



SUBJECT: Life Support, Active Thermal Control, and Fluid Systems Discipline Subset  
Area Functions

1) Life Support Systems

- a. Atmosphere Control
  - i. Cabin pressure control – regulators & relief valves
  - ii. N<sub>2</sub>/O<sub>2</sub> mixture control
  - iii. Trace gas/odor control
  - iv. CO<sub>2</sub> & Humidity control
  - v. Atmosphere sensors
  - vi. Integrated system testing
- b. Potable Water Systems
  - i. Water Quality Control
  - ii. Water stowage system
  - iii. Galley for drinks and food dehydration
  - iv. Microbial Control
  - v. Overboard water dumping
  - vi. Water lab/system testing
- c. Waste Management Systems
  - i. Liquid collection and stowage system
  - ii. Solid waste collection and stowage
  - iii. Crew hygiene equipment and supplies
- d. Air Circulation System
  - i. Fans & ducting
  - ii. Particulate control – onboard & ground
  - iii. Air cooling system
  - iv. Air duct flow analysis
  - v. Modular air mixing analysis
- e. Integrated systems testing
- f. Smoke detection and fire suppression
  - i. Smoke detectors/sensors, particulate & gaseous
  - ii. Fire suppression systems & agents
- g. Pressure suit life support systems

2) Active Thermal Control System

- a. Heat transport system – pumps, accumulators, & flow/temperature controls
- b. Heat collection – heat exchangers & coldplates
- c. Heat rejection systems – radiators, evaporators, & heat pipes
- d. Thermal system analysis

- i. Component/material heat transfer analysis
  - ii. Forced air cooling analysis
  - iii. Integrated systems thermal analysis
  - iv. Thermal model development and review
- e. Vehicle ground cooling systems
  - i. Ground cooling carts
  - ii. Ground evaporant cooling systems
- f. Testing
  - i. Thermal-vacuum testing
  - ii. Integrated thermal systems testing

### 3) Fluid Systems

- a. Thermal transport fluids
- b. Evaporant cooling fluids
- c. Gaseous Storage & Supply Systems
- d. Flow induce vibration analysis
- e. Toxicant & flammability
- f. Other non-propulsive fluids
- g. One-g and zero-g fluid properties
  - i. Two phase transport
  - ii. Wetting phenomenon
  - iii. Surface tension
  - iv. Evaporant processes
  - v. Condensation

Source: NASA Engineering Network. (2010). Retrieved on February 10, 2010 from [http://nen.nasa.gov/files/Life\\_Support\\_Active\\_Thermal\\_Control\\_and\\_Fluids.doc](http://nen.nasa.gov/files/Life_Support_Active_Thermal_Control_and_Fluids.doc)