

PROGRESS IN SANTA ROSA



The next aircraft for a complete CAFE Aircraft Performance Report will be this Lycoming O-320 powered Bushby Mustang II owned by Jim Lewis of Walnut Creek, CA.

An Update on the CAFE Foundation's Aircraft Testing Program

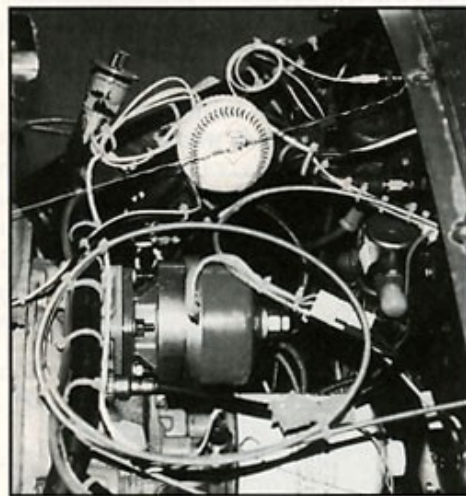
The last several months have seen the CAFE Foundation devote a huge effort to create a sophisticated new system for evaluating homebuilt aircraft. This EAA funded and sponsored program will be announcing some real breakthroughs in aeronautical understanding in the coming months. This has been helped in large part by major contributions from Fluke Corporation, Aircraft Spruce & Specialty Company, Terra Corporation, and B&C Specialty Company.

Perfecting the zero thrust glide (ZTG) test method, about which CAFE Board member Jack Norris has contributed the article this month, has spurred much of these advances. ZTG is proving to be an exciting and elegant new way to get the truth about an aircraft's performance.

EAA Headquarters in Oshkosh has generously provided a used 32' motorhome to serve as an all weather data processing center and ready room for the CAFE flight test crews. Heated and air conditioned, the interior is being outfitted with a wall of radio and computer video/electronic analysis equipment for year 'round use. It dou-

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bles as a great place for on-site meals, thanks to Vice President Larry Ford, the designated and now acclaimed chef. We have officially named it



This small alternator, donated by B&C Specialty, makes it possible to eliminate the alternator belt's side force for better zero thrust detection.

"Larry's CAFE Cafe" and his cooking has been a major draw to keep the CAFE engineers working on into the night on busy weekends. Antennas are being fitted to the motorhome for aircraft com, GPS, and, in the future, telemetry for data.

Several other major donations have been made to the CAFE Foundation in the last few months, giving the non-profit group the tools they need to round out the increasingly sophisticated test program. The Fluke Corporation donated a portable digital storage oscilloscope/meter which is a powerful and sophisticated instrument for analyzing real-time trends from various flight test sensors. This marvelous instrument gives the CAFE group the ability to get a clear understanding of several aspects of airplane performance while flying. It allows the study of laminar flow, exhaust system back pressure, static port turbulence, torque oscillations and many other detailed subjects.

The Aircraft Spruce & Specialty Company has donated an ICOM handheld aircraft transceiver to aid in conducting flight tests and to serve as



EAA has provided this well equipped motorhome to allow CAFE flight tests to continue year 'round.

a backup to installed aircraft com sets. Jim Irwin, president of Aircraft Spruce, has been a constant strong supporter of CAFE activities for over 14 years. His unhesitating generosity to the CAFE Foundation attests to his steady and honest efforts to improve the world of homebuilt aircraft.

Terra Corporation donated a TX-10 Base Station Aircraft Communications Transceiver which has been a great help to the ground crew. It has the power needed to reach out to the test aircraft when they are flying over the ocean. This ability proved a great help when, on a recent flight, the onboard computer program crashed and the flight crew was talked through a successful step-by-step reprogramming to get it started again and avoid aborting the flight. Sitting at the workstation in the motorhome, Ed Vetter was able to mirror the computer display in the cockpit as he talked them through it.

Bill Bainbridge of B&C Specialty Company in Newton, KS has donated one of his excellent lightweight alternator systems for use on the test aircraft. Since the zero thrust glides must be flown without an alternator belt, the resulting total loss electrical system meant shorter test flights and delays in the hangar while recharging batteries. The B&C alternator is the perfect solution to this problem because it is driven off the vacuum pump pad of the Lycoming engine and thus imposes no axial loads on the crankshaft during zero thrust glides.

Another exciting development is an invitation from NASA at Ames Research Center for the CAFE team to

present their findings on Jack Norris' new ZTG flight test method. Placing a test mule Cessna 152 into NASA's full-scale wind tunnel would allow comparing its drag results there with those from the zero thrust glide flight test program. This may also provide some spin-off studies of things such as sheared wingtips, laminar flow wheel pants, alternative cowl shapes, etc.

Work is now underway to complete a full Aircraft Performance Report on the popular Bushby Mustang II in a future issue of SPORT AVIATION. This report will be the most thorough yet completed and will be followed by reports on the Rutan Long-EZ, Questair Venture, Glasairs, and many others.

The CAFE Foundation enjoys the tremendous benefit of customized flight test weather forecasts from expert meteorologist Jim Mathews at the National Weather Service in Sacramento. Jim is capable of using NWS modeling, balloon soundings, Doppler Radar and Satellite photos to predict



Look for a comparison test of these two interchangeable cowl shapes in an upcoming CAFE performance report.

when the most favorable atmospheric conditions will prevail over the CAFE's headquarters in Santa Rosa. His help has thus far been right on target and this has provided for much higher quality flight test data.

The CAFE scales are being re-calibrated with special 1,000 lb. test weights that will be certified by the California State Department of Weights and Measures. An upgrade to the scales circuitry and programming will then be made to further improve their renowned accuracy. Conveniently located flush in the test hangar's concrete floor, these scales have been the basis for much of the aerodynamic insights recently obtained. Otis Holt is fabricating special high-strength dollies to allow moving the test weights onto the scales to confirm accuracy at any time.

CAFE Board member Crandon Elmer, an expert in scales and applied load cell technology, has been transferred from his job in Santa Rosa to a new position at Weightronix in Fairmont, MN. The CAFE team wishes him the very best at his new job there and hopes that all the EAAers in Fairmont will give him a warm welcome.

(CAFE - Comparative Aircraft Flight Efficiency, Inc., is a non-profit, all volunteer, tax-exempt educational foundation sponsored and funded by the EAA. CAFE headquarters is located at 4370 Raymonde Way, Santa Rosa, CA 95404, 707/526-3925, 707/545-CAFE (hangar/weekends), FAX 707/544-2734.)