REDWIRE

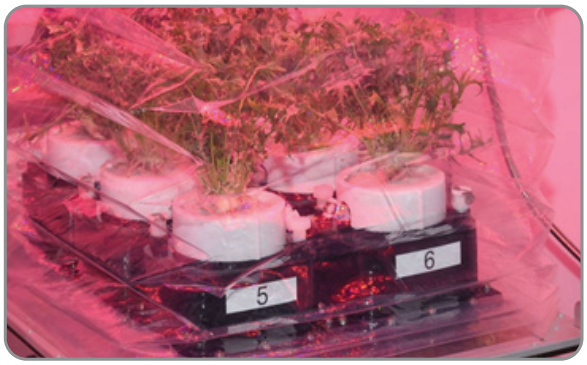
AEROSPACE TECHNOLOGY

PASSIVE ORBITAL NUTRIENT DELIVERY SYSTEM (PONDS)

PRODUCT DESCRIPTION

The Redwire Passive Orbital Nutrient Delivery System (PONDS) was developed for flight in NASA's Vegetable Production System (Veggie) facility with collaboration from Tupperware Brands. It can grow a wide variety of plants in space and requires far less monitoring and maintenance time from flight crews than other plant growth devices.

The National Aeronautics and Space Administration (NASA), Redwire Space, and Tupperware Brands Corporation (Tupperware) jointly developed an improved system for growing plants aboard the International Space Station (ISS). Since 2014, astronaut farmers aboard the ISS have been growing a variety of leafy vegetables and colorful flowers inside the Vegetable Production System, otherwise known as the 'Veggie' facility. However, NASA is always seeking to improve upon existing technologies, while reducing its need for resources such as crew time. In an effort to reduce the frequency that an astronaut must water plants growing in space, Dr. Howard Levine and his colleagues at the NASA Kennedy Space Center (KSC) began exploring new design concepts for the component of Veggie that holds the root structure of the plants, the so-called 'plant pillows'. Research at KSC led to a semi-hydroponic design concept dubbed PONDS. Iconic kitchen and housewares brand Tupperware and Redwire partnered to further develop the concept and manufacture spaceflight-qualified PONDS plant growth units for use aboard the ISS. Tupperware is applying its deep knowledge and longstanding success of design for manufacturability, injection molding, and food-safe construction materials to yield a system that utilizes capillary forces and unusual geometries to replace gravity. The result is a product that is expected to provide plants grown in space with a near functionally equivalent growing environment to their terrestrial counterparts.



REDWIRE

FIND OUT MORE ABOUT REDWIRE SOLUTIONS

REDWIRESPACE.COM | @REDWIRESPACE | SALES@REDWIRESPACE.COM

MADE IN THE USA

V1MAR2022

PARAMETERS

+ Up to six PONDS units can be installed in Veggie at one time.
+ Envisioned to be a single use item.
  - Discarded after plants are grown and harvested on orbit.
+ Portable and interoperable with other current and anticipated space plant growth facilities.

APPLICATIONS

+ Plant Growth Research
+ Low Earth Orbit (LEO) Missions
+ Gateway Missions

MARKETS SERVED

+ Plant Growth Research.
+ On-Orbit Servicing, Assembly & Manufacturing.

MISSION HERITAGE

+ International Space Station (ISS).
+ Uncrewed SpaceX Cargo Dragon.

The Passive Orbital Nutrient Delivery System (PONDS) is export controlled through an ECCN (Export Control Classification Number) issued by the United States Department of Commerce, ECCN 7A104. Export shipment requires successful application for an export license.

FOR MORE INFORMATION ABOUT OUR SPACE CAPABILITIES, CONTACT REDWIRE SPACE SALES AT
DISCOVER@REDWIRESPACE.COM

HERITAGE
Redwire is a new leader in mission critical space solutions and high reliability components for the next generation space economy. With decades of flight heritage combined with the agile and innovative culture of commercial space platform, Redwire is uniquely positioned to assist its customers in solving the complex challenges of the future space missions. For more information, please visit **www.redwirespace.com**

MADE IN THE USA
V1MAR2022

FIND OUT MORE ABOUR REDWIRE SOLUTIONS
REDWIRESPACE.COM | @REDWIRESPACE | SALES@REDWIRESPACE.COM