



# Advanced Life Support Systems Engineer



**Fred Smith**  
**Advanced Life Support  
Systems Engineer**

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I help provide life support (food, air, water) to the astronauts on the International Space Station (ISS). In my job, I utilize and develop many specialized technologies that make life possible in space. These include waste and water treatment systems, as well as plant growth chambers and synthetic soil production. One of my most memorable moments at work involved spending 60 days with three other crew members in a special test chamber (affectionately known as the can), where we recycled all of our waste water and air. During this experience, what I missed most was not being able to touch my loved ones or see the outside.

## Areas of expertise:

- Water recovery urine treatment subsystems
- Vapor compression distillation subsystems (VCDS)

## How I first became interested in this profession:

Back in the fifth grade in Kansas City, where I grew up, I wanted to be a basketball player. This changed in the sixth grade. I got to visit the Kennedy Space Center, and saw a great sci-fi movie called *Star Wars*. I then decided that I wanted to work in the space industry, and one day, perhaps become an astronaut.

## What helped prepare me for this job:

I came to NASA as a co-op in 1990. A co-op attends college one semester and works the next, then goes back to school, etc. In college I studied two separate careers. My Mechanical engineering degree helps me with the technical aspects of developing and testing advanced life support systems for the astronauts. My psychology degree is an added bonus in dealing with human response to long stays in restricted environments. As we attempt to simulate the living conditions that astronauts will encounter in space in controlled chambers on Earth, our primary concern will always be with their safety and well being.

## My role models or inspirations:

My family and church are a great source of strength and inspiration. I once got a great deal of satisfaction in tutoring a younger student, and seeing him do better as a result. Sometimes in helping others you help yourself, and I was motivated and inspired by this student's success.

## My education and training:

- B.S., Psychology, University of Kansas
- B.S., Mechanical Engineering, Prairie View A & M University

## My career path:

- Ten years at NASA/JSC working with physicochemical, and biological regenerative life support technology

## What I like about my job:

There is no other job like mine! What I like best about it is working on technology that no one else is working on; that technology will go into space and someday may help humanity reach other planets (such as Mars), and travel through space for extended periods of time.

## What I don't like about my job:

What I like least about my job is the paperwork, which becomes tedious at times.

## My advice to anyone interested in this occupation:

Ask lots of questions to clarify things you don't understand. Co-oping at the space center can give you the opportunity to see what type of work you may like, and to learn more about NASA.

## Additional Resources:

- American Institute of Biological Sciences  
<http://www.aibs.org>
- American Physiological Society  
<http://www.faseb.org/aps>
- American Society for Biochemistry and Molecular Biology  
<http://www.biophysics.org/biophys/society/biohome.htm>
- American Society for Microbiology  
<http://www.asmsusa.org>
- Astrobiology Summer Academy  
<http://academy.arc.nasa.gov/>
- Biotechnology Industry Organization  
<http://www.bio.org/welcome.html>
- Education Pays Calculator  
<http://www.educationpays.org/calc.asp>
- Graduate Student Researchers Program  
<http://spacelink.nasa.gov/Instructional.Materials/NASA.Educational.Products/Graduate.Student.Researchers.Program.Brochure/.index.html>
- MATHCOUNTS Competition  
<http://mathcounts.org/>
- Minority University Research and Education Programs  
<http://mured.nasaprs.com/>
- NASA Cooperative Education Program for college students  
<http://spacelink.nasa.gov/Educational.Services/NASA.Education.Programs/Student.Support/NASA.Cooperative.Education.Program/.index.html>
- NASA Jobs  
<http://nasajobs.nasa.gov/>
- NASA Office of Life and Microgravity Sciences and Applications  
<http://www.hq.nasa.gov/office/olmsa/>
- NASA SHARP Internship Program for high-schoolers  
<http://www.mtsibase.com/sharp/>
- NASA Student Employment  
[http://nasajobs.nasa.gov/stud\\_opps/employment/index.htm](http://nasajobs.nasa.gov/stud_opps/employment/index.htm)
- NASA Student Involvement Program student contests  
<http://www.nsip.net/index.cfm>
- Order NASA career videos such as "Engineers: Turning Ideas into Reality," "Careers: Aerospace Engineer" or "Reaching for the Stars" from NASA CORE.  
<http://core.nasa.gov>
- Student's Guide to Astrobiology  
<http://www.astrobiology.com/student.html>
- Tech-Interns.com  
<http://www.tech-interns.com/>

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Thank you.

