

A Different Starting Point Explores Different Actions

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Abstract

We have found that making strategic breakthroughs is a consequence of mingling conventional tasks and new concepts – and hunting for the right opportunity to permit the new to be supported. Examples will be given of some tricks that broaden your thinking: a 6½ minute film “Doing More With Much Less” will be shown that demonstrates a philosophy of vehicle movement with very little power; and there will be several examples of present products that illustrate when and how to accommodate breakthrough technologies. The examples will include Helios (the highest flying airplane at 96,863 feet), tiny drone airplanes with remarkable duration and control, and economical cars of the future with zero pollution.

Introduction

Our route to developments and commercial products has been both conventional and unconventional. We have deleted parts of our business that did not clearly fit the goal, so that we could focus more closely on the breakthrough items. For the most part we have pushed new techniques where our designs/products could play a significant new role. For example, we work on devices that move through air, on the ground, or in or under water, and have found that the technologies all have similar features. There is an overall goal of efficiency, and environmental sustainability, but these two items represent only a general guide, not an absolute requirement.

We find there is more opportunity all the time, and business keeps growing. The challenge, in a small company that is staffed with very creative people, is to stimulate the creativity but not let it diversify our approach too much. Creativity can be applied to all topics with which we deal. We try to keep the programs/products focused on just a few areas, but find the management of this strategy is difficult.

The Genesis

AeroVironment started in 1971 with no employees and no specific business plan but with the benefit of two prior decades of experience in creativity and management at Meteorology Research Inc. My Ph.D. in aeronautics had not moved me toward working for a big aerospace firm, but instead had provided a satisfactory base for getting into weather modification, atmospheric turbulence and instrumentation. Hobbies and dedications mingle in both organizations. In the summer of 1976, I initiated a new project to create the human powered Gossamer Condor. The main goal was to win the £50,000 prize for human-powered flight so as to get rid of a debt of comparable size I had acquired by sponsoring a friend's company that did

not succeed. The project succeeded in 1977 but its expenses ate up most of the prize. A £100,000 prize then became available for a human-powered flight over the English Channel. We won this event in 1979, and the prize money finally just covered the debt. However the subject of flying vehicles was intriguing, so we formalized an aviation division and started work on the solar powered Solar Challenger. This too succeeded, and the new division kept growing. When receiving the Lindbergh Foundation Award in 1982, I had to present a talk reviewing my plans. This was the opportunity to put all my diverse prior activities into perspective, and realize that the programs and my evolving interests all focused on global issues of not misusing the globe's future. As the company grew we got rid of some parts while emphasizing others. Now, with Tim Conner as President since 1990, we are benefiting from this dedication. All the segments are healthy, commercial sales are steadily growing, we are making an impact on energy efficiency and conservation, and there are huge gains visible in the future.

Programs

In aviation (taking place in Simi Valley) we are split into two parts: 1) the high altitude Helios plane, and 2) the low altitude drone aircraft. Helios, although it has reached 96,863' (2 miles higher than any other plane has maintained level flight), is focused on maintaining flight at 60,000-65,000 feet, in circles or maneuvers so small it is essentially motionless (just like a synchronous satellite but 2000 times closer). It can serve various needs, but its NASA-sponsored development is aimed mostly as a communications device to provide hundreds of thousands of data links to a city day and night for months at a time. The low altitude drones go from 0.5 ounces to 400 lbs, with the best known being our 9 lb Pointer airplane that is hand launched, lands automatically at nearly zero speed in a full stall, can be GPS controlled, and sends back video pictures (normal light and IR) and other data. Battery powered, it has flown as long as 4 hours on one flight.

Our surface devices include a 75-150 kW natural gas generator of electricity, and a growing commercial business in fast charge battery systems for electric forklifts and airport vehicles. In addition, using variations of the lithium batteries that now power our cell phones and microcomputers (and lots of tiny aircraft), 300-400 mile ranges can be achieved with economical, full size lithium batteries (an amazing new situation that has not yet had any effect on commercial car companies in Japan, Europe, or the U.S.)

The Future

The above prospects, and many others, keep evolving into more major programs. There are tremendous gains being made in efficiency and in total energy use, and in energy resources from natural sources. Our international fossil fuel supply will be peaking and then dwindling in very few years. If our civilization prepares properly (which is unlikely), this will not cause inconvenience.