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Site options

We looked at three possible sites for the 2017 Lake Michigan Ozone Experiment in Sheboygan. These were the water treatment plant on the lake shore, the parking lot at the McClone group further away from the lake, and the Spaceport science education facility in Blue Harbor.

1: best, 5: worst	Water Plant	McClone Group	Spaceport
Electrical			
Installing receptacle	4	4	2
Running cable	1	4	2
Location			
Distance from lake	1	3	1
Capturing atm flow	3	3	1
Security	2	2	2
Doppler Lidar FOV	2	4	1
Surface Met	1	2	2
Parking trailer	1	1	1
LTE Network	4	1	1
Network speed test (Mbps)	3 down, 1.7 up	24 down, 4.5 up	30 down, 17 up

Everyone that we met was exceptionally helpful and interested in the project. The water treatment plant has three issues. The cellular network (only Verizon was tested) has very poor signal coverage, the only easily available power would require a step down transformer, and the plant is just North of a coastal feature that may influence the observations. The parking lot at the McClone is scientifically not the best due to distance from the lake shore and getting a clear field of view for the Doppler lidar would be quite difficult. The Spaceport location covers all of our requirements and has the added benefit of great public outreach possibilities.

Spaceport Site Plan

The basic plan at the Spaceport location is to park the SPARC trailer on Lakeview Drive along the north side of the building. Jane has offered to work with the city to get permission to park our large vehicle on the street for an extended period of time. We will also try to get 'No Parking' signs so that we won't have to wait for other vehicles to move when we initially arrive or return from doing a transect with the HSRL. Power for the trailer will be provided by a plug on the outside of the Spaceport building. The Doppler lidar and the anemometer will be placed on the 3rd floor patio. Security for the Doppler lidar is very good. We will need to visually mark off the location on the patio since there may be visitors out there, but the patio is supervised by

spaceport staff when open to the public. The SPARC trailer itself won't be in a secure location, but with doors locked, equipment off the ground, minimal foot traffic after hours, and staff checking it daily, it should be reasonably safe for the duration of the experiment.

There is an electrical receptacle of almost the same standard that we use already mounted on the exterior of the building next to our parking location. The receptacle is 100A size where we use the 60A size. The simplest solution is to replace the circuit breaker in the panel with a 60A breaker and swap the 100A receptacle for the 60A one. Supply costs are roughly:

- \$250 Leviton 60A IEC 309 receptacle
- \$30 Square D QO 60A dual pole breaker
- \$75 Four (black, red, white, green) 15' lengths of 4 AWG wire

Depending on the size of the wire that was run for the 100A service, if it is 2, 3, or 4 AWG, we can use the existing wire. The breaker panel, conduit, and receptacle box are all easily accessible. Estimated labor for local electrician is \$500 for the install and \$300 to return the receptacle to the original condition. We will need to bring cable covers for the SPARC power cable since the cable will cross the side walk.

The 3rd floor patio has easy access from the elevator, so we can roll the Doppler lidar shipping crate right to the location. Getting the Doppler lidar out of the SPARC trailer is however a multiple person effort. Power for the Doppler lidar will be provided an existing GFCI outlet on the patio. Viewing angle obstructions for the Doppler lidar are limited to a 6' railing and a single story of the Spaceport building. We will need to create a wireless bridge from the Doppler lidar to the SPARC trailer to handle the data ingestion and view the instrument status / settings.

\$180 Pair of Ubiquiti Networks Nanobeam 5ACs for Ethernet bridge to Doppler lidar.

The distance from the side of the Spaceport building and the AERI instrument is approximately 20'. With a generous assumption of 40' height of the building, this gives plenty of space for the AERI primary and scattering fields of view.

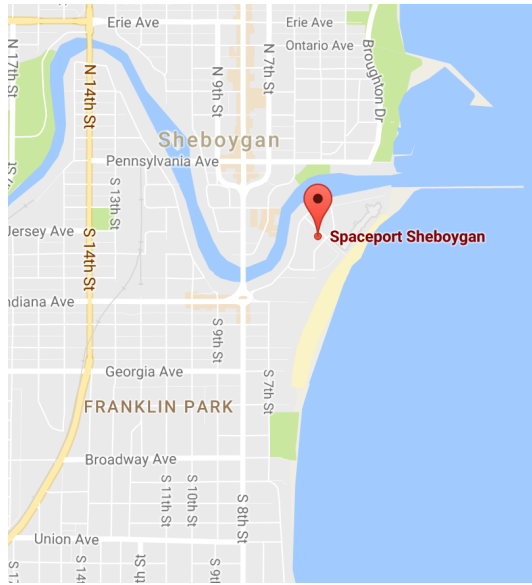
The temperature / humidity sensor tripod can be placed on the roof of the SPARC trailer to minimize the risk of tampering with the sensors. We need to include protective foot pads and weights on the packing list. The anemometer will be located on the patio with the Doppler lidar. We may need a cable extension to move the wireless transmitter to a location within line of site of the trailer.

Suggested long term hotel for staff:

The GrandStay Residential/Suites
708 Niagara Ave, Sheboygan, WI 53081
920.208.8000

<http://www.grandstayahospitality.com/find-a-hotel/locations/sheboygan/overview>

Google map image below showing the location of the Spaceport museum. Satellite image to show the parking location of the SPARC trailer.



Street view image of the Spaceport museum from the East.

Electrical sub panel that feeds the outdoor receptacles. Currently a 100A outlet and 90A breaker.



Conduit and bracing for outdoor outlet.



Railing on the 3rd floor patio and location for the Doppler LIDAR.

