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Reducing Technical and Program Risk of Complex Aerospace Projects

John Maris
CEO

CEOCFO: ***Mr. Maris, would you tell us the concept behind Advanced Aerospace Solutions*?**
Mr. Maris: AdvAero employs expert engineers, test pilots, and programmers, and uses a cutting-edge aircraft, simulator, and software with the sole objective of reducing the technical risk and program risk of complex aerospace projects.

CEOCFO: ***Would you give us an example of something your programs would be able to help with that others might miss?***
Mr. Maris: One of our larger projects is NASA's Traffic Aware Strategic Aircrew Requests (TASAR) program. TASAR is a very sophisticated software tool to help pilots make real-time trajectory optimization decisions in the cockpit to achieve fuel and time savings. TASAR accounts for other traffic, weather, and special use airspace in its computations.

Our task was to rapidly transition TASAR from the laboratory environment into the cockpit of a sophisticated business aircraft for evaluation by airline pilots. This was quite a challenge, but our specialized research aircraft is designed for just such a task, and we succeeded in accomplishing this very quickly. It took us about a year from the time we were first introduced to TASAR until we were flying it with the line pilots in the National Airspace System.

CEOCFO: ***What is it about Advanced Aerospace that would allow you to move so quickly on a program?***
Mr. Maris: I will quote a friend of mine who addressed the subject of thinking outside the box by asking: "What's a box?" Our concept is to avoid the temptation of driving quickly towards a specific solution. Instead, we spend a lot of time trying to identify *what problem* we are trying to solve, which is a different thing altogether. For example: rather than debating whether we should implement a red light or a green light, we would ask ourselves whether should we be using a light at all. To accomplish this, we have cultivated a team of experts who share this philosophy. We provide them with the appropriate tools, such as our specialized aircraft, software suites, and simulators, and we use their skills and resources to drive very purposefully towards the right solution. We work hard to avoid the trap of being "boxed" in too soon by a particular line of thought.

CEOCFO: ***Was that the idea from day one or did you realize somewhere down the line that is what it should be?***
Mr. Maris: It was not the concept from day one. From the outset, we have been a lean company, with a core of just 12 engineers and scientists. At this size we don't have the latitude that a large company might have to throw vast resources at a problem. In order to participate meaningfully in the very demanding field of NASA flight-testing, we had to gain efficiencies that very few companies are forced to acquire, and we could not achieve this using traditional methods. This forced us early on to adopt the new paradigm that I just described. The result is that we are operating at levels much higher than our size might indicate - as a major contributor to a NASA program, for example.

CEOCFO: ***How were you able to get attention from the right people initially?***
Mr. Maris: We have an outstanding relationship with our NASA management team, but two highly supportive mentor companies opened the door to NASA, and were instrumental in our subsequent success. The first was General Dynamics, whose principals took us under their wing, mentored us, and eventually introduced us to NASA. The second is Engility Corporation, our prime contractor for the TASAR program. Both of these companies have been profoundly supportive, and added the size and depth that we needed to gain entry to the TASAR program. Once the door had been opened, it was up to us to demonstrate what we could do.

AdvAero's philosophy is to demonstrate its capabilities by over-delivering by every possible measure: programmatically, cost-performance, human relations, and, above all, technically. For example, when we were expected to present PowerPoint slides, we would also deliver publication-quality documentation. When early laboratory demonstrations were expected, we delivered a fully operational system hosted in our research aircraft. NASA uses a specific terminology for scientific maturity called Technology Readiness Levels (TRL). TRL-1 is essentially an idea on a napkin and TRL-9 is something fully developed, tested in its operational environment, and ready for full deployment. Our skill is that we can take a TRL-2 or 3 concept and make it function like a mature TRL 6 or a 7 technology. This is important to NASA, our Prime contractor, and for their potential customers or investors in the technology.

CEOCFO: ***Is there skepticism because you are so good at what you are doing?***
Mr. Maris: Any skepticism regarding the viability of our ideas is quickly overturned by the fact that we are demonstrating our results in a high performance airplane at forty thousand feet. Our track record also proves the soundness of these ideas. AdvAero is a joint venture formed by three companies that have won a large number of aerospace awards, including an Aviation Week Laureate presented to us at the Smithsonian. We have done flight test work for New Zealand, which led to the Ministers Award to Industry, and we have won Canada's oldest aerospace award (the Trans Canada McKee Trophy). We also won Canada's prestigious Floyd award in 2013, the first time this has been issued to a company instead of an individual. And now we are this year's NASA's Subcontractor of the Year. These demonstrated successes are a good testament to the efficacy of our methods.

"AdvAero's philosophy is to demonstrate its capabilities by over-delivering by every possible measure: programmatically, cost performance, human relations, and, above all, technically… We are confident that we will continue to perform at the level that earned us this award, and are very excited at our future prospects." - John Maris

CEOCFO: ***Are people coming to you now?***
Mr. Maris: One of the problems with being an innovator in R&D is that one is almost always starting from the beginning. Our success with one particular technology or program doesn't necessarily confer much advanced standing for the next one. We have the advantage of being the incumbent on some projects, and we are also very well known within the communities that we serve. We also operate a particularly capable aircraft that is very good for R&D. Nevertheless, despite these advantages, we are still competing for new programs, so we spend a lot of effort bidding on new opportunities which is time consuming and expensive, but unavoidable.

CEOCFO: ***Is the field consolidating?***
Mr. Maris: I am the vice-chair of the Aerospace Industries Association of Canada (AIAC), which is the body that represents aerospace both to the Canadian government and towards the international community, so this is an important issue for me. The two major aerospace industry trends are globalization and consolidation of the supply chain, with increased risk sharing among partners. The days of relying on past performance and relationships with one's primes are numbered. Original Equipment Manufacturers (OEM) want to deal with a very small number of integrators and large Tier-1 companies who share the risk of their programs. In turn, these integrators want to deal with a small number of 2nd-and 3rd-Tier small and medium enterprises. The supply chain is consolidating at the same time it is globalizing, so the OEMs and primes are looking anywhere in the world to eke out cost advantages for the delivery of the goods and services that they need.

CEOCFO: ***What is the interest in aerospace today?***
Mr. Maris: Aerospace is a hugely appealing field, which represents some of the greatest accomplishments of the nation. The challenge is to keep the enthusiasm among today's youth, now that the high profile programs such as Apollo and the Space Shuttle have come to an end. The space station is a marvelous accomplishment that represents an uninterrupted manned presence in orbit for many years. Unfortunately, its success is low-key, and we sometimes need to remind ourselves just what an extraordinary achievement it is.

CEOCFO: ***What do you see for the future of space travel?***
Mr. Maris: I am not completely current with the status of space travel, but I was at NASA HQ in March when the Administrator explained where NASA is going. They are working on Orion, which is the next-generation of space capsule and a represents a next giant leap in US manned space exploration. Private companies, such as SpaceX and Virgin Galactic, are heralding the commercialization of space transportation and science. These are among the pioneers of the exciting transition from the purely governmental control of the manned space flight program into the private sector, analogous to the onset of the jet age in the sixties. I think the future is very bright for space.

CEOCFO: ***What has surprised you as Advanced Aerospace has grown?***
Mr. Maris: What surprised me about our success is that we were named Subcontractor of the Year for the very first project we performed for NASA, following a rigorous selection process. Each NASA center selects one prime and one subcontractor, and puts their names forward into a pool for the national evaluation. We were surprised to be NASA Langley's nominee, along with our Prime, Engility, as this is a vibrant aerospace center, and there would have been substantial competition. We were even more surprised and delighted to be picked as NASA's subcontractor of the year for our first project with the agency.

CEOCFO: ***What might be different next year?***
Mr. Maris: Next year we go forward from the baseline of what we have already accomplished. We began our journey with NASA as a startup company with ambitious claims for the future. These are behind us now: the Phase-1 flight tests complete, papers written, and conference presentations complete. We move forward with a very solid foundation that we didn't have when we began working with NASA. We are confident that we will continue to perform at the level that earned us this award, and are very excited at our future prospects.

CEOCFO: ***What should people remember most about Advanced Aerospace Solutions?***
Mr. Maris: Above all, I am proud of the technical accomplishments of our engineers and scientists that earned us this award. When we started this project, no airborne implementations of the TASAR technology existed. The equipment required to host TASAR in our aircraft did not exist, and there were no operational concepts to help guide its implementation. It's as if someone had invented antigravity in the lab, and was trying to figure out how to field the technology! We started with all these intersecting unknowns, and deployed a spiral model where everything eventually came together on our first flight. It was inspirational to start the aircraft and see the TASAR technology come alive, only a year after we were first introduced to the software in NASA's Air Traffic Operations Laboratory.

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