New Directions In Alternative Fuels

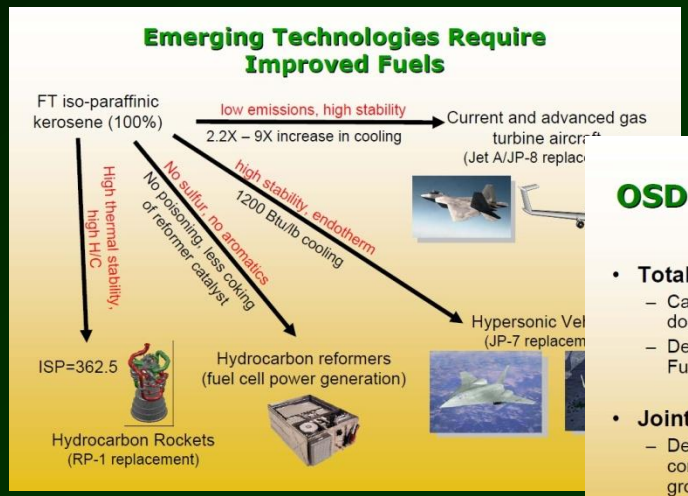
Solutions For Fully Synthetic Jet Fuel

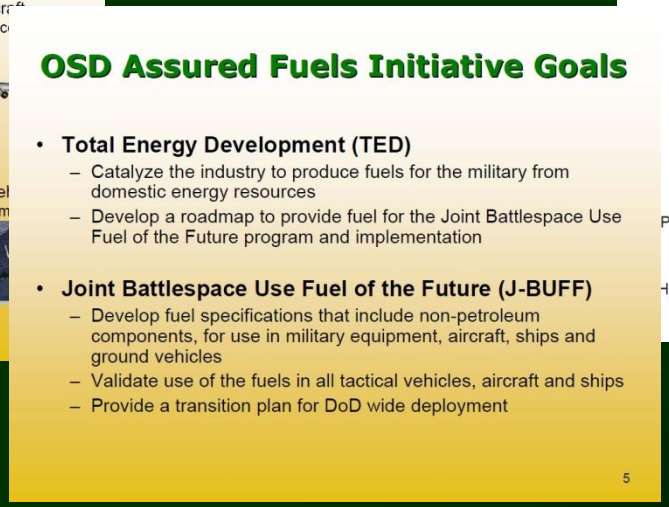
Density & Aromatics

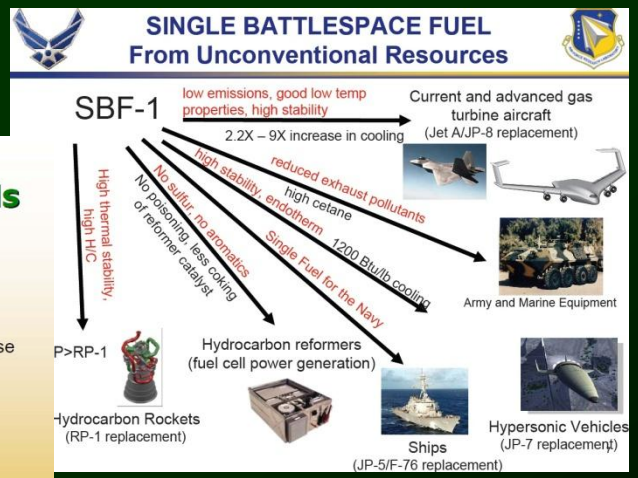
Integrated Synthetic Fuel Incorporated
www.isfuel.com **Date: 07/28/2010**

New Direction By Old Inspiration

- Single Battlespace Fuel (SBF)
- Joint Battlespace use Fuel of the Future (J-BUFF)

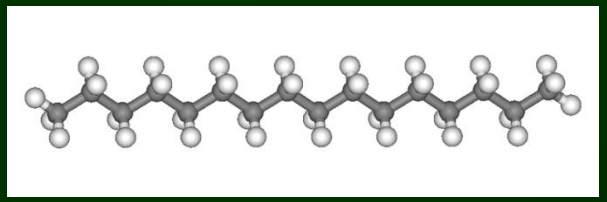


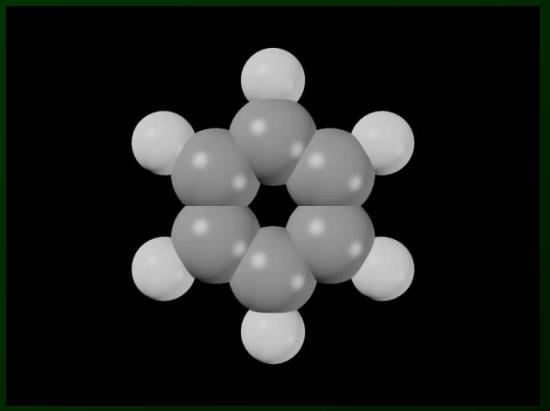




100% FT Iso-paraffinic Kerosene

- Low In Density
  - Not In Compliance with Fuel Specifications
  - Not Compatible with Equipment & Operational Requirements
- Low In Aromatic Compounds
  - Not Able To Swell O-rings
  - Not In Compliance with Fuel Specifications
  - Not Compatible with Fuel Equipment & Systems



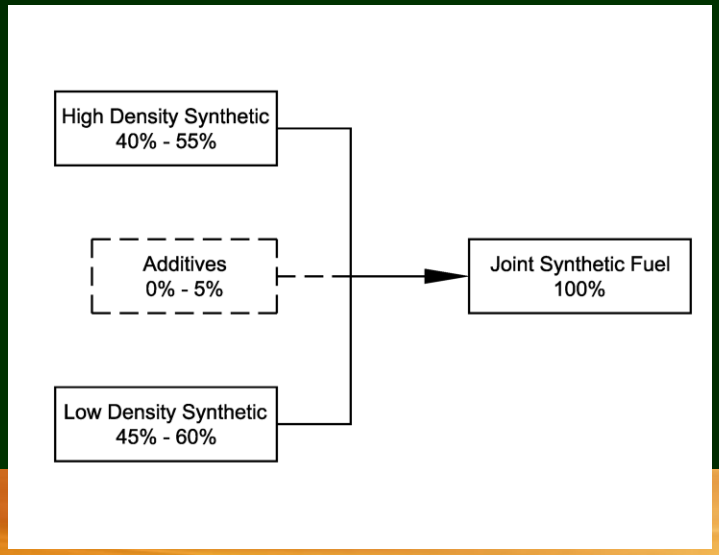


Another Fuel Program of Interest

- Dr. Schobert's fully synthetic thermally stable heat sink fuel
- Barely met heating value per specifications
- Did exhibit o-ring swell properties, yet low in aromatics
- High In Density
  - Not In Compliance with Fuel Specifications
  - Not Compatible with Equipment & Operational Requirements

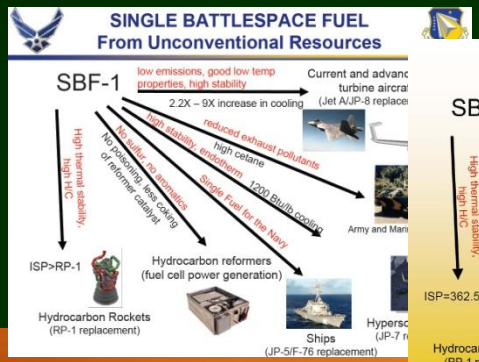
What would happen if you were to blend fuels?

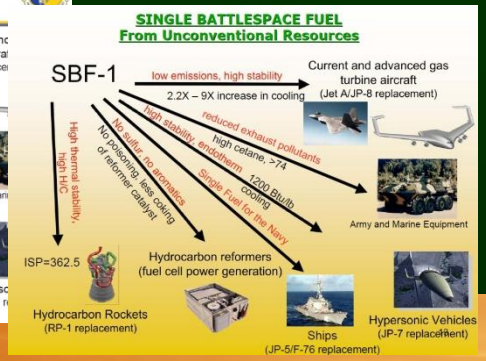
- High Density Synthetic (HDS) Fuel
  - Thermally Stable Heat Sink Fuel (Bi-cyclic Rings)
- Low Density Synthetic (LDS) Fuel
  - Synthetic Paraffinic Kerosene (SPK) (Branch Chains)

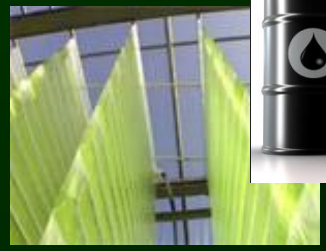


Blend Tests Showed Possible Joint Fuel Possibilities

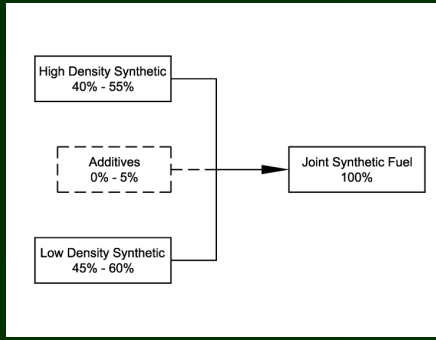
- Fully synthetic fuel requires no crude oil for production
- A joint fuel passes both diesel & jet fuel specifications
- An interchangeable fuel is great for crisis situations
  - Emergency Relief
  - Humanitarian Efforts
  - Fuel Logistics for Jet or Diesel Shortages



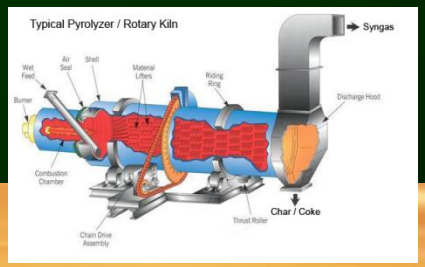


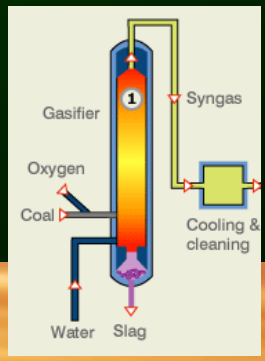


Methods of Production

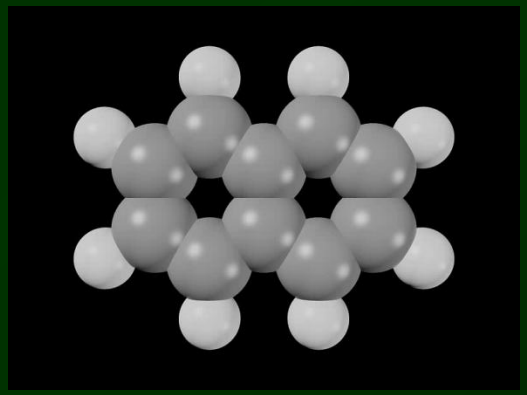


- Separate Site Production for Blends
  - May Be Production Cost Prohibitive
- On-site Co-generation (Pyrolysis / Gasification / Hydrogenation)
  - May Reduce Production Cost
  - Production Synergistic / Increased Efficiency
  - Initial Cost May Be Slightly Higher (Equipment Intensive)
- Integration of waste biomass and municipal waste
  - Introduced Over Time / Maintain Fuel Property





Summary



- Joint Synthetic Fuels – Highly Desirable
- SPK / FT Fuels – Low Density / No Swell
- Heat Sink Fuel – High Density / Ring Swell
- Blend Fuel – Fully Synthetic / Joint Fuel Possibility
- Co-production Positive Economic & Production Efficiencies

How do we get started?

- Feasibility Studies
  - Confirm Process Methods & Economics
- Pilot Plant
  - Small Scale Confirmation / Test Fuel for Certification
  - Biomass Integration Test Platform
- Full Scale Plant Development