

## Controlled Environment Systems Research Facility Guelph BlueBox System SEC5

The SEC5 (AKA “The Large Hypobaric Chambers”) growing system was developed for low pressure (hypobaric) studies of canopy scale seed to seed plant growth and development as part of the Space and Advanced Life Support Agriculture (SALSA) research program. Each chamber was initially equipped with 6000 Watts of HPS/MH lighting but have been refurbished (2019) with Intravision multispectral LED arrays. These growth chambers are an integral part of the CESRF hardware collection used to study plant growth and development, photosynthetic gas exchange, air quality, and hydroponic solution remediation technologies under reduced and ambient atmospheric conditions common to both Earth-based studies and extra-terrestrial exploration and habitation.

### Environment control

Temperature  
VPD/Humidity  
Carbon dioxide  
Oxygen  
Light spectrum  
Light intensity  
Nutrients  
Plant water status  
Air pressure

### Technical Specifications

- 2400 Watt water-cooled multispectral and programmable LED lighting system with available UV (368 and 380nm), blue (448), lime green (568nm), red (655nm), far red (735nm), and white (5650K) irradiation
- Carbon dioxide enrichment from 0 – 10,000 ppm
- Continuous CO<sub>2</sub> (0-20,000ppm) data recording
- Temperature control range from 15°C - 35°C +/- 0.5°C
- VPD control from 0.2 - 1.5 kPa
- Variable speed air flow with bottom up distribution
- Integrated Argus Control System - full data graphing and recording of all sensors and actuators
- Made of primarily non-off gassing inert materials (stainless steel, glass, Viton)
- 1500 x 1000 x 1200 mm (DxWxH) growing volume can accommodate a wide variety of crops
- Recirculating NFT hydroponics with redundant temperature, pH and EC sensors
- Ability to custom blend the amount of CO<sub>2</sub>, nitrogen and oxygen
- Vacuum ports available for custom system modifications depending on the experimental protocols required

