



DEPARTMENT OF THE NAVY

Biomass 2013



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Pacific Ocean USS Princeton (CG 59) pulls oiler USNS Henry J. Kaiser (T-AO 187)



Royal Australian Navy S-70B Sea Hawk helicopter

2012 GGF DEMONSTRATION



SECNAV and CNO aboard USS Chafee

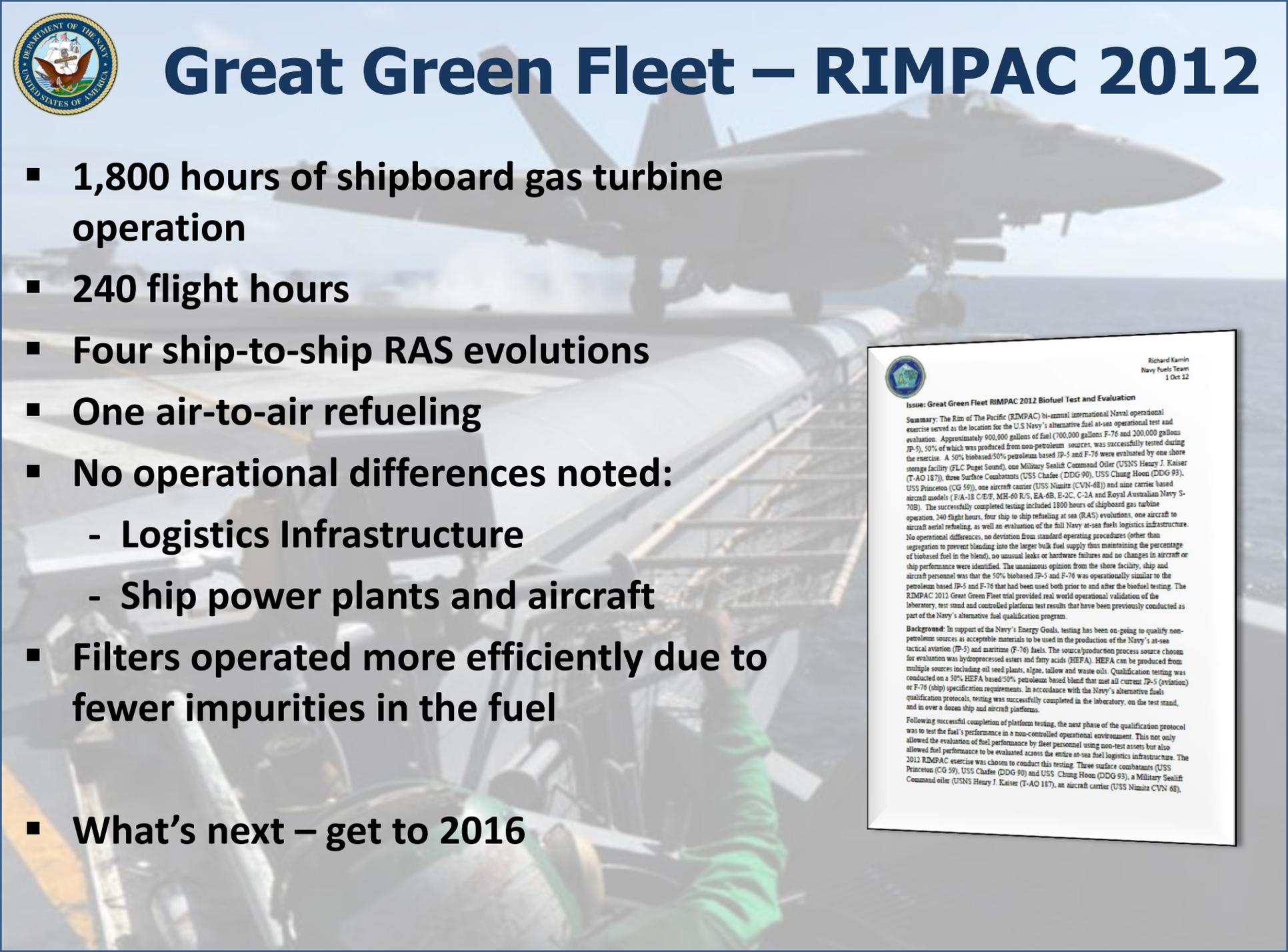


USS Princeton (CG 59) ,USS Nimitz (CVN 68)



Great Green Fleet – RIMPAC 2012

- 1,800 hours of shipboard gas turbine operation
- 240 flight hours
- Four ship-to-ship RAS evolutions
- One air-to-air refueling
- No operational differences noted:
 - Logistics Infrastructure
 - Ship power plants and aircraft
- Filters operated more efficiently due to fewer impurities in the fuel
- What's next – get to 2016



 Richard Karim
Navy Fuel Team
1 Oct 12

Issue: Great Green Fleet RIMPAC 2012 Biofuel Test and Evaluation

Summary: The Rim of The Pacific (RIMPAC) bi-annual international Naval operational exercise served as the location for the U.S. Navy's alternative fuel at-sea operational test and evaluation. Approximately 900,000 gallons of fuel (700,000 gallons F-76 and 200,000 gallons JP-5), 50% of which was produced from non-petroleum sources, was successfully tested during the exercise. A 50% bio-based 50% petroleum based JP-5 and F-76 were evaluated by one shore storage facility (FLC Pagan Sound), one Military Sealift Command Oiler (USNS Henry J. Kaiser (T-AO 187)), three Surface Combatants (USS Chafee (DDG 90), USS Chung Hoon (DDG 93), USS Pinckney (CG 59)), one aircraft carrier (USS Nimitz (CVN 68)) and nine carrier based aircraft models (F/A-18 C/F, MH-60 R/S, EA-6B, E-2C, C-2A and Royal Australian Navy S-70B). The successfully completed testing included 1800 hours of shipboard gas turbine operation, 240 flight hours, four ship to ship refueling at sea (RAS) evolutions, one aircraft to aircraft aerial refueling, as well as an evaluation of the full Navy at-sea fuels logistics infrastructure. No operational differences, no deviation from standard operating procedures (other than segregation to prevent blending into the larger bulk fuel supply thus maintaining the percentage of bio-based fuel in the blend), no unusual leaks or hardware failures and no changes in aircraft or ship performance were identified. The unanimous opinion from the shore facility, ship and aircraft personnel was that the 50% bio-based JP-5 and F-76 was operationally similar to the petroleum based JP-5 and F-76 that had been used both prior to and after the biofuel testing. The RIMPAC 2012 Great Green Fleet trial provided real world operational validation of the laboratory, test stand and controlled platform test results that have been previously conducted as part of the Navy's alternative fuel qualification program.

Background: In support of the Navy's Energy Goals, testing has been on-going to qualify non-petroleum sources as acceptable materials to be used in the production of the Navy's at-sea tactical aviation (JP-5) and maritime (F-76) fuels. The source/production process source chosen for evaluation was hydroprocessed esters and fatty acids (HEFA). HEFA can be produced from multiple sources including oil seed plants, algae, tallow and waste oils. Qualification testing was conducted on a 50% HEFA based 50% petroleum based blend that met all current JP-5 (aviation) or F-76 (ship) specification requirements. In accordance with the Navy's alternative fuels qualification protocols, testing was successfully completed in the laboratory, on the test stand, and in over a dozen ship and aircraft platforms.

Following successful completion of platform testing, the next phase of the qualification protocol was to test the fuel's performance in a non-controlled operational environment. This not only allowed the evaluation of fuel performance by fleet personnel using non-test assets but also allowed fuel performance to be evaluated across the entire at-sea fuel logistics infrastructure. The 2012 RIMPAC exercise was chosen to conduct this testing. Three surface combatants (USS Pinckney (CG 59), USS Chafee (DDG 90) and USS Chung Hoon (DDG 93), a Military Sealift Command oiler (USNS Henry J. Kaiser (T-AO 187)), an aircraft carrier (USS Nimitz CVN 68),

DPA Title III Advanced Drop-in Biofuels Production Project

- Multiple, Commercial Scale Integrated Biorefineries
- Drop-in fully compatible MILSPEC fuels (F-76, JP-5,8)
- \$510M Agency Funding (total planned)
- No More Than a 50% Cost Share from Gov't
- Cost-competitive with conventional petroleum w/o subsidies
- Produced domestically; non-food feedstock





DPA Title III Advanced Drop-In Biofuels Production Project

- As of June 19th, 4 Phase 1 awards have been made
- Potential for 170 million gallons of drop-in compatible MILSPEC fuels (F-76, JP-5,8) to start production by 2016
- Weighted average price in 2013 dollars <<\$4/gal
- Project has \$100 million in FY12 funds from DOD, \$60 million in FY13 from USN that can't be reprogrammed
- USDA has contributed \$161 million in CCC funds
- Phase 2 awards set to begin July 2014
 - Construction and commissioning



DPA Title III Advanced Drop-In Biofuels Production Project

Company	Location	Feedstock	Conversion Pathway	Capacity (MM gpy)
	Gulf Coast	Fats, Oils, and Greases	Hydroprocessed Esters and Fatty Acids (HEFA)	94.0
	South Sioux City, NE	Fats, Oils, and Greases	Hydroprocessed Esters and Fatty Acids (HEFA)	65.8
	Western United States	Municipal Solid Waste	Gasification – Fischer Tröpsch (FT)	17.0
	Lakeview, OR	Woody Biomass	Gasification – Fischer Tröpsch (FT)	16.0

THANK YOU



F/A-18E
Mt. McKinley, Alaska