

Honeywell's UOP

Renewable Fuels from Sustainable Sources: Beyond Potential to Production

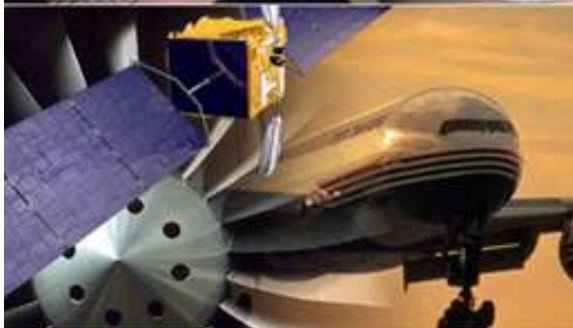
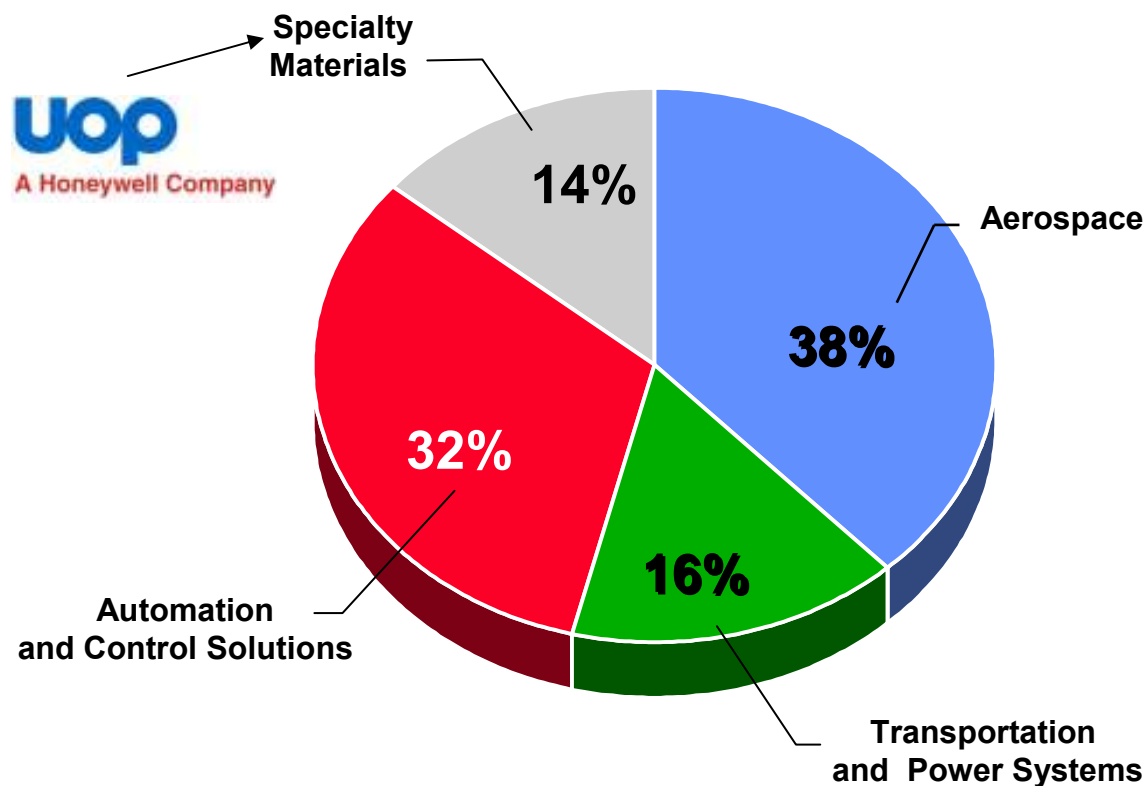


Jim Rekoske, Vice President & General Manager
UOP Honeywell

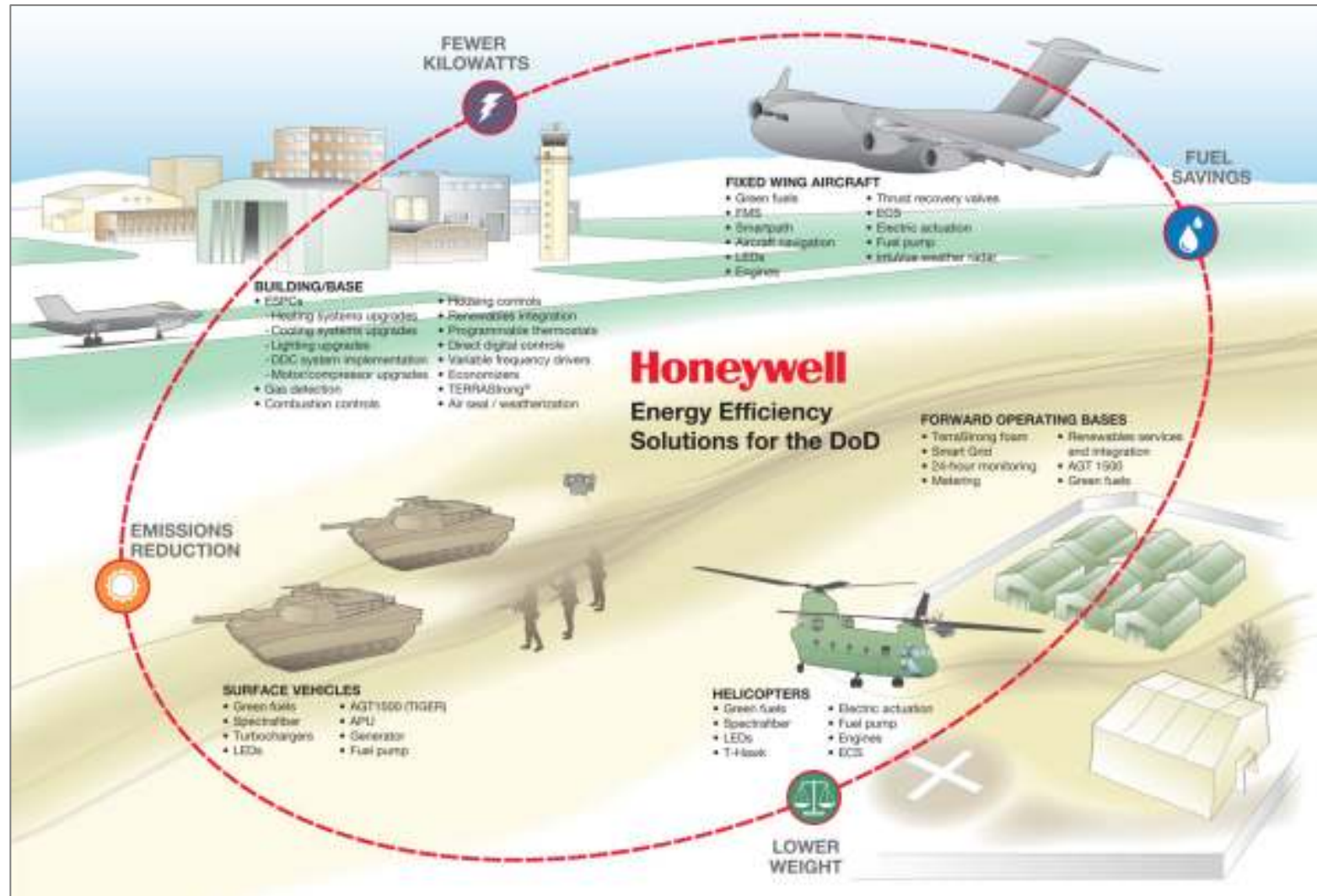


Honeywell Overview

***\$33 B Broad and Diverse Businesses,
Technologies and Products***



DoD Energy Efficiency – Touching Every DoD Mission



Green Fuels for Energy Security

GREEN FUELS

Honeywell Solutions

- Green Fuels – diesel, jet, bunker fuel



Green Diesel in tanks and ground vehicles



Green Diesel in Ships



Green Jet in all DOD aircraft



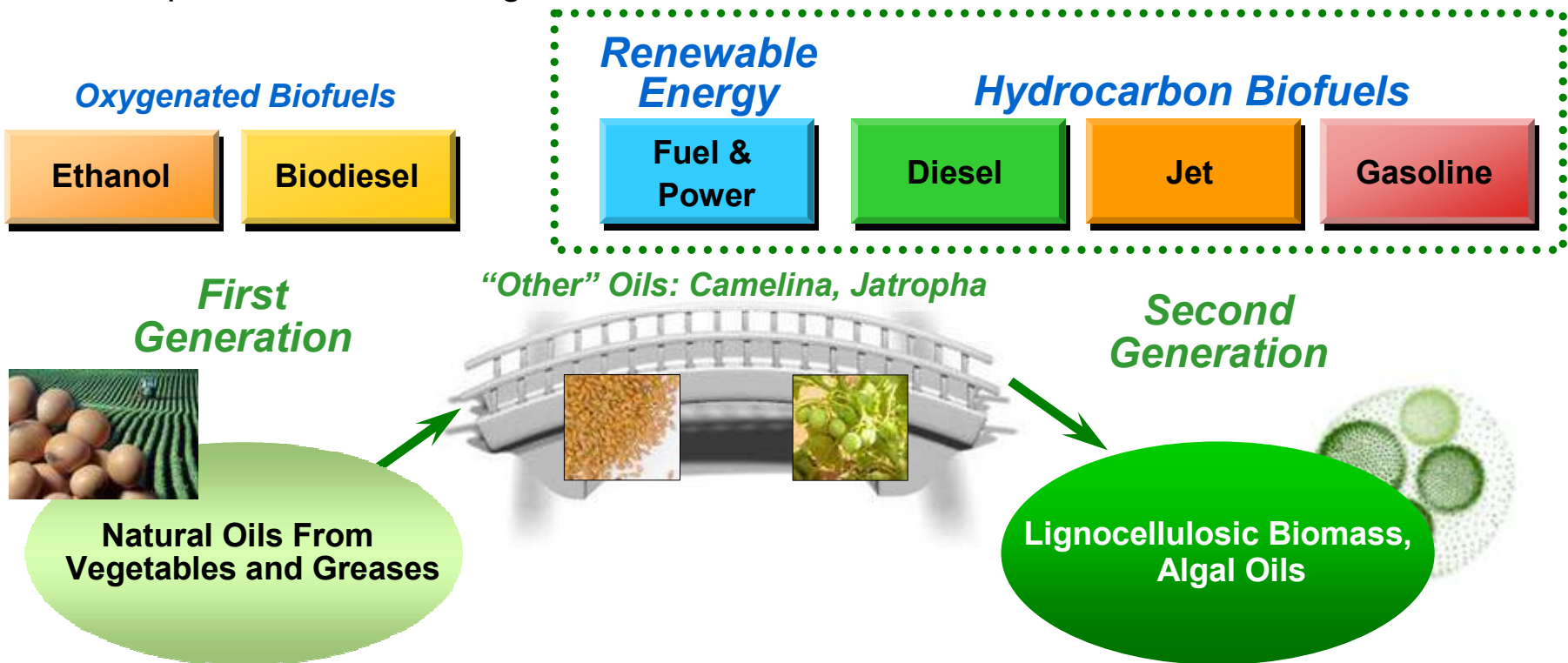
Pyrolysis Oil for installation and Forward Operating Base Power – DOE grant

Energy Efficiency Savings

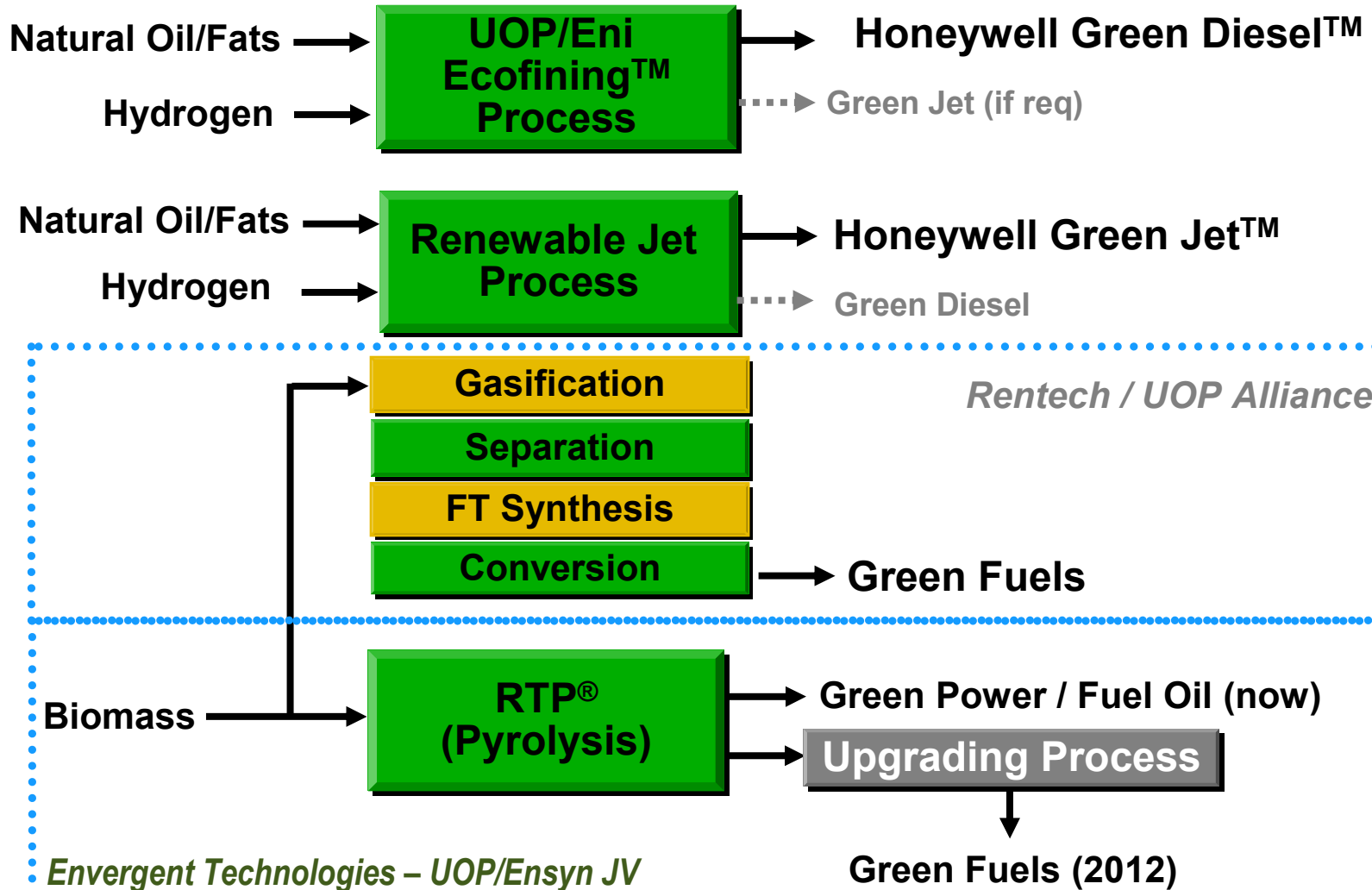
- Green fuels certification and use across land, sea, air installations and platforms
- Fuel (Gallons) – Impact 3 billion gallons per year DOD fuel use
- Emissions – ~6M MT CO₂ annual savings with 25% Green Jet and Diesel in fuel stocks
- Assures domestic fuel supplies
- Lowered GHG
- Enhanced DOD Energy Security Requires government scale up for high rate production

Honeywell Renewable Fuels Vision

- Building on 96 years of petrochemical industry technology and expertise
- Produce real “drop-in” fuels instead of fuel additives/blends
- Leverage existing refining, transportation, energy, biomass handling infrastructure to lower capital costs, minimize value chain disruptions, and reduce investment risk
- Focus on path toward second generation feed stocks and chemicals



UOP Renewable Fuels Technologies



Sustainable Technologies – Feedstock Flexible / 2nd Generation

Completed Flight Demonstrations



AIR NEW ZEALAND



Feedstock:
Jatropha oil



- Successful ANZ Flight Demo Date: Dec. 30, 2008



Feedstock:
Jatropha and algal oil



- Successful CAL Flight Demo Date: Jan. 7, 2009



Feedstock: Camelina,
Jatropha and algal oil



- Successful JAL Test Flight: January 30, 2009



- KLM European Test Flight: November 23, 2009



Recent Service Bio Jet Fuel Demos



USAF A-10C Bio Jet Test
25 March 2010
Eglin AFB



Navy Green Hornet Bio
Jet Test
22 April 2010
Pax River NATC

Royal Netherlands Air Force
16 June 2010
Gilz Rijen Air Base Netherlands



DoD Renewable Fuel Delivery Status

| Customer | Fuel Type | Awardee | Producer | Quantity | Status |
|-----------|------------------|------------------|-------------------|----------|------------|
| Navy | HRJ-5 (camelina) | Sustainable Oils | UOP | 40,000 | Produced |
| Air Force | HRJ-8 (tallow) | UOP | UOP | 100,000 | Produced |
| Air Force | HRJ-8 (camelina) | Sustainable Oils | UOP | 100,000 | Produced |
| Navy | HRJ-5 (algae) | Solazyme | UOP | 1,500 | Produced |
| Navy | HRF-76 (algae) | Solazyme | UOP – Pilot Plant | 50 | Produced |
| Navy | HRF-76 (algae) | Solazyme | UOP | 20,000 | Produced |
| Air Force | HRJ-8 (tallow) | UOP | UOP | 100,000 | TBD – DESC |
| Air Force | HRJ-8 (camelina) | Sustainable Oils | UOP | 100,000 | TBD-DESC |
| Navy | HRJ-5 (camelina) | Sustainable Oils | UOP | 100,000 | TBD-DESC |
| Army | HRJ-8 | TBD | TBD | 18,450 | Produced |

Actual Production – Not Just Potential

Summary

- Honeywell's UOP has production-proven technologies for renewable fuels
 - Available for license today
 - Demo capacity in operation
- Our technologies are feedstock flexible
 - Camelina, tallow, triglycerides from algae, other oil seed crops
 - Actively developing full biomass conversion processes
- Our technologies deliver real, drop-in fuels
 - No compromises needed; chemically and physically indistinguishable from petroleum-derived fuels
 - No changes to delivery, consumption infrastructure

***Real Biofuels are part of the future...
but they also part of the fuel mix today!***