



**Friday Harbor High School Aerospace Team wins 2019 International Space Settlement Design Competition
August 1, 2019**

Report from teacher Dan Garner -

On Monday July 29, the FHHS Aerospace Design team completed their 7-month quest for a World Championship title.

The team traveled to the 2019 International Space Settlement Design Competition (ISSDC) World Finals along with 19 other teams from 10 countries from around the globe to compete at NASA's Kennedy Space Center. The FHHS team, along with their corporate teammates (Uruguay, Canada, India and central US semifinalists) presented their Space Settlement design to the judges at 11:00 am Monday morning, July 29, 2019.

The team, dubbed "Rockdonnel" had 35 minutes to present their 50-slide proposal to NASA and Aerospace industry judges and then faced 10 minutes of questions. Their design, a settlement named Balderol, was Rockdonnel's answer to this year's RFP (Request for Proposal) for a city on the moon's far side in the year 2050.

Rockdonnel received this RFP just 42 hours earlier and had to design the construction, operations, and planning of the entire settlement from scratch. At 6:00 pm Monday evening, the judges awarded the contract to Rockdonnel in front of a packed auditorium of 500 people. This sleep-deprived, exhausted team shot out of their seats and mobbed together in a heap of hugging and cheering - one big mass of hysterical, jumping and astonished kids who are as religiously, racially, and nationally diverse as any team I've ever seen, sharing that universal language of a hard won victory. It was impossible to think that these were mostly strangers to one another just 48 hours previously. That being said, 24 hours earlier, things did not look so promising.

Around 5:00 pm on Sunday afternoon, the team had hit a low point. Their design has just been harshly critiqued by a panel of experts in a design review, and it was with tails between their legs that Rockdonnel entered into a long night of designing. Around 10:00 pm however, Arlo Harold had the brilliant idea of re-structuring the 60 person team: 25 designers would continue their work and would piece together the slide show. Department heads would keep their top three designers. The other 35 would become an art department and a presentation team. They would work on creating drawings, rendered images,

and animations and would edit the presentation, put together a script and then get some much needed sleep. Because the team had grown to accept Harold's leadership, they put their full force into the design, and by 5:00 am had put together a beautiful and thorough design proposal.

Additionally, Lucy Urbach and Brandon Payne worked right up to 7:00 am finishing the 150-item compliance matrix for the final two slides, an item that would aid the judges in finding design items in their deliberations, something never seen before in a world final competition. It very well may have been the deciding element.

The presentation itself was well received. Balderol was situated in a "rille", or a small canyon. Four enormous domes connected by tunnels graced the canyon floor. The walls of the rille were studded with a honeycomb-like network of in-set houses. Beneath the surface were all of the elements it would take to keep humans alive in any city. It included schematics for infrastructure like a fully designed solar power energy network, water networks, atmospheric composition, pressure requirements, radiation shielding, agriculture needs and dietary intake, and contingency plans in case of system disruption or disaster.

In short, the team designed an entire working community, from initial construction to the housing designs to safety precautions. As complicated as that may sound (and yes, it is complicated) the team focused this year on compliance with the RFP's requirements and producing a simple design.

Designs from all Friday Harbor students made it into the design brief. Julian Brown, who took over as head of structure at 1:00 am, created the design for a lunar industrial park, available for raw materials processing. For Operations, Emma Mughal's design for road construction, routing, and import/ export planning was featured- it fit particularly well with Hank Erickson's internal transportation design. In Human Factors, Sander VanHamersfeld worked on community layout; Evan Foley's concept for a cliffside embedded honeycomb housing system was later highlighted by the judges as were Darcy Ayers' spacesuit designs, created to biometrically take into account individual body shapes and metabolisms. Also in Human Factors, Emmett Carrier created a very thorough airlock and spacesuit docking port system. As the head of Automations, Joely Louck's entire section was impeccable and cohesive, while Jaden Jones and his to-scale drawing of the settlement also made an appearance more than once in the presentation.

It is a difficult task to encapsulate all of the work put into this year's design, and even harder to capture the jubilation that occurred when the Rockdonnell and the Friday Harbor name was read out as the 2019 World Champions, but suffice to say that the intensity of the joy was heightened by the difficulty of the

competition, coupled with the focus and intense, relentless collaboration that had to occur in order to be in contention. The joy was further heightened in knowing how much support we had behind us on the island— that our team was not bounded by the walls of that award venue, but was extended beyond our knowing to the many hopes and thoughts of the many supporters in Friday Harbor. We may be a small school, but we have talent, vision, and the faith of our community that larger schools could only dream about.

The members of the 2019 Friday Harbor Aerospace Design Team are Lucy Urbach, Joely Loucks, Brandon Payne, Julian Brown, Arlo Harold, Evan Foley, Emmett Carrier, Sander VanHamersfeld, Jaden Jones, Emma Mughal, Hank Erickson and Darcy Ayers. The team is taught and coached by FHHS teacher Daniel Garner and was bravely accompanied by Jill Urbach, Mike Loucks, and David Harold.

The Aerospace Team, also known as Island Orbital Technologies (IOTech), would like to give a special thanks to our supporters this year. To Valmark, The San Juan Island Public Schools Foundation, the Soroptimists, San Juan Island Lions Club, San Juan Island Leos, Rotary Club of the San Juan Islands, Island Petroleum Services, San Juan Interiors, the Marble Family, and G. Opatz. Without your financial support we wouldn't have been able to make it to NASA in the first place. We would also like to thank Kari McVeigh, Fred Woods, Jill Sandwith and all of the SJISD staff for believing in us and helping to make this trip happen.