

Duke

# Oshkosh Engine Round-Up

The exciting world of aviation powerplants

BY MARINO BORIC

**"NOTHING NEW IN THE** world of aviation engines" is a phrase I heard daily during AirVenture 2011. For the occasional lurker that phrase may be true; however, this attentive observer found many interesting new suggestions. Some of them are promising, with almost unbelievable performance data. True, the really big names in the engine business haven't presented anything really new, being somehow in hibernation until the final aviation fuel decision is made, but there was still enough fine-tuning and exciting new stuff around in the smaller, less stylish, modest booths.

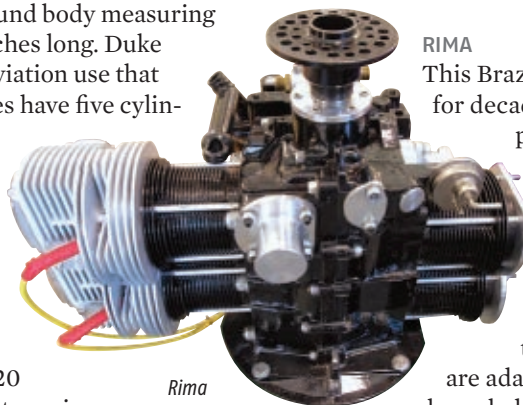
## DUKE ENGINES

This seems to be one of the most promising new internal combustion engine proposals on the market today. The engine built and designed by New Zealand's Duke Engines seems to fit very well in the aviation environment with its round body measuring only 11.6 inches in diameter and 17.3 inches long. Duke has two engine versions intended for aviation use that develop 103 hp and 180 hp. Both engines have five cylinders, have 1.85-liter displacement, and weigh only 101 pounds. The Model 1 with 103 hp at 3300 rpm is direct-drive; the Model 2 with 180 hp at 6250 rpm needs a gearbox.

The engine consists of five conventional cylinders that are axially (ring pattern) arranged. The whole cylinder group rotates counter to crankshaft at 20 percent of crank speed causing pistons to reciprocate at 120 percent of crank speed. A near wave (sinusoidal) piston motion is achieved using a Z-crank with single inclined journal and a nutating body attached to all connecting rods.

Four-stroke porting and valve function is achieved using sliding seals between the rotating cylinder group and a flat non-rotating ported surface (cylinder head). That means that the rotating cylinders move behind openings and the spark plugs in the cylinder head.

According to the manufacturer, the engines have much lower vibration levels than conventional four-stroke engines and are suitable for spark or compression ignition (gasoline and diesel cycle ignition). They are able to "digest" conventional and alternative fuels.



Rima

## RIMA

This Brazilian manufacturer—known for decades in the automotive field—presented two new aviation engines at AirVenture Oshkosh 2011. Both are based on the well-known air-cooled Volkswagen engine (Rima has manufactured more than 200,000 of them) that are adapted for aviation, using the knowledge of Brazilian universities and advanced materials. The former car engine was adapted in design (adding a propeller bearing) and material (engine