

Alexis C. Livanos

Vision, Ethics, Passion, Transformation—The Shaping of a Leader in Aerospace

Alexis Livanos spent about a decade at Caltech, from the mid-1960s to the mid-1970s, earning three degrees (BS with Honors '70, MS '73, PhD '75) and then doing post-doctoral studies in applied physics. We had the good fortune to talk with Dr. Livanos about his travels from Greece to Caltech, through the aerospace industry, right up to his present position as corporate vice president and president of Northrop Grumman's Space Technology sector. His official biography will tell you about his expertise in the fields of advanced communications systems, technology and technology insertions, hardware design, and satellite manufacturing and production. You will learn that he has participated in the successful launch of more than 40 satellites. But that doesn't really get to the core of the man—his quick and forthright style, at turns funny, reflective, thoughtful, and thought-provoking. Our conversation was wide ranging, and we invite you to listen in.



ENGenious: What inspired you to become an engineer?

AL: The reason I came to the United States from Greece was because of NASA and the excitement of space exploration. My interest and passion in space started when I was 12 or 13, in high school—it was called Athens College. I was trying to figure out the equations governing how rockets moved. Eventually, I had the opportunity to choose Caltech and I came because of the Jet Propulsion Laboratory, and the climate. Later, I selected Fred Culick [Rich-

ard L. and Dorothy M. Hayman Professor of Mechanical Engineering and Professor of Jet Propulsion, Emeritus] as my advisor because he was in propulsion. After the first year in propulsion, I switched to lasers, then to electromagnetic theory, solid state physics, and finally to signal processing for earthquake prediction applications.

Spending a substantial amount of time at Caltech and importantly, having the opportunity to study many different disciplines in depth, is probably the best thing I have ever done because it prepared me for the breadth of the aero-

space business. When I told Fred Culick that I wanted to work for Nick George [formerly Professor of Electrical Engineering and Applied Physics], it was perfectly okay. And when I told Nick I wanted to work for Amnon Yariv [Martin and Eileen Summerfield Professor of Applied Physics and Professor of Electrical Engineering], that was perfectly okay. This “sharing of students” is unheard of in academia. But it was of tremendous benefit to me, because if you look at my continuation from Caltech into industry, I followed the same path. The key is the ability to quickly *adapt* in an environment. Also key is having the ability and the intellect to cut through to the fundamental issues, address them and then not be bashful about asking a lot of questions.

ENGenious: What else about your Caltech education has influenced you?

AL: At Caltech I gained the ability to organize my thought process in a way that looks at all of the alternatives in a very methodical, logical manner. This has been absolutely invaluable. The second thing I value is the joy of research. Look at how we are pushing the technology here at Space Technology, in areas very similar to those in which Caltech is involved. We’re involved in micro-electromechanical systems [MEMS], light-weight materials and large apertures, as well as high-energy lasers, advanced communications systems, and environmental sensors. Twenty years from now, all these technologies will be part of our lives. Pushing the envelope is part of what I learned at Caltech. In business, it’s important that you have a fiscal responsibility toward your shareholders, but it’s also important that you have the vision for the mission. These are highly complementary. The third thing I gained at Caltech is the ability to take science from one domain, apply the principles, and come up with a solution in a different domain. I think this is absolutely vital in terms of one’s ability to invent and be successful.

ENGenious: Did you get anything from Caltech on the business side?

AL: Not during my formal career at Caltech, but I did attend one course at Caltech’s Industrial Relations Center when I was working at TRW; it was called Managing Innovation. I thought it was an excellent course. I used some of that material and concepts to understand the balance between innovation, creativity, and the business of running the business. But the important thing to note is that Caltech teaches the ability to think. Once you learn that, you can apply it to return-on-investment calculations, contracts and pricing, profit margins, and regulatory and accounting requirements.

ENGenious: After Caltech, how did you decide to go into industry rather than academia?

AL: One of the pivotal moments of my career was when I decided that I really did not want to stay in academia. I always had thought that industry was tedious—but it is not like that at all! After my PhD, I started working with Bill Bridges and Amnon Yariv at Hughes Research Labs, and I just fell in love with it. Although I had an offer from Yale, I joined TRW in the very early 1980s. For the next 15 years, I followed the same pattern that was established at Caltech: I worked in diverse fields. I did program management, electro-optics, semiconductor electronics, digital electronics, radio and microwave frequency electronics, payloads, then structures. And that’s how I grew.

I think another pivotal event was when I decided to venture into the “commercial world.” While at TRW, I once tried to recruit an absolutely brilliant communications engineer who was working for Loral. But he recruited me! So I failed in that plan. Loral at the time had finished its divestiture of all of its defense businesses to Lockheed Martin. The company had an excellent track record in terms of performance. Space Systems Loral was doing commercial satellites, and I decided I wanted to try something new. I call this event “the MBA school of hard knocks.” It was really an eye-opener. Going from a cost-reimbursable environment to a commercial environment was a different world, but it has given me the breadth and ability to look at



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to encourage the resurgence of our upcoming generation, from the 6th grade up, into the sciences. We are starting to get the “pull” mechanisms to grow. Now what is needed is the excitement, the vision. At Northrop Grumman, we are building the James Webb Space Telescope, which will travel 940,000 miles from Earth to the Second Lagrange Point (L2). It will image the universe as it was nearly 13 billion years ago, giving us insight into the formation of the first galaxies, planetary systems, and the evolution of our solar system. This project is really cool. It is forward-looking and visionary. This is what will grab the attention of students and draw them into the sciences.

Under the right leadership, the aerospace industry will regain that sense of pride, creation, the ability to improvise, and the ability to insert technology. I believe that all government agencies operating in space, including NASA, NOAA, U.S. Air Force, and the intelligence community are starting to make those changes that will attract a lot of bright people. I think we’re going to get there. We’re going back to the way things were done in the ’60s and ’70s, when there was a clearer vision and a closer working relationship between industry, government, and academia.

business in a different fashion.

But one constant throughout my career has been the importance of integrity—both ethical and scientific integrity—and respect. We must respect the technology and the system engineering aspects of the business, but also understand what “business” means, what shareholder value means, and understand how the two are interdependent.

ENGenious: What are your thoughts on the consolidation and evolution of the aerospace industry?

AL: Northrop Grumman’s acquisition of TRW has been very successful. Our value comes from our culture, the way we do things, the kinds of people that we have, and our vision. When Northrop Grumman acquired TRW, they trusted and respected our set of values. Other mergers and acquisitions didn’t have the same philosophy, resulting in cookie-cutter rules and constraints. If you homogenize everything, you get mediocrity.

The industry is evolving, which is healthy. I think there is a realization on the part of both the government—including the DoD and NASA—as well as the aerospace industry that we need to address workforce issues and our image. For the first time, I see a proactive stance

ENGenious: What is a typical day like for you?

AL: I arise around 6:00 a.m., and am at work usually around 7:30 a.m. A critical role for me is setting strategy for our company’s performance and growth, so I spend a good amount of time in meetings with my executive and program teams. We also have critical reviews and it is my job to ask the hard questions on deliverables, schedule and cost. In addition to meetings with employees and customers, I travel to Washington, D.C. several times a month to speak directly to customers and key government representatives.

My personal style is to speak directly to the executives and engineers instead of exchanging emails. I walk the halls so I will know what we need to improve. I also meet with employees on a one-on-one basis and ask them what it is they are doing, and what ideas they have. Employee com-

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munication is really important. I'm more comfortable with informal communications—I don't write "directives." Ours is a non-adversarial environment, and I'd like to continue to grow and build the teamwork that we have at Space Park. I feel very lucky to be a part of this team.

ENGenious: What do you find most satisfying?

AL: Several things. I like being *immersed*. I don't manage by remote control. I like knowing what is happening and how I can help. And because of my affinity toward engineering and science, it is interesting to me to understand an issue in detail. People like the fact that management has a certain level of scientific or engineering curiosity and expertise. I can appreciate their work because I understand how difficult it is. So I'll talk to our teams in the laser lab, for example, and I'll ask them about wavefront quality, momentum shift, thermal dissipation, phase transition, and so on. This makes a difference.

Few things are as satisfying as good old-fashioned, hard-edged competition. I am absolutely energized by it. It's probably why I like doing the impossible, tough tasks. The truly big challenges are invigorating. In my view, consolidation has not eliminated the competitive drive at any company in our industry. So, I must be driven to win—not just compete—or someone else will be. That's a key strategy when you have talented employees.

One last thought about satisfaction—it also comes, believe it or not, from the Caltech motto: "The truth shall make you free." That simple statement inspired me as a student, and it pushes me forward now. It's part of the reason I continue to learn and personally evolve. Many people probably take it for granted today that the truth and perceptions really are one and the same, but it is perhaps one of the most important management lessons I've ever learned. The way others see you is more important than how you see yourself. This has not just changed my management style to be more participatory and more logical, but also has altered the way I look at the world—it has made life a lot easier.

And this all gets back to acting with integrity and honesty. If we want to be seen as being ethical, for example, there's no faking it—you are or you aren't. That's another way in which my Caltech education has influenced me—Caltech does a superb job of teaching the value of ethics and integrity. The Honor Code and learning to trust and have respect for intellectual property have provided for me a critical and solid foundation for this business. Part of that trust is built by communicating openly and honestly with whomever you are speaking with. Lay out the facts, help others see the truth about a problem or issue, and they will respect you for leveling with them. It gives you the freedom to make the best decisions and see clearly ahead. **ENGE**

Dr. Livanos serves as the chair of GALCIT's Advisory Council, an external advisory and outreach committee. He is also chairing, with President Jean-Lou Chameau and JPL Director Charles Elachi, an international aerospace conference celebrating 50 years of space technology hosted by GALCIT. The conference will be held at Caltech in September 2007. For further information visit: <http://www.galcit.caltech.edu/space50>.