



Tech Snapshot Advanced Materials

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AIR BUOYANT VESSEL

Using "nothing" (i.e. vacuum) instead of helium to achieve buoyancy in air.



SUMMARY

An air-buoyant vacuum vessel (aka a vacuum balloon) would float in air by the same principles as a helium weather balloon or blimp, but be filled with "nothing" (i.e. vacuum) instead of helium. In order to achieve buoyancy in air, a solid hollow structure would need to be made from material strong enough to withstand the crushing force of atmospheric pressure, while light weight enough to float when vacuum is applied to the interior void space.



MARKET

The technology has the potential to disrupt the aerostat and weather balloon industry by reducing reliance on helium, extending operating durations, and increasing reliability. Agriculture (i.e. crop monitoring), defense (i.e. surveillance), and internet access industries could benefit from applications of this technology.

BENEFITS

The technology has the potential to:

- decrease the cost and facilitate the targeted treatment of crops,
- increased surveillance and decreased need for field agents, and
- providing internet access to remote locations.

- "Nothing" (i.e. vacuum) is less expensive than helium.
- "Nothing" (i.e. vacuum) is more abundant than helium.
- "Nothing" (i.e. vacuum) is lighter weight than helium.
- "Nothing" (i.e. vacuum) is easier to transport than compressed gas cylinders of helium.

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WHY WE ARE BUILDING AIR BUOYANT VESSEL

This technology is a solution to the ever increasing cost and decreasing availability of helium gas, and the impact this is having on private, academic, industrial, and government ballooning applications.



WHAT'S BEHIND OUR TECHNOLOGY

This technology is much safer to using hydrogen in place of helium in aerostat and weather ballooning applications due to the flammability and chemical volatility of hydrogen.



OUR COMPETITIVE ADVANTAGES

The increasing cost and decreasing availability of helium gas is driving the competitive interest and attractiveness of this technology.



OUR TECHNOLOGY STATUS

Current project funding is driving the development of ultra-strong, ultra-light-weight materials with the end goal of the project being the production of an air-buoyant vacuum vessel prototype constructed from these materials. Once air-buoyancy of the vacuum vessel is demonstrated, steps will be taken to commercialize the technology.



PUBLICATIONS AND IP

S133529.001, "Air-Buoyant Structures in Vehicles", U.S. Patent Application No. 15/997,163, Application Date: 06/04/2018.