

A graphic on the left side of the slide shows a realistic globe of the Earth, tilted to show the Americas. Below the globe, several stylized human figures in shades of blue and yellow are depicted with their arms raised, appearing to support or hold the globe. The background is a solid dark blue with a light blue wavy ribbon-like shape across the top.

Oxygen Line Cleaning System

First of its Kind:
On-Board Cleaning



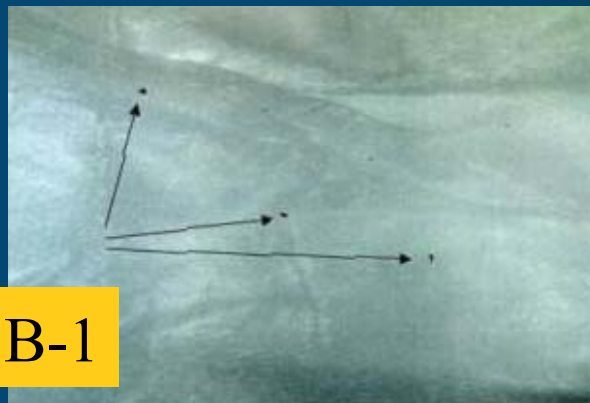
Oxygen Line Cleaning System

New technology, proven solution

- **Provides**
 - **Faster, easier line cleaning**
 - **Cost and labor savings**
- **Eliminates**
 - **Environmental hazards, banned substances**
 - **Health and safety concerns**
 - **Equipment fires**



Why clean oxygen lines?



B-1



B-1B



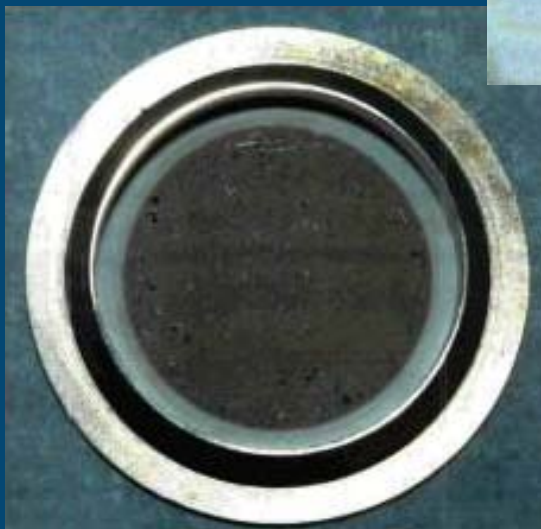
F-15



F-16

Why clean oxygen lines? *(continued)*

C-130



A graphic in the top left corner shows a globe of the Earth being held up by several stylized human figures in white and light blue. The background is a dark blue gradient with a light blue wavy line across the top.

What we found

- Teflon
- Silicon (possible carcinogen)
- Metal cuttings
(stainless steel, aluminum, brass)
- High chrome steel
- Plastic
- Dirt and rust
- Origin?



Contamination impacts

- **Reduces pilot effectiveness**
- **Decreases regulator lifetime**
- **Increases fire potential**
- **Increases maintenance costs;
aircraft downtime**



Cost-benefit analysis

- **Current cleaning costs**
 - Manufacturer - clean rooms and facilities
 - Labor intensive procedures
 - Line removal equipment and chemicals
 - Environmental discharges and disposal
- **OLCS**
 - Labor to operate equipment: 2-4 hours
 - Closed system; minimal costs
- **What are the savings?**



F-16 specifics

January 2002 - June 2003

- **Regulator removals**
 - 2 scheduled
 - 165 unscheduled = \$250K
- **Converter removals, 5 & 10 liter**
 - 7 scheduled
 - 332 unscheduled = \$630K
 - 23% require container changes = \$120K
- **WUC 47000 Actions**
 - 36 scheduled
 - 1312 unscheduled



C-130 specifics

January 2002 - June 2003

- **Regulator removals**
 - 174 scheduled
 - 588 unscheduled = \$880K
- **Converter removals, 5 & 10 liter**
 - 11 scheduled
 - 152 unscheduled = \$300K
 - 23% require container changes = \$55K
- **WUC 47000 Actions**
 - 538 scheduled
 - 1698 unscheduled



Cost savings estimates

1,000 aircraft regulators

- **Assume 40% reduction in regulator failure**
 - 1000 aircraft regulators x 0.40 = 400 @ \$1500
- **Cost = \$600,000**
- **Unit capital cost = \$250,000**
- **Cleaning cost/aircraft**
 - \$300/aircraft x 1,000 = \$300,000
- **Total cost = \$550,000**
- **Payback: ~ 800 aircraft regulators**



Two systems - multiple uses

- **Oxygen Line Cleaning System (OLCS)**
 - Cleans large aircraft systems in place
- **Gaseous Oxygen Cart Cleaning System (GOXCCS)**
 - Cleans oxygen support equipment
 - Cleans fighter aircraft systems in place
 - Parts cleaning chamber
 - Cleans cylinders and tanks
- **Both systems use HFE-7100 with high flow rate**

Oxygen Line Cleaning System



Gaseous Oxygen Cart Cleaner



GOXCCS Left Side

Oxygen Converter Cleaner



OCCS FRONT. 1

A graphic in the top-left corner shows a globe of the Earth being held up by several stylized human figures in white and light blue. The figures are arranged in a circle, with their arms raised to support the globe. The background is a dark blue gradient with a light blue wavy line running across the top.

Other uses

- **Hospital and medical oxygen systems**
- **Hydraulic systems**
- **Hydrazine systems**
- **Cylinders and pressure vessels**
- **Any plumbing systems**



Points of contact

Versar, Inc. - Prime Contractor

Jerome Strauss - Program Manager

Comm: 703-642-6736

strauger@versar.com

John Herrington - Senior Logistician

Comm: 937-864-7812

Herrington@erinet.com

Terence Caldwell - Lead Engineer

Comm: 405-739-0062

tacaldwe@ou.edu

C3P

Pelagio Castelo Branco

c3p@c3p.org or

pcbranco@c3p.org

351 96 901 8806

ITB, Inc.

Robert Hill

Hillr@itb-inc.com

(321) 453-3838



Thank You!