

New Cleaning Fluids

Space Propulsion Technology
Assessment Workshop

April 2001

Current Baseline New Cleaning Fluids

- 50 different fluids are used on the STS
- Twelve different cleaning verification fluids are used

Potential Solutions

New Cleaning Fluids

- Desire is for a single cleaning fluid
 - All purpose solvent
 - Ideally a straight replacement for Freon 113
 - Leaving by law
- Cleaning fluid properties needed
 - Don't have to heat
 - Don't have to mix
 - Not toxic
 - No special clothing
 - Evaporate quickly
 - No residue
 - LOX compatible
 - Not highly expensive


Technologies to Implement Solutions (TRLs)


New Cleaning Fluids

- Limit need for cleaning
 - Use EMAs and EHAs and limit hydraulics (4/5)
 - Hydrogen instead of hydrazine and MMH (4)
 - Avoid removing engines
 - Fewer umbilicals (4)
 - Line replaceable umbilical end with minimum in-field cleaning (2/3)
- Check research in cleaning fluids for other fields
- Instigate a focused research program for a Freon 113 replacement (2)
 - Research may work
 - Did for trichloroethylene
 - Work apparently being done by major chemical companies
 - Not exactly focused on our needs

Cost to Mature Technology

New Cleaning Fluids

\$100K	
\$500K	
\$1M	
\$5M	
\$10M	
\$30M	
\$50M	
\$100M	
\$500M	

6 Mo	
1 Yr	
18 Mo	
2 Yr	
3 Yr	
4 Yr	
5 Yr	
5 Yr+	