

Report from GM's Volt Web site which includes an interview with Lionel Liebman, manager of Program Development – Applied Research at Lockheed Martin:

[Lockheed Martin Signs Agreement with EESstor](#)

[Ref. <http://gm-volt.com/2008/01/10/lockheed-martin-signs-agreement-with-eestor/>]

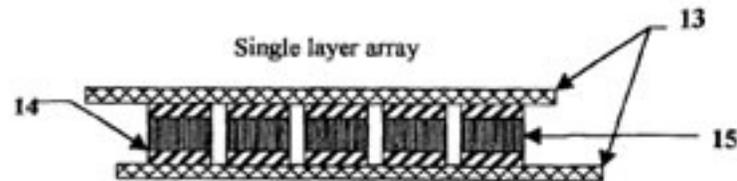


Figure 3

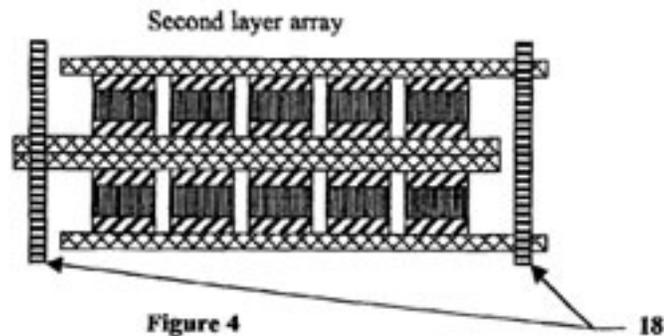


Figure 4

Mostly, we talk about the Volt here, but relevant and related topics are often worth discussing.

We have previously discussed a secretive Texas company called EESstor, who are reported to be working on a new type of ultracapacitor that can hold 10x the energy in 1/10th the weight of typical batteries, at a fraction of the cost.

They have an agreement to produce caps for Zenn electric cars but to date have not shown any prototypes. This has led some to suspect EESstor as not having the technology they report.

Today, however, Lockheed Martin, the major U.S. military equipment manufacturer has announced a partnership agreement with EESstor to develop energy applications.

If these ultracaps can really deliver what they are projected to, they could offer a dramatic advantage for electric vehicles.

To that end, I interviewed Lionel Liebman, manager of Program Development – Applied Research at Lockheed Martin Missiles and Fire Control.

The entire interview can be seen by clicking below.

Can you tell me what your announcement was today?

Lockheed Martin and EESstor are working together to find areas for integrating their technology to a variety of power management platforms we're working on.

Is it a financial contract?

We're not taking any sort of ownership of EESstor. It is an exclusive rights agreement to allow us to market these technologies to a very limited number of potential customers including homeland security and the defense markets.

Lockheed Martin builds fighter jets and military equipment?

And missiles, rockets, ground equipment, vehicles, and systems sensors. Obviously everything that requires power to operate. Power is becoming a sticking point or burden to the warfighter and that's one of the things we're focused on is coming up with solutions that make the warfighter's job easier and more efficient.

Are you looking to develop portable energy storage for the battlefield?

Yes there are opportunities not only to help in the area of relieving some of the dependence on fuel as energy. Also to increase the value of some of the renewable energy initiatives that are going on right now. Energy storage increase the value of these types of power generation technologies. EESstor's technology can help in that area.

What have you seen from EESstor in terms of their technology?

We've visited their facility. We were very impressed. They are taking an approach that lends itself to a very quick ramp-up in production. We've seen a lot of their testing and efforts to measure the purity of the powders that they use, and the chemistry. We'll be working with them very closely this year to develop prototypes in certain pursuits.

Have you been able to evaluate any of their current prototypes?

That's an effort that's ongoing. We're really just getting started to integrate their technology into some of the efforts that we have going on here. That's going to be something that we're doing this year.

So its a collaborative effort to build the prototypes then?

That's right.

Do they have something that they've tested that you've seen which makes you want to work with them?

We haven't personally tested their prototypes yet. Its something that we'll work on together this year.

How does Lockheed Martin feel about ultracaps and storage versus li-ion or NiMh batteries?

Lockheed Martin doesn't have a bias. One way or another its really just a function of what does the customer want. For certain applications being able to provide pulse power is really really important, in another its not so much really pulse power but continuous power. If you talk to the Army they are really interested in hybridized solutions. Suffice it to say that EESstor's technology is a piece of some of these systems solutions that we come up with. We are a system integrator so we look at the EESstor technology as a building block or a tool in a toolbox to provide the best solutions for the soldier.

Do you see the ultracap as a power solution or an energy solution?

The EESstor chemistry and architecture lends itself to both types of applications. Its a scalable technology. In the situation where you are trying to store energy, transport it without discharge obviously thats very attractive in the utility grid load leveling (situation). If your talking about powering for example a high energy weapon that requires a short burst of energy a capacitor is a great approach to do that. Capacitors are in hybridized systems today for that reason. The chemistry is great purely from the view of battery technology but its also very attractive for some of these extremely high pulse power applications.

Are you looking to use this technology in any vehicular type of application?

We have a number of platforms that were working on. Our applied research group is primarily focused on land forces power management which involves several area including vehicular power.

The needs of a consumer for a hybrid fuel-efficient [car](#) versus the need for a soldier in the battlefield are a bit different. The common theme there is 'what can we do to make them more efficient', and battery technology is important for that.

Are you confident that their technology will offer a greater amount of energy and power density than batteries?
Yes, and at a fraction of the cost.

Do their caps hold 10x the energy at 1/10th the weight of a lead acid battery?
Yes.

How does the price of EESstor's capacitors compare with Li-ion or NiMh batteries?

It really depends on the chemistry, the volume, the packaging, the application. It is really application-specific. It's going to be lower price. We're not just concerned about hardware cost. Really what we're focused on is logistics. Especially the logistics footprint in theater. That's probably more important than material cost. And that one of the things that we think this technology can bring. Because it can be used for a variety of applications with a common architecture and chemistry. Its compact, its scalable and can be applied to a variety of applications. That obviously very attractive to a logistics community, to have more common components and that type of thing.

Is there a production plan for 2008?

Yes for EESstor. Their approach is when they start manufacturing these batteries, not just the cells, but also the package assembly, they will be in production. If you can get a visit to EESstor they'll show you their process and everything they've got in place to support that. Assuming that everything comes together in terms of tests and qualifications and that sort of thing, they will be ready to ramp up very quickly, because of the nature of the architecture and scalability of what they are doing.

Can you say anything about the use of EESstor's technology in commercial vehicles?

We are basically working with them exclusively and in the homeland security and defense department's markets. The commercial vehicle market, that's what EESstor will pursue. If there is a military application then we're going to help them integrate their technology into those applications, but when it comes to commercial vehicles that's EESstor's responsibility.