

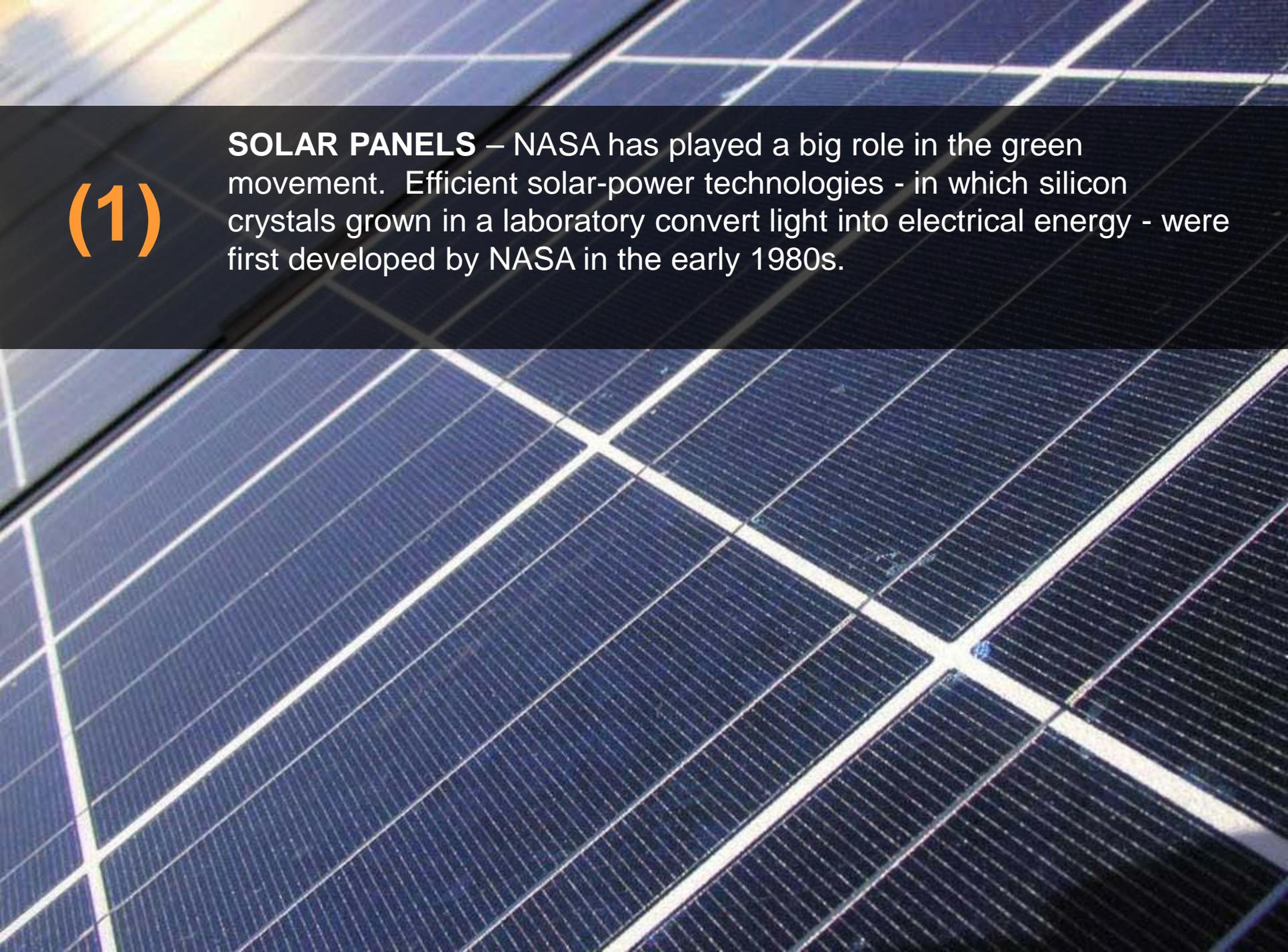


NASA Benefits Earth



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Space Center Rotary, 6 April 2009





(1)

SOLAR PANELS – NASA has played a big role in the green movement. Efficient solar-power technologies - in which silicon crystals grown in a laboratory convert light into electrical energy - were first developed by NASA in the early 1980s.



(2)

RECYCLED PAVEMENT – Another green idea by NASA was to reuse old tires by freezing them to below -200 degrees Fahrenheit. They then separated the rubber from other materials resulting in a material called crumb which is used to build highways and roads.

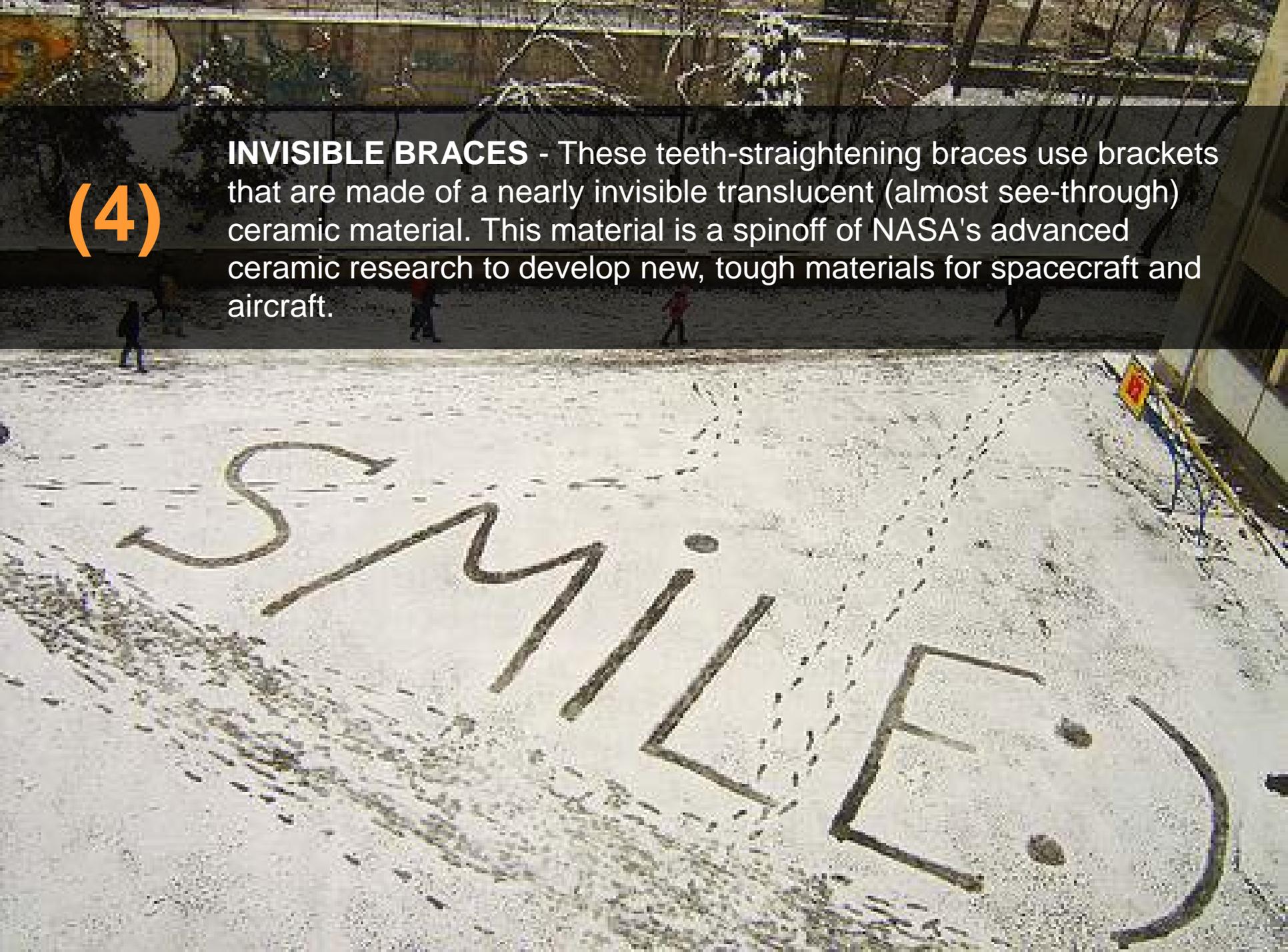


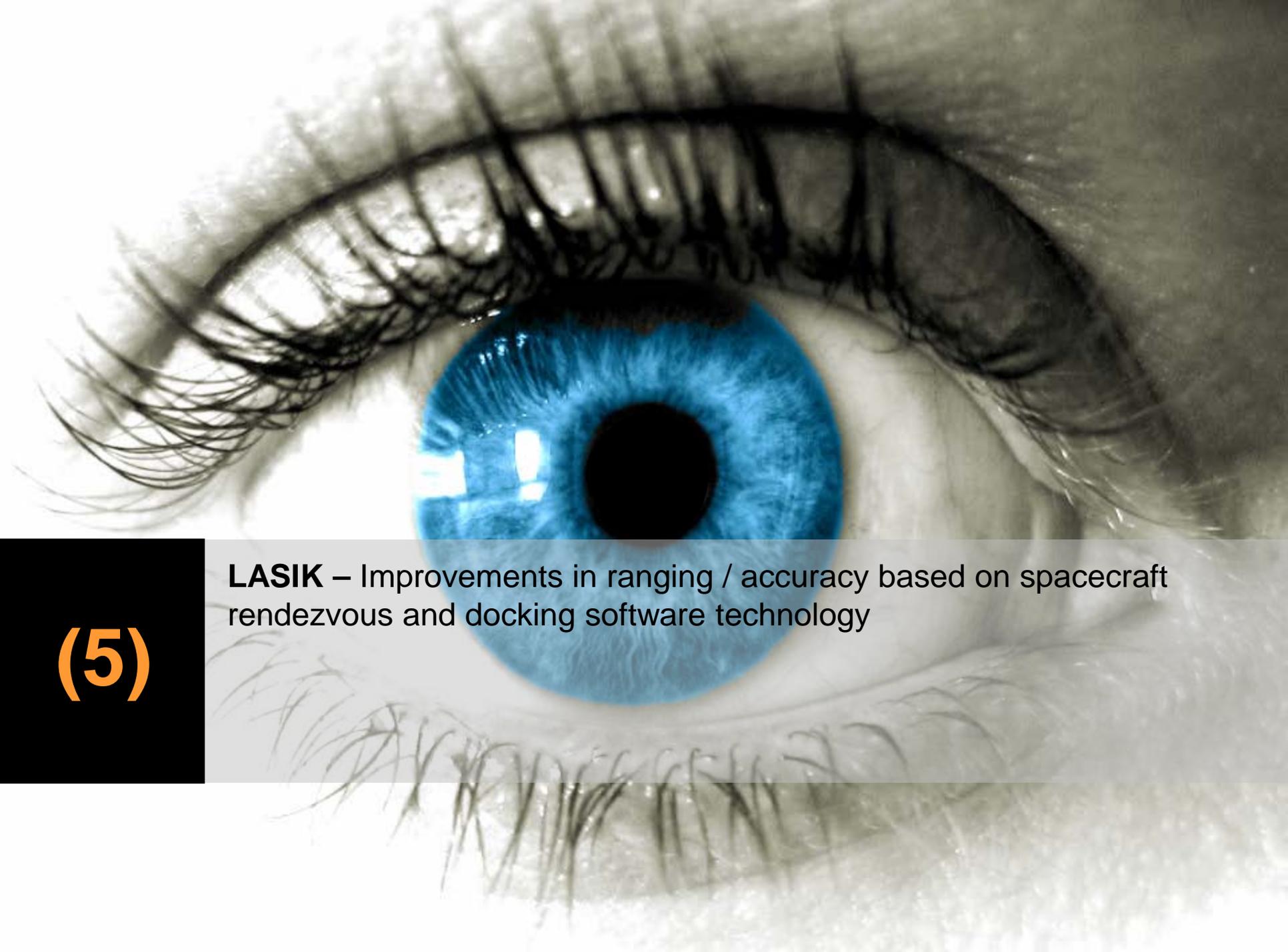
(3)

THERMOMETER PILL – Due to a heightened awareness of heatstroke risk among athletes, the “thermometer pill” is now used to detect elevated core body temperature during sporting activities. In the NFL, the Jacksonville Jaguars, Philadelphia Eagles, and Minnesota Vikings are using the technology to monitor their players.

(4)

INVISIBLE BRACES - These teeth-straightening braces use brackets that are made of a nearly invisible translucent (almost see-through) ceramic material. This material is a spinoff of NASA's advanced ceramic research to develop new, tough materials for spacecraft and aircraft.





(5)

LASIK – Improvements in ranging / accuracy based on spacecraft rendezvous and docking software technology



(6a) **AERODYNAMIC HELMETS** - NASA aerodynamicists were tapped to help industry leaders develop cool, light weight, aerodynamic biking helmets to meet U.S. Cycling Federation and American National Safety Institute Standards.

(6b) **AERODYNAMIC TIRES** - A special bike wheel uses NASA research in airfoils (wings) and design software developed for the space program. The three spokes on the wheel act like wings, making the bicycle very efficient for racing.



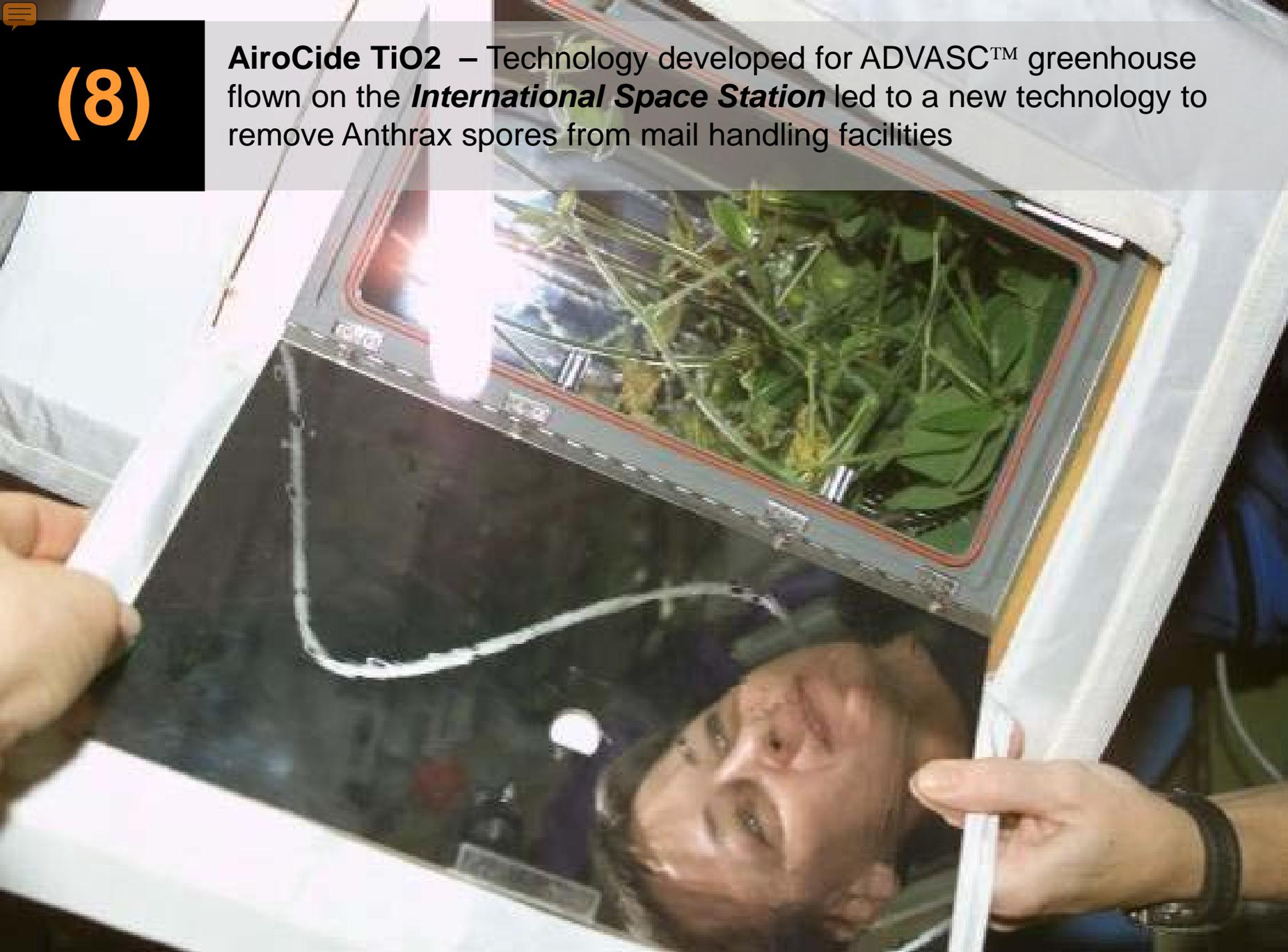
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Cataract detection – Technology for detection small quantities of proteins, originally developed for use in research on the Space Shuttle and *International Space Station* can detect cataracts before conventional devices can see them forming



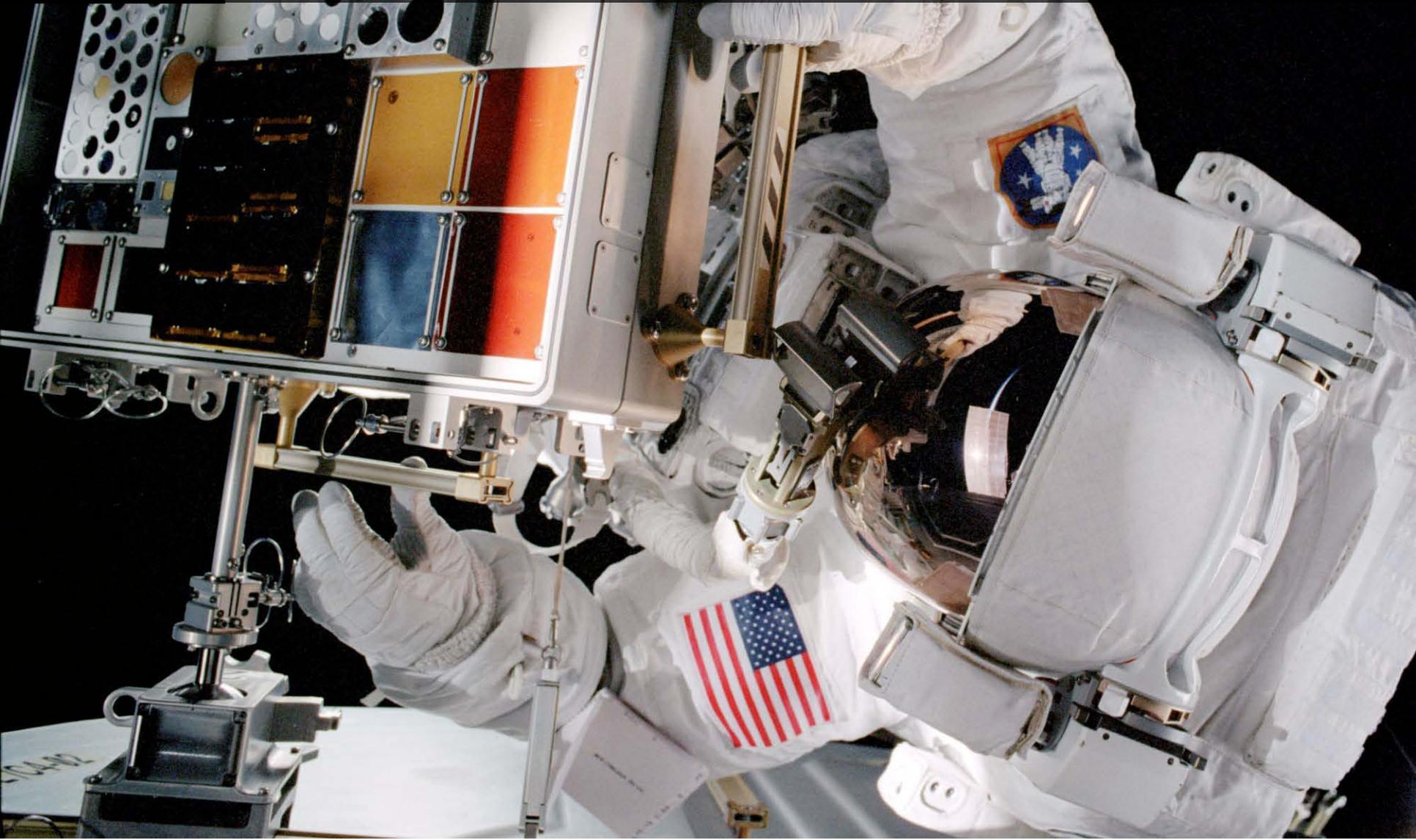
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AiroCide TiO₂ – Technology developed for ADVASC™ greenhouse flown on the *International Space Station* led to a new technology to remove Anthrax spores from mail handling facilities



(9)

Atomic Oxygen – Studies of the way that atomic oxygen erodes materials on the *International Space Station* have been applied to atomic-scale restoration of artwork damaged by fire or vandalism







(10?)

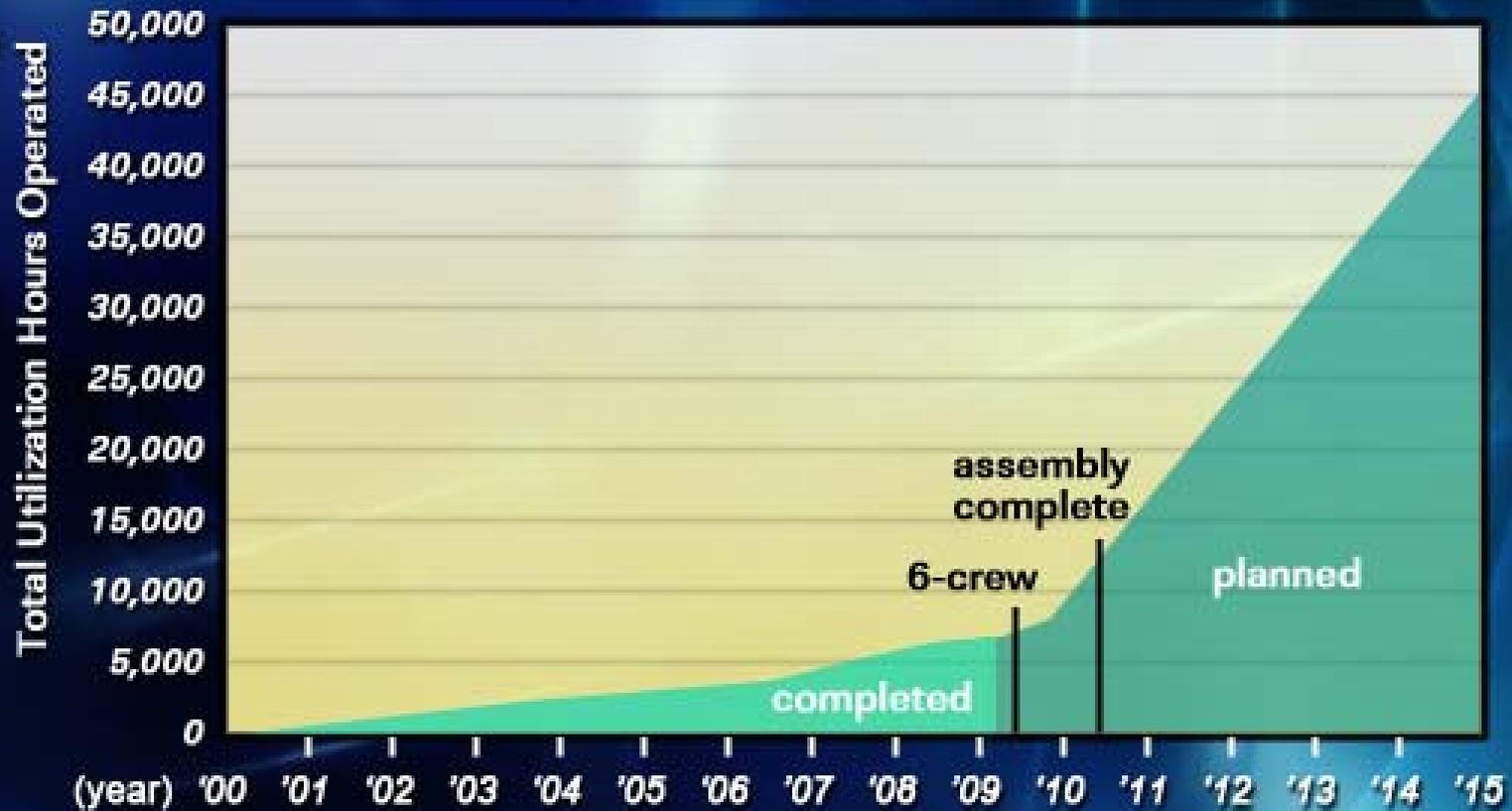
Macroencapsulation – Microcapsules (micro-balloons) for drug delivery produced on the *International Space Station* were successful in targeting delivery of anti-cancer drugs to successfully shrink tumors in ground tests. A device to produce similar capsules on Earth has now been patented, and clinical trials of the drug delivery method are beginning.



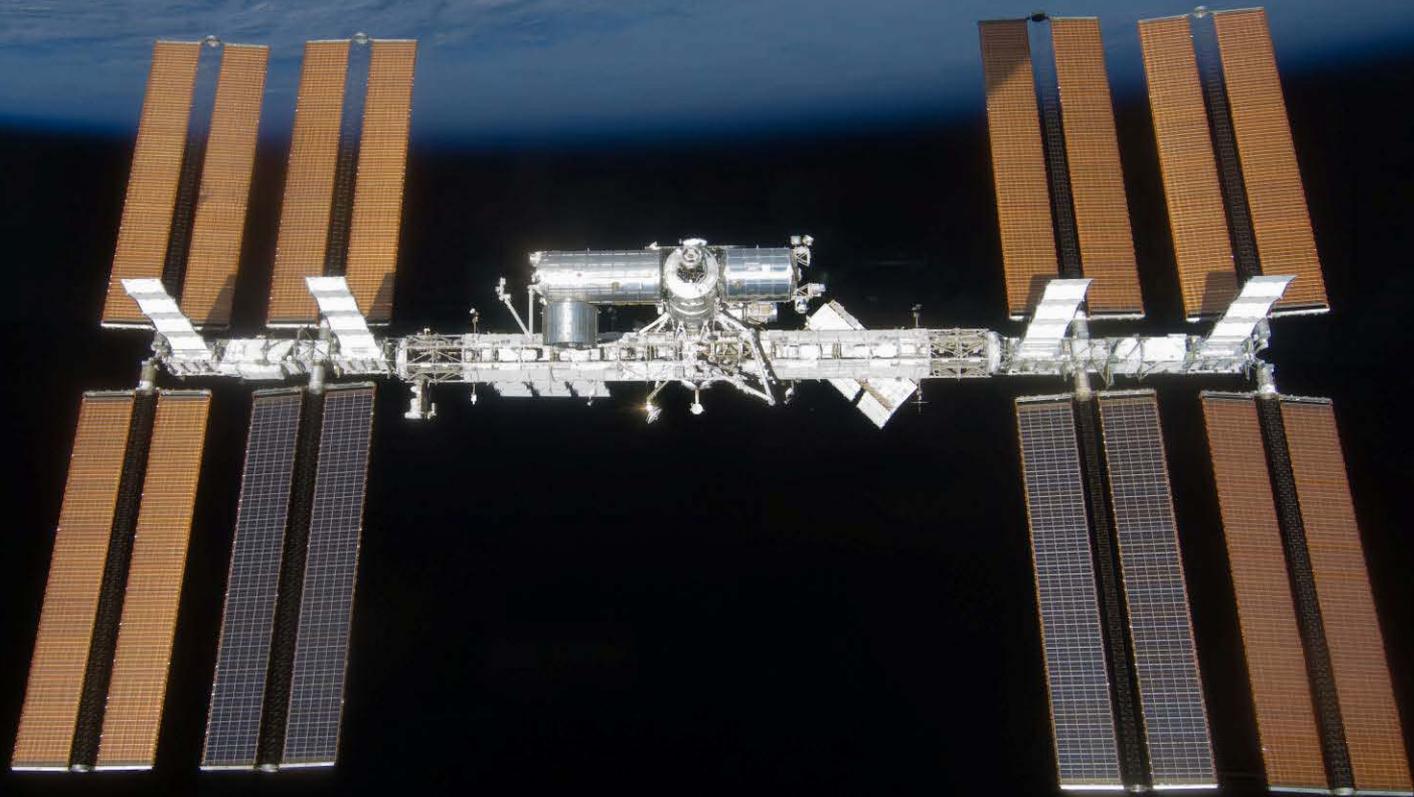
Salmonella Vaccine Development – Scientific findings from *International Space Station* research have shown increased virulence in Salmonella bacteria flown in space, and identified the controlling gene responsible. AstroGenetix, Inc. has funded their own follow-on studies on ISS and are now pursuing classification as an Investigational New Drug (IND) with the FDA

(11?)

Research on the *International Space Station* is Just Beginning!



ISS as a National Laboratory



- Allows entrepreneurs and other government agencies access to space for their R&D
- NASA continues its core exploration research on human health and technology development