Decontamination Chemistry Overview for Advanced Planning Briefing to Industry

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Outline

- Decontamination Program Overview
  - Solution Chemistry
  - Sensitive Equipment Decontamination (JSSED)
- Technical Requirements/Challenges
- Schedule
- Industry Opportunities
- Summary

Decon Business Area Overview

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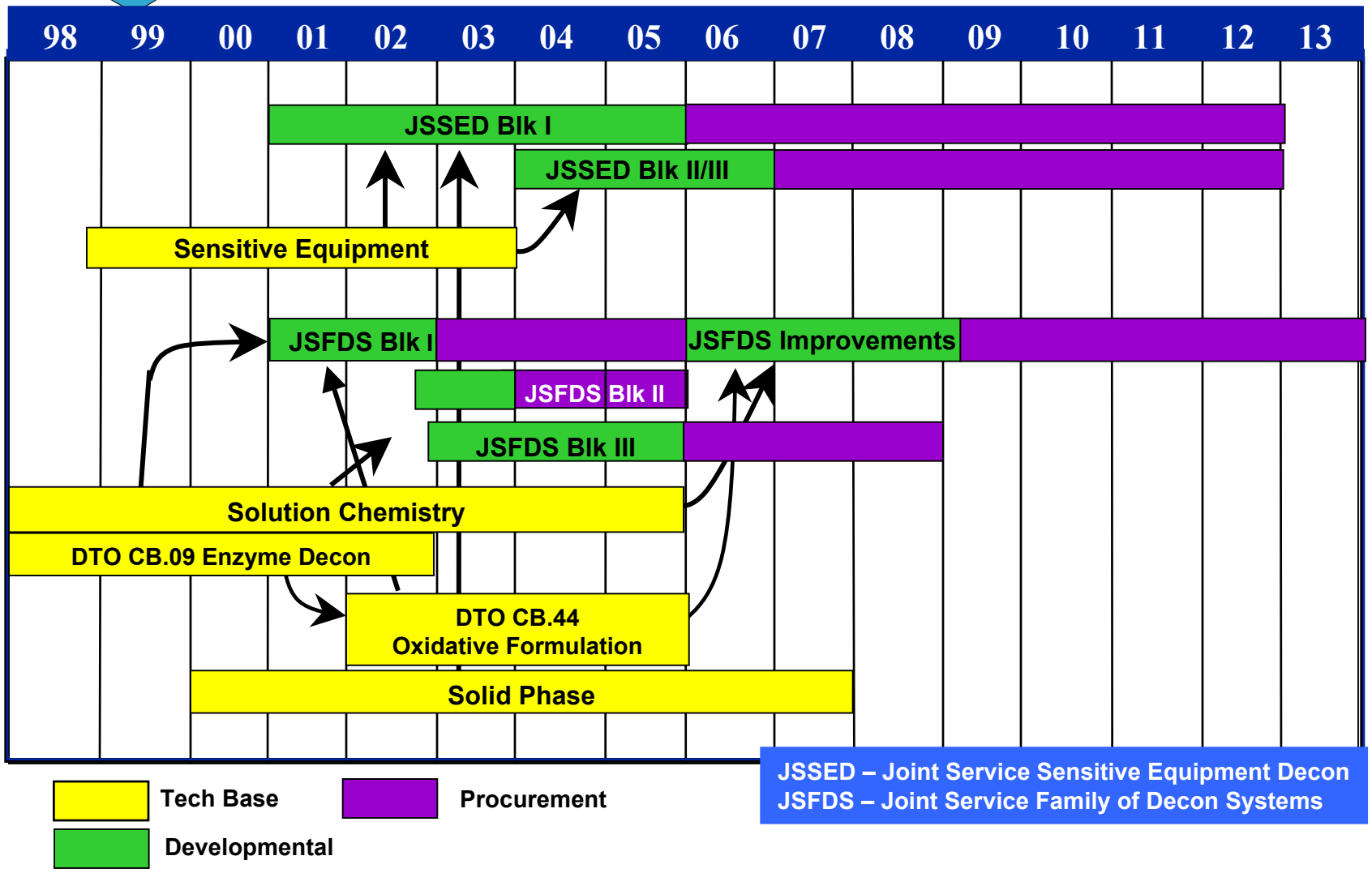

JSSED – Joint Service Sensitive Equipment Decon
JSFDS – Joint Service Family of Decon Systems

Decontamination Business Area Taxonomy

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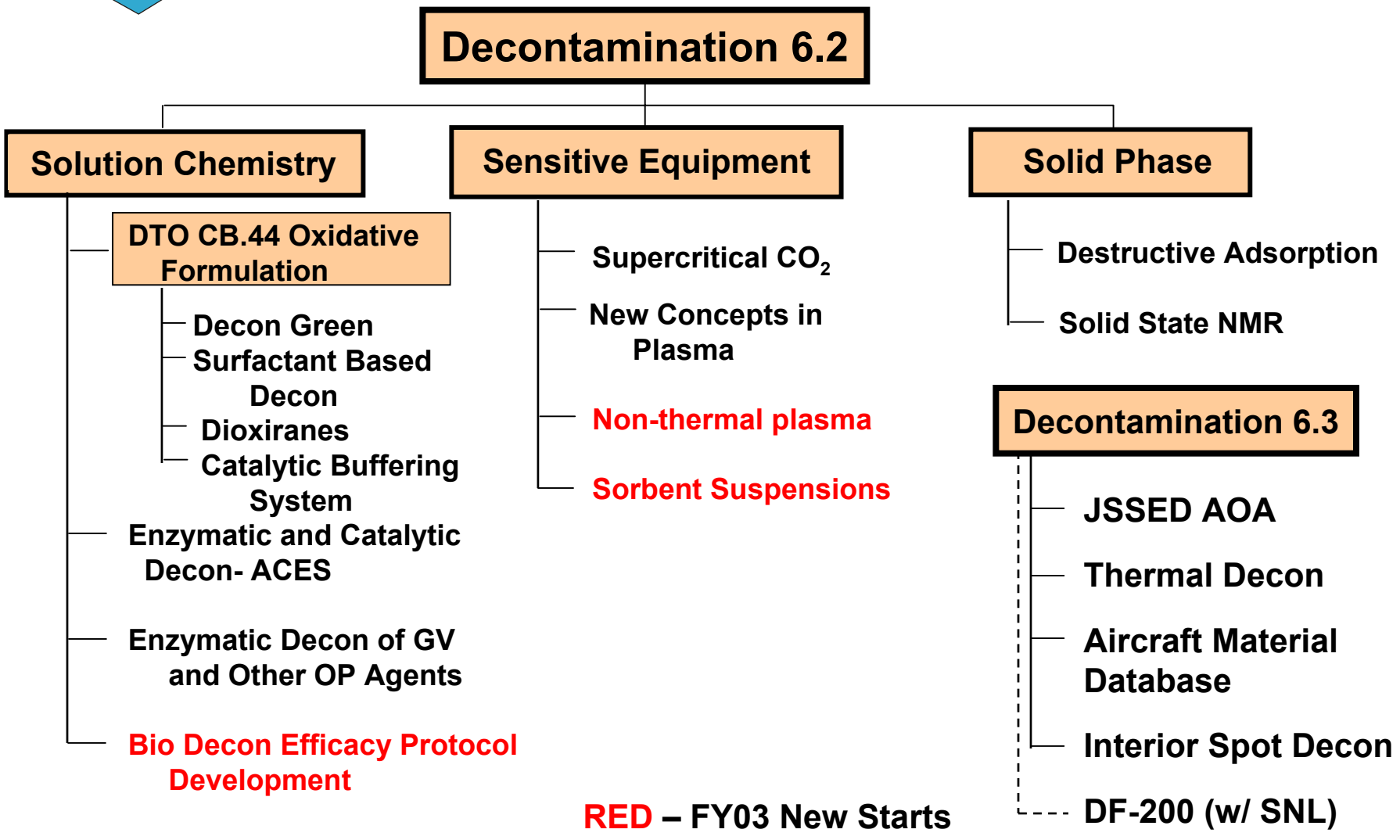
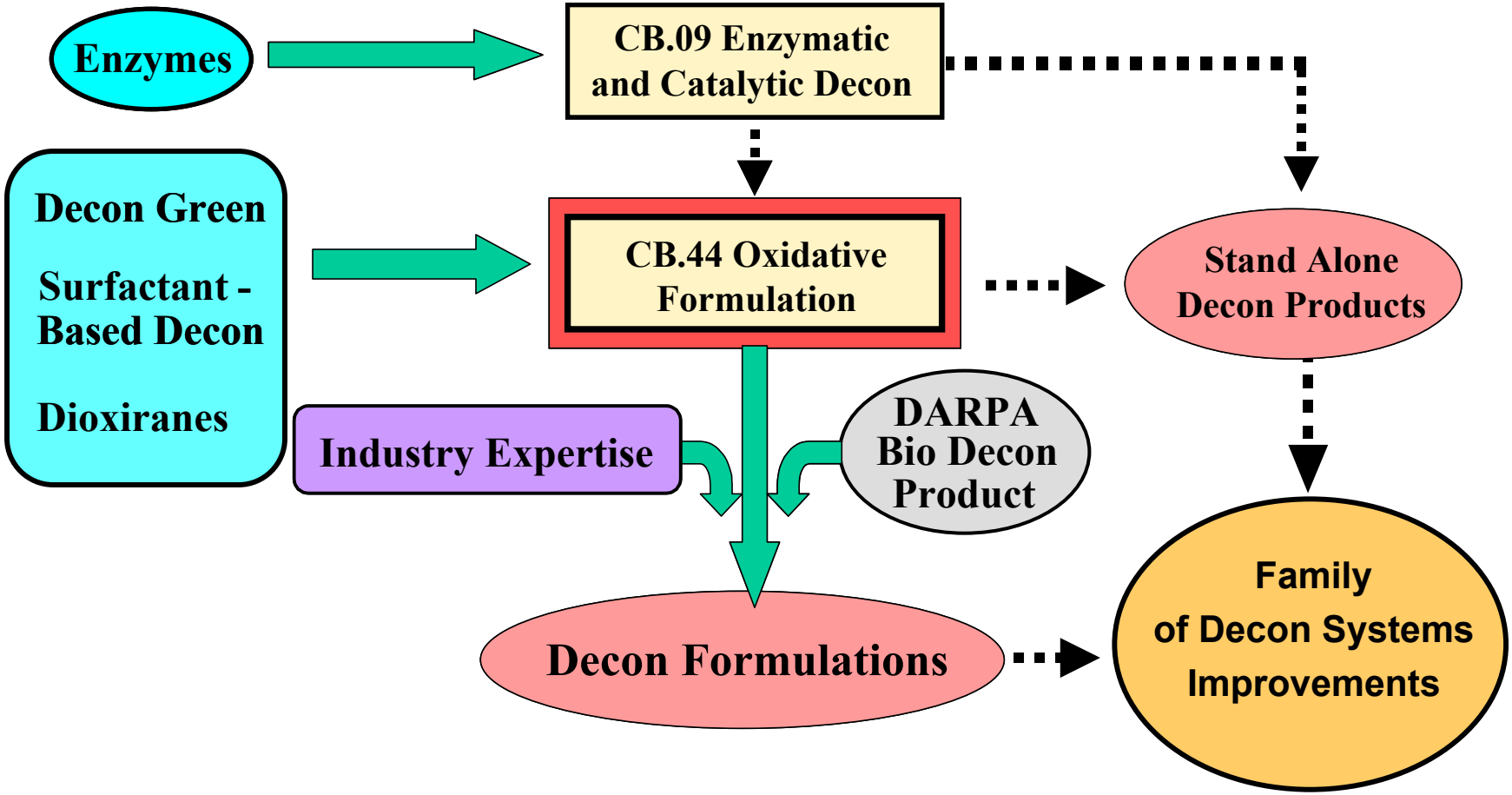


Solution Chemistry Taxonomy



Solution Chemistry

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Oxidative Decontamination

Objectives:

Develop a non-corrosive, material compatible, non-toxic and environmentally friendly oxidative chemical and biological decontaminant to replace DS2 and STB/HTH for thorough decon.

Payoffs:

- Neutralization of CWAs at material-friendly pH of 7.5-9.0 by either oxidation or displacement reactions yielding acceptable reaction products.
- Decontaminant will be effective against all CB agents.
- Uses formulation approach – allows incorporation of enzymes and polymeric catalysts (DTO CB.09) and DARPA developed bio decon formulation.
- Uses simple in-situ mixing and is compatible with existing decon applicators.

Solution Chemistry Technical Requirements

- Additives to improve reactivity
  - Activators
  - Commercial catalysts
  - Improved solvents
- Liquid or solid concentrates (leveraging off of commercial formulation industry)
  - Freeze dried or stabilized enzyme solutions
  - Mixed formulations (similar to laundry detergents)
- Efficient applicator systems to prevent waste
  - Foam application – increases contact time, minimizes run off
  - Dual use mixer/applicator
  - Spray on / vacuum off systems

JSSED Technical Requirements

- Materials compatibility information
  - Comprehensive database of aircraft interior materials of construction
  - Safety-of-flight components – aircraft wiring, hydraulic seals, POL, etc.
- Better understanding of unique shaded/hidden areas, complex geometries and interior airflow characteristics
- Material friendly decontaminants

Sensitive Equipment Decontamination

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JSSED Block I

- **Supercritical carbon dioxide ($SCCO_2$)**
  - HD and GB are highly soluble
  - HD and GB are effectively removed from various materials and complex shapes
  - VX and TGD testing underway

- **Non-Ozone Depleting Solvent Wash System**
  - Pseudo "dishwasher" design with the ability to filter and recycle the solvent
  - Exploring the use of reactive nanoparticles as an in-line filtration system for the solvent

Sensitive Equipment Decontamination

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JSSED Blocks II/III

- **Modified Solvent Wash System**
  - Combination of solvent with suspended nanoparticles
  - Commercial technology exists that will allow spray on/vacuum off with a single manpack device
- **Thermal Approaches**
  - Determining temperature- time profiles required for desorption of chemical agents
  - Looking at material degradation effects on the desorbed surfaces
  - Leveraging work done on the Jet Exhaust Decon System (JEDS)
- **Plasma**
  - Leveraging DOE work at Los Alamos
  - Evaluating plasma/peroxide system at ECBC
  - Conducting side by side plasma testing

Unique ECBC Resources for Large Scale Decontamination Studies

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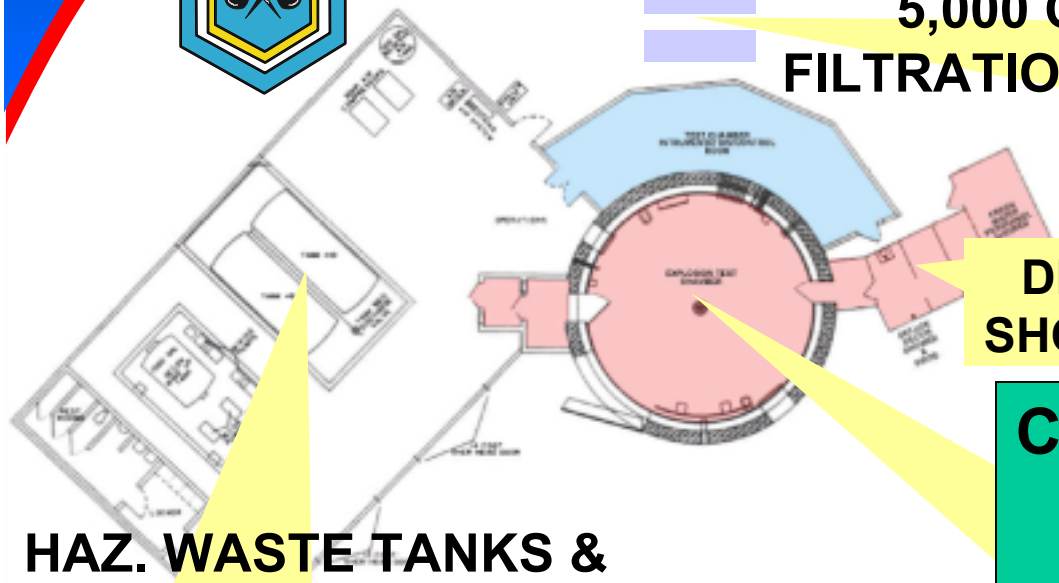

5,000 CFM FILTRATION UNITS

DECON SHOWERS

CHAMBER Building

- 32 feet dia. x 20 feet height
- 16,000 cubic feet

HAZ. WASTE TANKS & SUPPORT FACILITY

Decon Business Area Development Schedule

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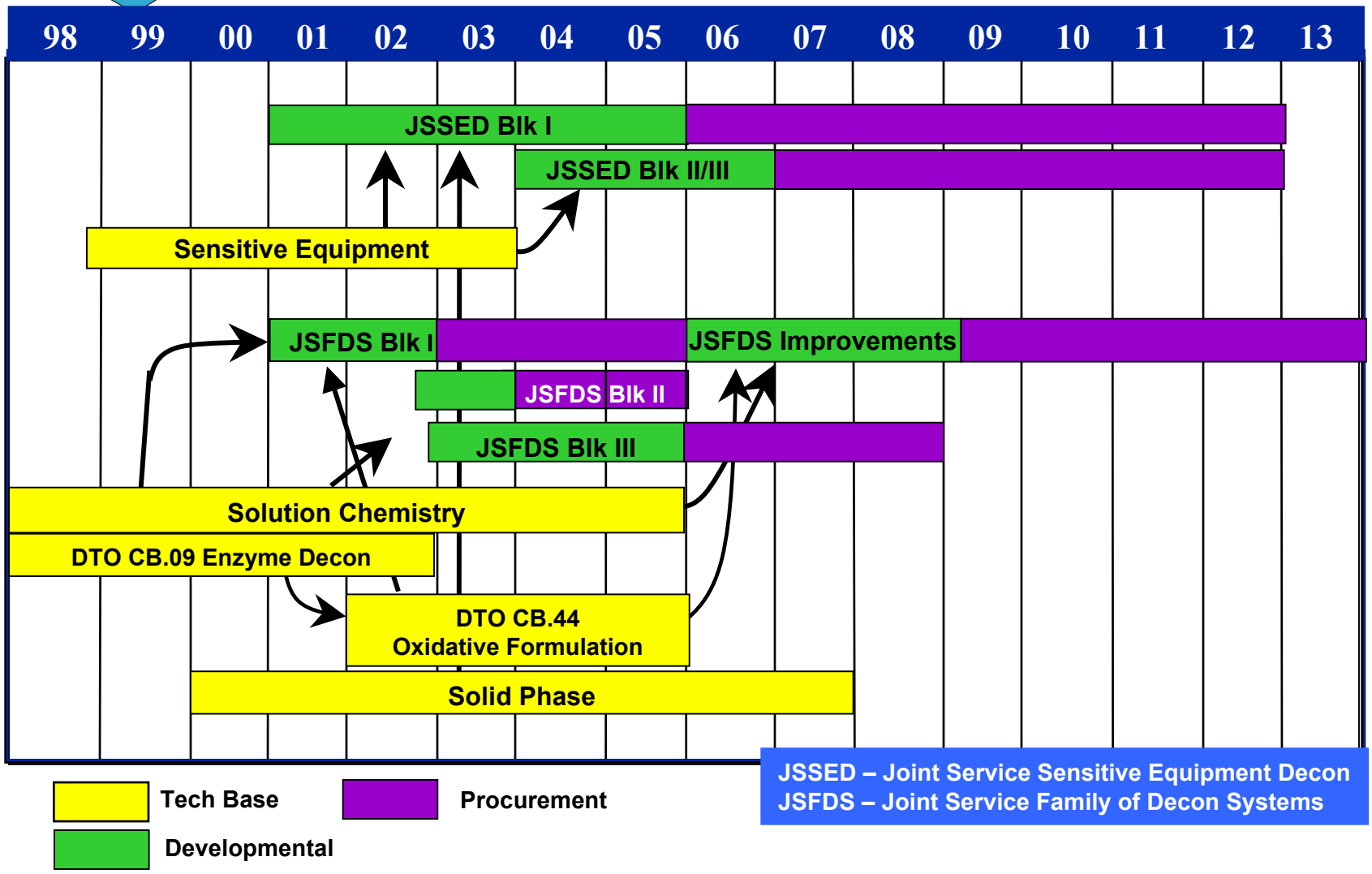

Industry Opportunities

- Sensitive Equipment Milestone B
  - Transition from Tech. Base to Development
  - FY04
  - POC – Brian MacIver (410-436-5919)
- Solution Chemistry Milestone B
  - Transition from Tech. Base to Development
  - FY06
  - POC – Dr. George Wagner (410-436-8649)

Conclusions

- Decontamination Must Achieve Efficacy and Materials Compatibility
- No Single Incumbent Technology Meets All DOD Decontamination Requirements
- Novel Decontamination Solutions **Must** be Validated Against Rigorous CW/BW Challenges
- Formula for Success: Industry's Best Technology Validated Against Worst Case CW/BW Threats