Deployable Vegetable Production System

ORBITEC's deployable vegetable production system, affectionately known as "VEGGIE," is a plant growth facility for growing fresh fruits, vegetables, herbs and flowers for long-duration spaceflight. The design is optimized to use minimal mass, power, volume, and stowage while providing a supply of fresh food. The system also acts as a tool for astronaut recreation and relaxation with the added benefits of scrubbing CO_2, providing oxygen, and recycling gray water.

THE TECHNOLOGY

Few new designs so closely meet the rigorous demands of two masters—in this case, VEGGIE satisfies three: astronauts, biological scientists, and spaceflight integration engineers.

The novel expandable bellows of the VEGGIE system has resulted in a growing area of 0.16 m^2 with a system mass of approximately 7 kg and a stowage volume less than 3.5" high.

The bellows design provides an adjustable distance between the root mat and lights to allow for maximum light to reach the plant canopy. The clear Teflon allows viewing of specimens on a root mat that can be harvested and replanted for up to one year before replacement.

Using powerful and efficient LED lighting, the VEGGIE system provides up to 300 µmoles/m^2/s of light output to ensure maximum growing potential.

APPLICATIONS

The VEGGIE system is adaptable to a number of configurations, crops, and customer requirements.

- The system can be mounted anywhere power is available, using cooling from a host system's avionics air or cabin air.
- VEGGIE units can be mounted individually or in groups to provide a constant supply of fresh food.
- Potential crops successfully grown include something to suit every taste, including: lettuce, radish, peas, squash, cucumbers, green onions, carrots, spinach, beans, basil, cilantro, coriander, marigolds, and petunias.
- A number of upgrades are also available to better fit specific applications:
    - *Custom size and light output*
    - *Automated deployment and height adjustment*
    - *Automatic water delivery*
    - *Humidity, ethylene, and atmospheric control*

TECHNICAL SPECIFICATIONS

Root Mat with Integrated Fluid Reservoir

Growing area ..... 0.16m^2

Reservoir capacity ..... 2.0 L

Flexible Bellows Enclosure

Maximum growth height ..... 45 cm

LED Lighting

Maximum power ..... 115 W

Light output 640 nm (red) ..... 0-300 µmoles/m^2/s

Light output 440 nm (blue) ..... 0-50 µmoles/m^2/s

Light output 540 nm (green) ..... 0-30 µmoles/m^2/s

System Specifications

Stowage volume ..... 20.8" x 15.6" x 3.2"

Mass ..... 7.2 kg

User Interface

Adjustable light levels

Adjustable day/night cycle

Also Available on a Made-to-Order or Custom Basis

VEGGIE's LED lighting provides high intensity lighting in a lightweight, thin profile system with tunable frequencies to match biological need.

For more information, contact:

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