



The Bend High Desert Flyer of Chapter 1345

WEBSITE: <http://1345.eaachapter.org/>

KBDN AWOS 134.425

OCTOBER 2012, VOL11, #10

PREZ SEZ:

It's October already and we still have 80 degree days! You have to love that. Our airport is almost all finished with it's "remodeling" and the taxiways are finally smooth again!

As most of you know, we lost an aviator this past month. Ray Dillard was our President during "2006" and I was his V.P. I went to his "service" at the airport cafe and it was well attended by family, neighbors, friends and fliers. I didn't really know Ray that well but after joining his extended family, I know him allot better. Lots of stories were told as well as a Military Honor Guard and a fly-by of an RV-9 (with Ray on board!)

At last months meeting, Eric Simkins gave us a power point show of Boeing's work with "fuel cells". Eric has been involved with using fuel cells for the "Cassini Space Mission to Saturn" (check out some of it's specs here @ JPL's web site <http://saturn.jpl.nasa.gov/>) and is currently working on more down to earth projects involving unmanned flying machines. Hopefully we can get him to tell more on this next new phase of flying.

We have another young man interested in aviation, Derek Miller. We are giving Derek a student membership to our club and I hope you get a chance to talk with this young man. Like Devan Simkins, he is young, smart and wants to get involved. Since these two gentlemen represent our future leaders, lets give them as much support and encouragement as possible. Derek was also the "man of the hour" by pulling the winning ticket for our 50/50 drawing, and he pulled my ticket!!! That's another \$10 to the chapter, thanks for all who participate.

Our next meeting will be on Oct. 10th at the Pro Air conference room, above their maintenance hanger at Bend Muni. Doors open at 6 with the meeting at 6:30pm.

Pizza, waters, beer and wine will be available. As of now, I'm not sure what Henry has in store for us. He was talking about a guest speaker, another airplane project and or his own geodesic gyro copter. We will see.

Next month, you get a chance to clean your closet of "aviation related stuff". I have a few things that I am donating to the chapter to auction off (just in time for Christmas). Also for November we need to select officers for the chapter. I think most everyone is willing to maintain their positions so don't be afraid to show up! Also we will be having a "Chili Night" (instead of pizza) for the Nov. meeting so plan on bringing spouses and friends!

See you on the 10th and bring a friend or anyone interested in aviation!

Thomas Phy, President

Treasurer's Report

Financial for period 1/1/12 through 9/30/12

Total Income:	\$748.00
Total Expense:	\$775.86
Net Income (Loss)	(\$ 27.86)
Cash Balance:	\$2,044.69

Jack Watson, Treasurer

September meeting minutes

This time, our trusty Secretary (and Treasurer) had to leave the meeting early, but Tom stepped in and the Prez Sez details above cover the proceedings

The FanWing

Arguably the first entirely new aircraft design developed within the past century. Instead of jet engines or rotors, it uses huge rotating fans embedded in its wings for both lift and propulsion. Scale models have been flying for years, and we've just learned that a manned ultralight prototype should be airborne in early 2013.



Inside of the wings of a FanWing aircraft are long cylindrical turbines (picture the rotating blades on one of those old push-lawnmowers). The turbines are spun by engines such that they force air over the top of the wing, generating lift and forward thrust simultaneously. Since the lift is engine-powered (like in a helicopter), a FanWing can take off nearly vertically, but it's as efficient as a traditional fixed-wing airplane in level flight. The design is also quiet, cheap to build, easy to fly, impossible to stall, and in the event of an emergency, it can autorotate to a safe landing.

This all sounds fabulous, but we're still waiting on FanWing to build a version of their aircraft that we can actually fly. The company has released a development timeline for a human-sized version that includes a January 2013 "first hop," followed by flight tests through June and a first public demo at the Oshkosh EAA AirVenture event in July of 2013.

60-Year Homebuilt Project Ready To Fly

An 84-year-old former Boeing manufacturing engineering instructor says he hopes to finish a 60-year-old project this year with a flight in a replica of one of the most unusual homebuilt aircraft designs ever conceived. Ed Kusmirek built a replica of a 1924 Dormoy Bathtub aircraft at his home in Renton, Wash. The project began in the 1950s when Kusmirek found an authentic engine for the type (actually a motorcycle engine) in Oklahoma. Since then he's plugged away at recreating the single place light aircraft, starting in his living room and moving to his garage. Now, he says, he's a few pen strokes away from flying it.

Kusmirek has asked for an inspection from the FAA and he has to brush up his own flying skills. He has a pilot certificate but isn't current. In the spirit of homebuilt aircraft of the era, Kusmirek has used an assortment of adapted technology to create the aircraft, from bicycle spokes as tension wires to dirt bike wheels for landing gear. A rowing machine bungee provides the landing gear suspension. After six decades of development, he said he plans to fly it once and then donate it to a museum.



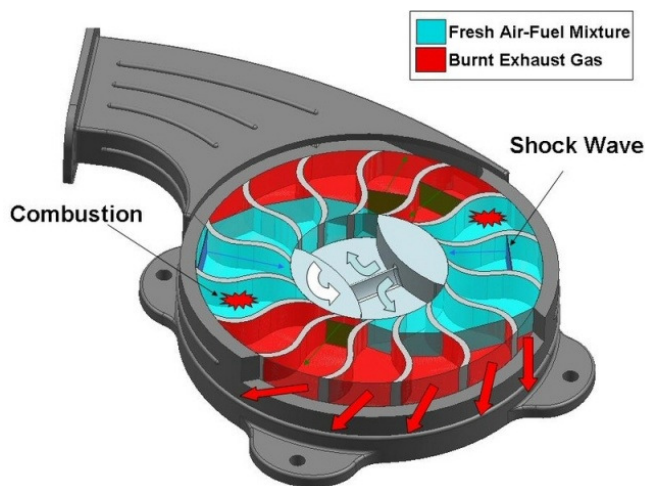
The edging around the cockpit is pipe-insulation foam covered with chamois leather.. The hubcap on each wheel is the top of a plastic soda bottle The wheel hubs and a cover on the engine are made from saucepan lids. The tail skid at the rear of the fuselage uses a spring from an old recliner.

"The Wright brothers used a lot of bicycle parts," Kusmirek said. "I figured there's no reason I couldn't..."

A New Engine

Dr. Norbert Mueller, an associate professor at Michigan State University's (MSU) college of engineering, plans to have a new engine generating power through a 25-kilowatt battery out later this year. The new engine connected to a generator and buffered by a battery and likely some capacitor storage would be powerful enough to run a full size vehicle.

The new engine is a "disk wave" chamber instead of a piston in a cylinder. The disk wave principle uses a novel internal system to generate shock waves by igniting a compressed air and fuel mixture that propels rotors. No valve gear, pistons, connecting rods or crankshaft.



The engine is a system of rotors with radial channels that work due to timing as the shock waves are generated and move through the system. To grasp what's going on, consider a turbine with air going in one end and exhaust gas exiting the other, like a set of fans. The wave engine – it seems – is like a squirrel cage or centrifugal fan with the air coming in the center and exhaust leaving the perimeter. Seems simple . . . vent the incoming air fuel mix properly, ignite it and vent it out at the right moment.

ARPA-E, the Advanced Research Projects Agency-Energy provided a \$2.5 million ARPA-E grant in 2009 to Mueller who says, "The wave disk engine is smaller, lighter and easier to manufacture. You have to be aggressive with your research in today's world if you want to get anywhere."

Mueller's engine designed is said to reduce the weight of the engine by 30%, cut the weight of vehicle by up to 20%, improve the fuel economy by using 60% of the fuel for propulsion, reduce the total cost by up to 30%, and reduce the CO2 emissions by 90%. That's a very big list with big numbers all in the shadow of the American car companies' headquarters in Detroit.

Mueller says they have four working bench prototypes, "We have engines – real, working, good-sized models – running right now." The MSU research team will turn one of them into a 25-kilowatt disk wave engine and generator package this year, "We'll be able to drive a full-sized hybrid vehicle, or even a hybrid SUV." Mueller said, "The engine was obviously hard to design. But it's easy to manufacture."

The wave disk engine offers a major improvement using 60% of the fuel to create power, making it up to four times as efficient as today piston engines. That offers a whole new calculation on fuel use. It would also stuff a plug into the progress of grid charged electric vehicles. Consumers and the oil companies will love this – cutting 75% of the gas bill for one and staying in the game for the other is a natural symbiosis.

In case you're wondering why the piston engine isn't ever going to catch up to turbine types, it's the working function problems. Pistons (plus the pins and a part of the mass of the connecting rod) have to go up and down essentially stopping and starting with the acceleration and deceleration twice with each crankshaft turn. Lots of energy gets used doing that. Plus there is the air turbulence inside the crankcase – twice the displacement of the engine gets pumped in every revolution using more energy. There are also all those moving parts, compressing springs and other things going on. It's astonishing the modern internal combustion engine is as efficient as it is.

Mueller can hold the bench prototype engine in just one hand. The engines would be relatively easy to manufacture and reduce the overall weight of a car by hundreds of pounds, enabling hybrid vehicles to be perhaps 20 percent lighter and 30 percent less expensive. A series hybrid could be very desirable, indeed.

Carnot's theorem

As with all heat engines, the efficiency of a wave disk engine is governed by the temperature difference between the hot and cold sides (see Carnot's theorem). Compared to a conventional piston engine, a wave disk engine works at higher peak temperature, which theoretically makes it more efficient. The design also works without a cooling system, saving weight. Compared to turbine based systems, the rotational speed and the rotor-blade temperature of the wave disk engine is lower, which creates lower stress

Carnot's theorem, developed in 1824, also called Carnot's rule is a principle that specifies limits on the maximum efficiency any heat engine can obtain, which thus solely depends on the difference between the hot and cold temperature reservoirs.

Max Efficiency $\eta = 1 - (T_C/T_H)$

T_C is the absolute temperature of the cold reservoir
 T_H is the absolute temperature of the hot reservoir
efficiency η is the ratio of the work done by the engine to the heat drawn out of the hot reservoir.

Thought for the day --

Is it good if ---- a vacuum really sucks?

Bruce "leaves his mark" at Madras

THIS IS THE SIGN WHICH WILL DESIGNATE BARBWIRE BRUCE'S PARKING PLACE.

**RESERVED FOR
HANDICAPPED RV PILOT
"BARBWIRE" BRUCE MYERS**

ALL OTHERS STAY CLEAR FOR THE SAFETY OF YOU AND YOUR AIRPLANE. LEAVE PLENTY OF SPACE ON BOTH SIDES FOR BARBWIRE BRUCE TO SWING IN AND PARK.



Two pixs of Barbwire Bruce...third pix is of Tom Berg checking the wingtip of Larry Simm's Cessna and Rambo Rob Norris looking for marks on Barbwire Bruce's rudder.

Airshow of The Cascades

For those who missed it, here are some highlights from this Aug 24-26 event, held at Madras Airport.



Douglas A-26 Invader



Mikoyan-Gurevich MiG-17



Perfect smoke ring



Camping on the grass

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