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Crover Diesel, a startup in development of lightweight diesel engines for small aircraft, is now seeking accredited angel-investors.

Crover Diesel is picking up where a relatively unknown engine program from the 1960s left off. The McCulloch Corp., better known for its popular line of chainsaws and superchargers, was a company that often pushed technological boundaries. Company founder Robert McCulloch was a true visionary whose talents ranged from developing yard tools to founding Lake Havasu City. Among his endeavors were two aircraft engine developments: the TSIR-5190 and TRAD-4180 programs. The TSIR-5190 was a spark ignition (gasoline) 5-cylinder and the TRAD-4180 was a compression ignition (diesel) 4-cylinder. Their ingenuity was later referenced in NASA paper CR-3260 *"150 and 300 kW Lightweight Diesel Aircraft Engine Design Study"* which arrived at a radial two-stroke diesel as an optimal engine choice. These ahead-of-their-time two-stroke radial piston engines had many advanced features, but unfortunately neither progressed to the point of production. Their brilliant and advanced features can be applied to today's small aircraft needs.

In general aviation there has been an unfortunate multi-decade trend of reduced pilots and flights, primarily related to the prohibitive expense of owning and operating light aircraft. To reverse this decline there is a need to lower operational costs and return aviators to the sky. General aviation technology aids all sectors of aviation and the recently signed law H.R. 1848: Small Airplane Revitalization Act of 2013 is proof that revitalization is of top priority in the United States. Rejuvenating this area of the industry is not only good for general aviation: it contributes to economic growth, strengthens transportation infrastructure, and leads to the cultivation of jobs.

Looking at aviation piston engine fuel (Avgas), we find prices continue to increase, and questions abound about long-term availability due to its TEL (lead) content. This casts doubt on the continuing viability of using status quo piston engines. New piston engine design can bring the benefits of reduced operational cost, reduced environmental impact, and foster new possibilities in airframe design.

What is the solution?

The Crover Diesel project sought information about the McCulloch programs and acquired the only known surviving example of the TSIR-5190 engine. This prototype engine was reverse studied and restored for an operational test run. This restoration effort proved invaluable in understanding the efforts of McCulloch and established a foundation for a new concept matched to current needs.



McCulloch TSIR-5190

Working to develop a purpose-built modern radial diesel, the Crover Diesel project has created patent-pending technology. This clean-sheet design intends to meet the modern demands of small aircraft through an understanding of the broad small aircraft market, while eliminating many compromises. Crover Diesel's primary objective is to reduce long-term operational cost for small aircraft.

We believe new engine development needs to focus on three key factors to make this happen:

First, use an established long-term and globally-available fuel supply, satisfied in jet-fuel as opposed to Avgas. Currently, for every 100 gallons of jet-fuel used in the USA only 1 gallon of Avgas is used. Looking at global numbers, the disparity between Avgas and jet-fuel consumption is even larger and creates an economic disadvantage to the refining and distribution of Avgas. This gap remains regardless of Avgas composition, whether in its current 100LL form or any future lead-free initiative. Finally, Avgas is difficult, if not impossible, to obtain in many rural and emerging areas of the world. Given the choice, jet-fuel is simply the better option. This reason alone justifies the need for diesel piston engines – engines that can operate with jet-fuel.

Second, reduce fuel consumption. This can be accomplished by focusing on increasing engine efficiency and flight performance, while taking advantage of the inherent efficiency advantages of a diesel engine over its gasoline counterpart. A new design can also optimize flight performance numbers such as: improved power at altitude, propeller efficiency, cooling system efficiencies, etc., which combined reduce the fuel required for a given flight profile.

Third, create an engine design that can be expanded to accommodate a broad range of airframes and their power demands. Because development, certification, and manufacturing cost are high for any new aircraft engine, including a large base of category specific power and configuration needs, a significant reduction in the cost for an entire engine family can be achieved.

With these objectives combined with an innovative design, we expect this engine program to be highly successful.

Aircraft engine revitalization is essential for the future of general aviation. Now is the time to pursue engine development.

Find out more about the Crover Diesel project by visiting www.CroverDiesel.com

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We look forward to discussing investment opportunities.

