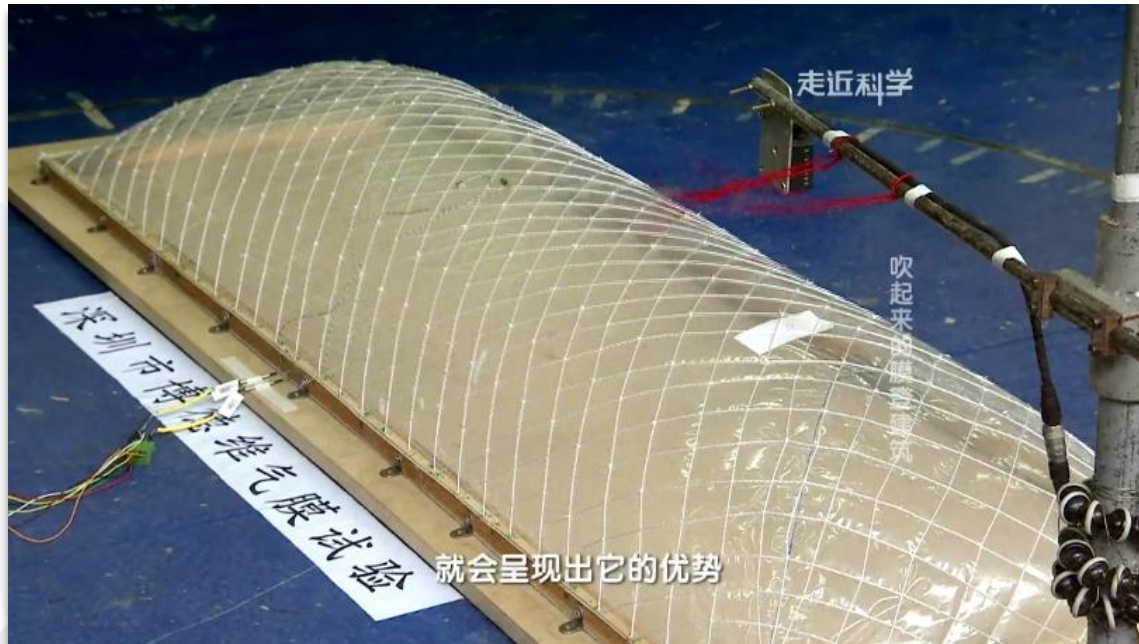


ABOUT BROADWELL



➤ R&D Center

Broadwell has close partnership with many top universities and R&D partners. Broadwell has invested millions of dollars in R&D, owns **over 135 patents, and 80% of the new inventions in the air dome industry** belong to Broadwell.



ABOUT BROADWELL



➤ Partnerships

BROADWELL adheres to customer value as the center of our philosophy, with a commitment to providing the best solution with the best service, and creating win-win cooperation with our partners.



CHAPTER 4

BROADWELL AIR DOME PROJECTS



BROADWELL CLASSIC PROJECTS



Broadwell Project List in Overseas (Part)					
NO	YEAR	PROJECT NAME	COUNTRY	DIMENSION (sq.ft)	FUNCTION
1	2010	Ufa Warehouse	Russia	10,760	Warehouse
2	2015	MBA badminton Puchong Malaysia	Malaysia	30,913	Badminton
3	2015	Turkey Balikesir Children's Park	Turkey	48,678	Children's Park
4	2016	Turkey Antalya Children's Park	Turkey	60,256	Children's Park
5	2016	Sport Air Dome in New York	USA	23,377	Stadium
6	2016	Las Vegas Projection Fulldome	USA	31,387	Projection
7	2017	Maryland Bel Air Swimming Club	USA	16,882	Swimming Pool
8	2018	Seattle Vashon Island Tennis Club	USA	12,643	Tennis
9	2019	The Pohang City Dome	Korea	16,140	Sport & Earthquake Shelter
10	2019	Gustavus Swanson Tennis Center	USA	48,689	Tennis
11	2020	2020 Super Bowl Projection Show Dome	USA	423,664	Projection

On Going Project (Part)					
1	2020	Almaydan Soccer Complex for Male	Qatar	67,788	Football
2	2020	Almaydan Soccer Complex For Female	Qatar	58,911	Football
3	2020	International School Sports Stadium	Indonesia	25,824	Sports
4	2020	NCWC Tennis Club Dome	USA	48,564	Tennis
5	2020	Fly Ash Storage Facility	India	116,208	Storage

Gustavus Adolphus Swanson Tennis Center, Minnesota, USA, 2019

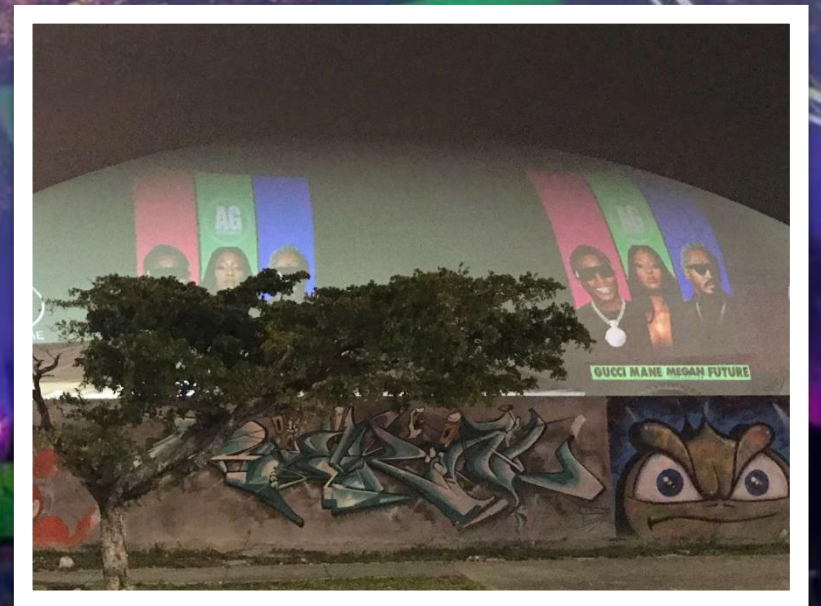
➤ 175' x 280' x 60' - 49,200 sq ft

This Tennis Dome is located in Gustavus Adolphus College, St. Peter, Minnesota. This is a very heavy snow area, and our dome is designed for a heavy snow load. From design, manufacture, shipment to construction completion, it only took **40 days**.



Projection Dome – in Super Bowl, 2020

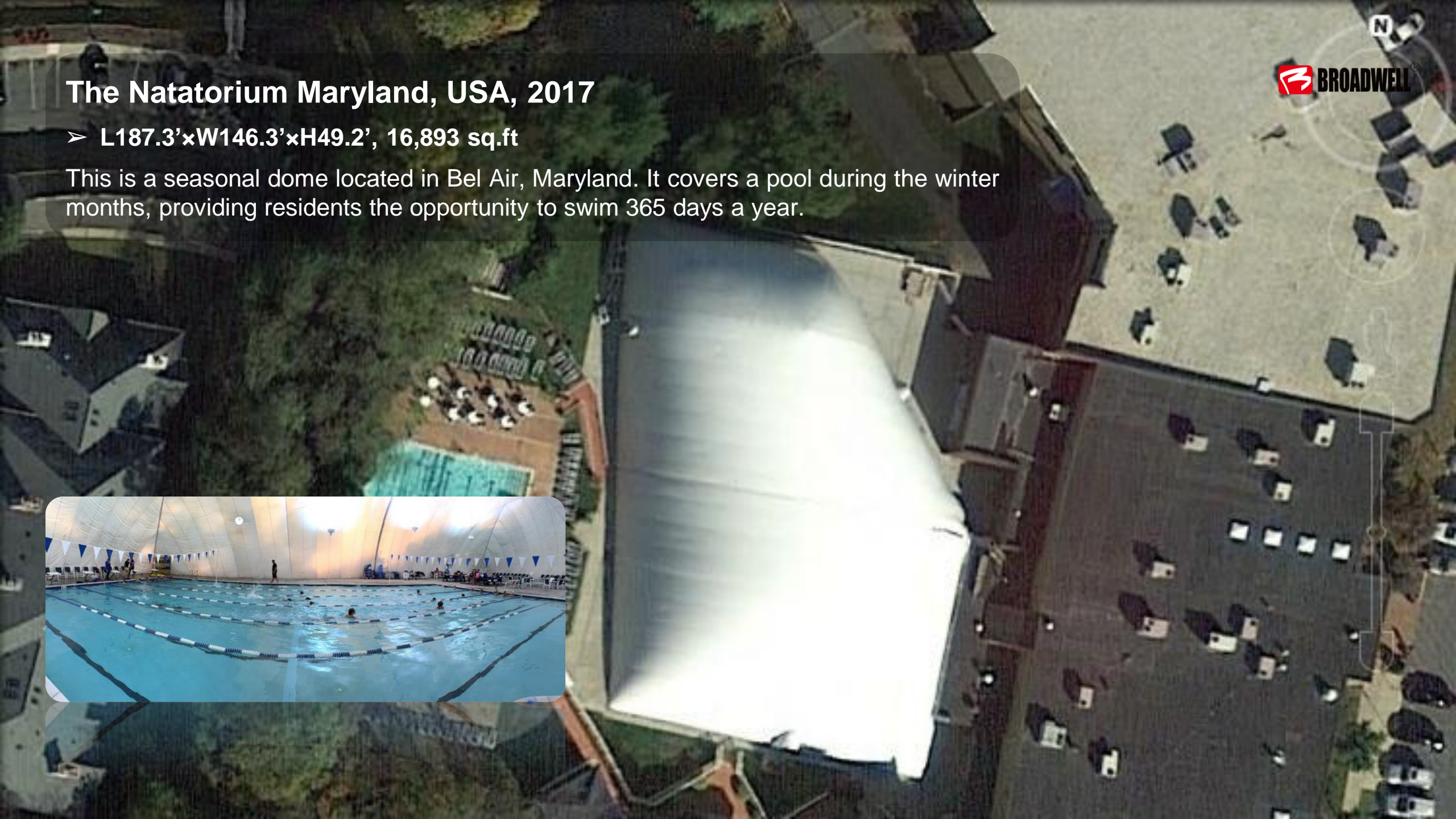
39,374sq.ft, Miami



The Natatorium Maryland, USA, 2017

➤ L187.3'xW146.3'xH49.2', 16,893 sq.ft

This is a seasonal dome located in Bel Air, Maryland. It covers a pool during the winter months, providing residents the opportunity to swim 365 days a year.



Shenhua Group Bayannur Coal Bunker, 2012

➤ L761'xW328xH118', 249,723sq.ft, L1312'xW361'xH138', 473,612sq.ft

Shenhua Group Bayannur Coal Domes is the first coal bunker dome in China and are among the largest domes in the world. The huge inside space allows large coal handling equipment work inside the air dome. We finished this dome within one year, while traditional structures of the same size would have needed 2-3 years and cost many times more than the cost of the dome. For this dome, we developed a customized real-time monitoring system to monitor the build up of poisonous gas inside the dome, to ensure optimal safety for workers



Children's Park, Balikesir & Antalya, Turkey, 2015

➤ L285.4'xW170.6'xH55.8', 48696sq.ft, L262.5'xW230'xH65.6', 60,278sq.ft

The Children's Park Dome Project is the first Chinese-made dome in Turkey. It is a livelihood project invested by the local government. It provides a full range of facilities for local children and adolescents.



Beijing ISB Sports Stadium



➤ L248'xW185'xH61.7', 45,973sq.ft*2

International School of Beijing (ISB) is a long-established international school founded in the 1970s. It is a full-time, wholly foreign-owned institution that provides education for the children of foreigners working and living in Beijing.

The ISB Dome Tennis Stadium is the first sports venue in China that can filter pm2.5 and meet the healthy indoor environment of AQI (the highest standard of Ambient Air Quality Index).

The sports dome is equipped with **Broadwell's patented "Blue Sky" purification system**, which has a high-grade air filter unit that effectively filters out harmful particles such as pm2.5, providing an outdoor pm2.5 index of 700 indoors but only 20 clean air environment. The sports dome is the world's first indoor stadium with air purification.



Zhengdong Dragon Lake National Fitness Center, 2018



➤ (L328' X W131.2' X H42.7') X 3, 129,167sq.ft

The whole center consists of three air domes: one swimming pool, one basketball and one trampoline. Each one is over 40,000 sq.ft. It is located in the high tech park of Zhengzhou, the center of China. It is a multi-function sports park, allowing thousands of people to enjoy the park at the same time.



Pohang City Disaster Evacuation Center, 2019

➤ L164'xW98.4'xH39.4', 16,146sq.ft

This is a government evacuation center in Pohang, Korea. After investigating many structure types, the Pohang government chose Broadwell Air Domes as the solution after their earthquake in 2017. It is used as a sports center on a daily basis, and is designated as an evacuation center during a crisis.

This whole facility is powered entirely by solar energy.



Shanghai Communication University Basketball Stadium

➤ L466'xW124.7'xH49.2', 58,082sq.ft

This dome is the basketball stadium which we built for Shanghai Communication University, one of the best universities in China, which is located in Shanghai. This dome has a dedicated monitoring system which allows the client real-time monitoring of temperature, humidity, air pressure, air quality, and several other customized functions.





Shanghai Tongji University 2018 WIEE Conference Hall, 2018

➤ L262.5'xW197'x65.6', 51,667sq.ft

This is the main conference hall for the 2018 WIEE (World Innovation & Entrepreneurship Expo), and many important events and activities have been held in the dome. It is located in Tongji University, the most famous university in China.

Cifeng City Museum, Inner Mongolia, 2016

➤ L449.5'xW230'xH82', 103,226sq.ft

This dome covers an archeology site that is about 4000 years old. It is the most important archaeological discovery in Northeast Asia since 2000.

It is one of the “2009 Top Ten New Archaeological Discoveries in China” by the State Administration of Cultural Heritage.

Considering there is a railway tunnel under the site, the air dome is the perfect solution to protect the archeology site with the least impact to the tunnel.

The air dome has good sealing performance, which can completely separate the cultural relics from the outside world. And the temperature and humidity in the air dome can be adjusted through the smart monitoring system, which can easily meet the indoor environment needs of protecting cultural relics.



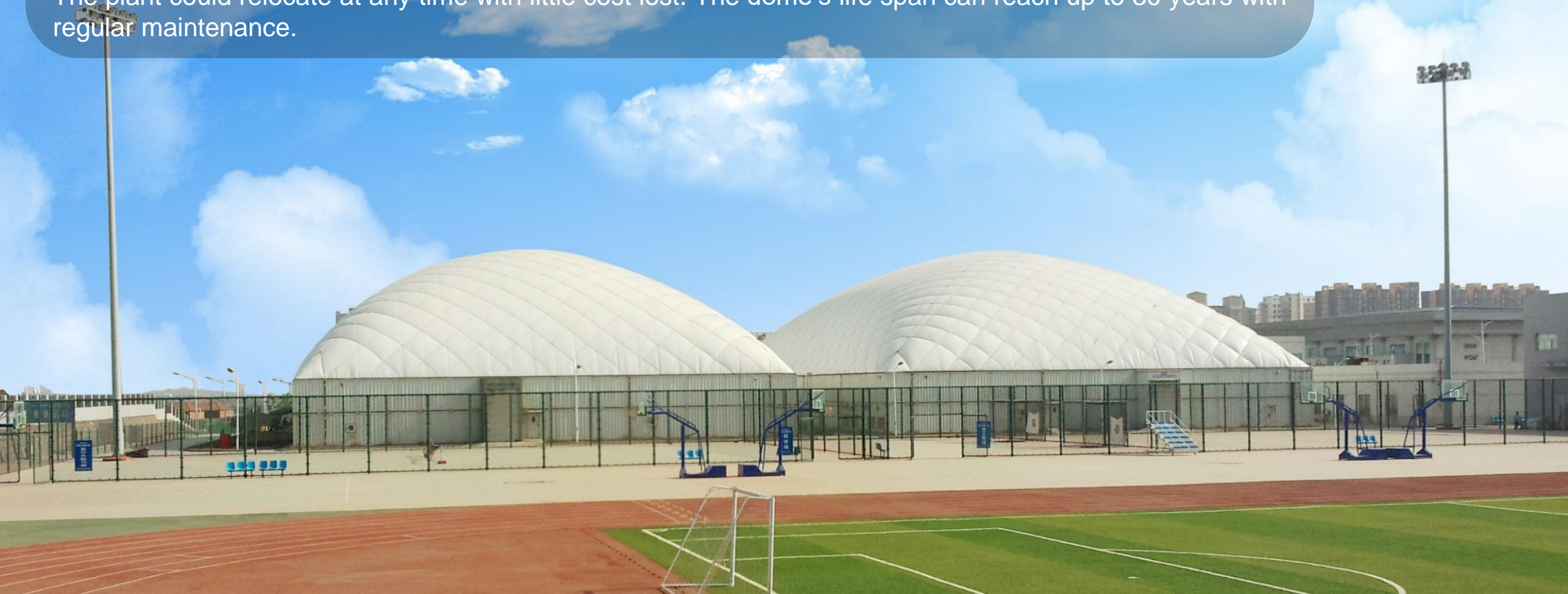
Foxconn Moveable Clean Plants, 2011

➤ L200'xW137.8'xH55.8', 27190sq.ft*4

The production of precision accessories provided by Foxconn for Apple mobile phones is completed here.

These domes utilize a transparent membrane on top of the dome to utilize natural light during the daytime, which can save more than 60% of the energy consumption for the Foxconn plant.

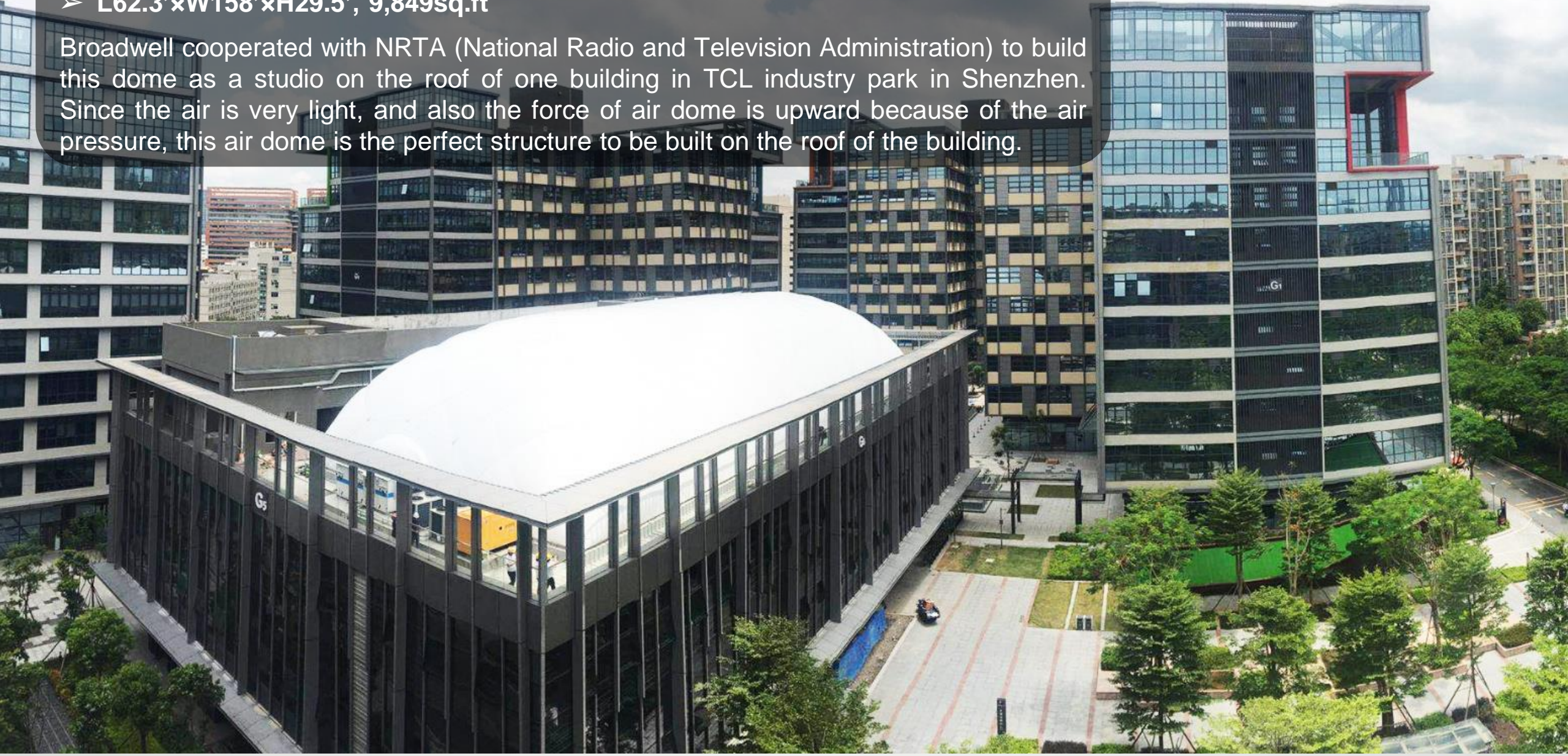
The plant could relocate at any time with little cost lost. The dome's life span can reach up to 30 years with regular maintenance.



TCL Studio Roof Dome, 2019

➤ L62.3'xW158'xH29.5', 9,849sq.ft

Broadwell cooperated with NRTA (National Radio and Television Administration) to build this dome as a studio on the roof of one building in TCL industry park in Shenzhen. Since the air is very light, and also the force of air dome is upward because of the air pressure, this air dome is the perfect structure to be built on the roof of the building.



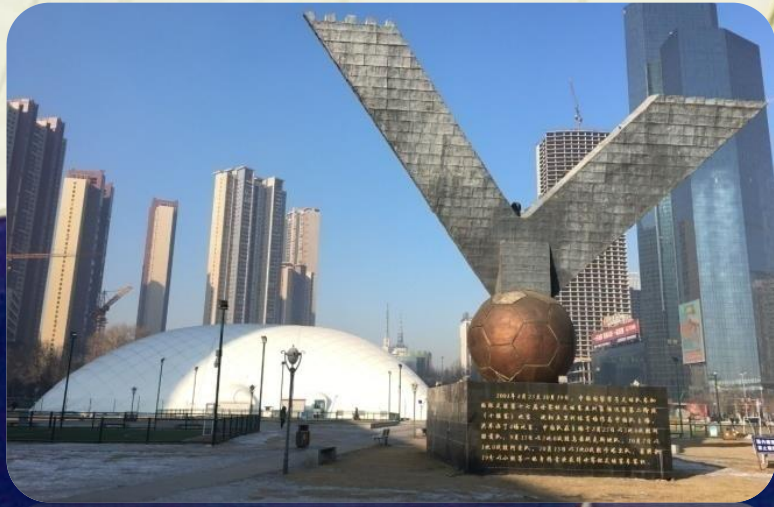


Henan Medical Technician College Stadium, 2015

➤ L334.6'xW223'xH75.5', 72,807sq.ft

The Henan Medical Technician School is China's first air dome. There is a 200-meter running/walking track around the inside of the dome, with 50 standard badminton courts on the interior. These courts are flexibly converted into tennis courts, basketball courts and even football fields.

The air dome is equipped with Broadwell's "blue sky" air purification system, which can efficiently filter the air entering the room to ensure that the air is fresh and clean, creating an indoor air sports environment with excellent air quality.



Shenyang Children's Football Park, 2016

➤ L187.3'xW146.3'mxH49.2', 27412sq.ft

This is a football air dome located in Shenyang, Liaoning Province, the north-east part of China. This dome is used for children's football training, and it provides children a place to play and train even in the cold or high air pollution days.

Merchants Port (Shenzhen) Granary, 2014

➤ L525'xW164'xH65.6, 86,111sq.ft

The granary dome is not only leak-proof, moisture-proof, heat-insulated, closed and ventilated, but also has the advantages that traditional steel structure granaries can't match: good sealing performance, strong anti-corrosion ability, seawater erosion resistance; light weight, suitable for construction in soft coastal areas.

Broadwell Air Dome Industrial Park, 2015

➤ 96,875sq.ft (#1), 68,006sq.ft (#2)

The biggest and most advanced air dome industrial park in the world. It is a high cleanliness air dome manufacture center, which can produce 5 million square meter of fabric envelope with top quality.



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Visit us on YouTube: [Broadwell Air Domes](#)



Thank You!