

Chancellor Ayers, honored guests, proud parents, and soon to be graduated students, I am truly honored to be here with you today for such a life changing event.

As I thought about how I could provide some insights to all of you as you embark on an exciting career, I'd like to share my 4 "hard learned" secrets to a happy and productive career in aerospace

The first secret,...follow your passion.

This may seem overused and redundant, especially since you are all in aviation and aerospace....a career path steeped in passion, a passion fueled by the memories we all had growing up mesmerized by flying in airplanes, or watching airplanes, pilots and rockets fly.

However in this case, I am not referring to the passion for aerospace and aviation, but the passion for what specific role you will play in this broad industry.

Although I am sure all of you will be very happy to have good jobs in the industry, I am talking about finding what type of role, what type of position really drives you, really motivates you, really excites you to excel.

This was a lesson I learned early in my career.

I was a first level technical manager. One of the technical managers in another group was transferred into my group...a demotion...Marvin, was probably 20 years my senior, and had a PhD specializing in Heat Transfer. Marvin was a very talented engineer and understood the

details of heat transfer phenomena. However he had a hard time getting the RIGHT things done,

When the organization was challenged with parts failing prematurely in the hot section of a gas turbine, and just needed a good assessment of the basic temperature field in a specific component,

Marvin instead was enamored with some arcane, 3rd order detail which had little to no bearing on the result, but which piqued his natural curiosity.

SO here I was given the task of mentoring Marvin on how to get things done.

Twice a day I met with him to go over detailed tasks and completion status. He struggled with the structure and the deadlines. He was really unhappy.

A few months later, it was time for Marvin to leave the company and to my surprise, as I was conducting his exit interview, he shook my hand...and thanked me.

As uncomfortable as it was for him to have those 2 a day detailed reviews with me, it was the first time that he really understood what was expected of him, and he finally realized, this was not the role for him.

This alone would have been a lasting impression. However, about 6 months later, I saw him in the grocery store and I asked how he was doing.

He said he has never been happier...he was teaching at the local college. He enjoyed the interaction with students, the ability to explore

the arcane aspects and details of heat transfer...and in a word...he found his passion.

That left a memorable impression on me...not because he found it, but that it took over 20 years of his career to finally find what excited him, to finally find what fueled his passion and what created the highest expression of his talents. Don't be a Marvin...find your specific passion early and excel

The Second secret....challenge the status quo...make a difference.

It may not always appear clear to you, especially after going through countless interviews, some successful, and some not so...however, you all have very valuable technical and social skills that are not yet fully understood or fairly valued yet in the aerospace workforce.

You were not only trained on computers, you were brought up on computers and therefore you are innately comfortable with them, if not proficient. Heck, most of you can win immortal battles in a virtual reality while simultaneously eating pizza and drinking coke.

As you enter the workforce there will be a tendency to under estimate you, to consider that your lack of experience will mean it will take longer to do a specific task or it will take additional people to train you, to guide you. This analysis took the last person 6 weeks...I think you should have it done in 8. It took old Joe 2 months to complete this test report , I am sure you will need 3...that will be the conventional thinking....that will be the "status quo", especially in larger companies.

Challenge that conventional thinking and demonstrate the real value your life experiences, and your knowledge of technology can really bring to your chosen path.

I vividly remember just such a situation. I was an engineering director responsible for our engines in airline service, specifically a turbofan and a family of turboprop engines. Our turbofan engine was experiencing some very difficult icing phenomena at high altitudes.

We needed a full dynamic computer simulation of our engine so that we could understand various impacts on the engine without costly and time consuming engine testing. My experts told me it would take \$1M and 12 months to complete such a task. We had neither. So we stuck to the conventional engine testing approach although it really paced our ability to resolve our issues.

That summer we were given a summer intern...as we were deep into this icing problem I really didn't have anyone to spare to work with him and spoon feed him tasks... so I asked him about his experience with dynamic simulations... he had done a little...nothing anywhere near as complex as a turbofan engine...but he was willing to give it a try.

Eric was his name...university of Maryland...going into his senior year. I gave him the software manuals for the simulation program language, I gave him a bunch of engine performance reports and told him come back if he had any questions. He went to his cubicle...and there I saw him...every day...reading, working on the computer...reading some more...I would ask...any questions?...no...working it. I lost track of time that summer and as we headed into mid August Eric came into my office....I asked how he was doing on the task?...he was done he said!!.

I thought to myself, that's good, even if it's rough or incomplete, at least we will have a framework of something my experts could build on....I said "great' lets look at it. To which he proudly walked me over to his cubicle..sat me down in front of his computer and he proceeded to

show me the dynamic simulation of our engine. It looks great I said...truly an amazing result.

SO, let me make sure I have this clear...its mid August, and you not only have the simulation written and working, but its already validated???...yes he said.....A smile broke over my face as I recognized how much fun I would have needling my so-called experts who claimed the need for a year and a \$1M dollars while a single intern (albeit a very bright and industrious one) was able to complete it in a summer.

It was a powerful lesson for me, not only in challenging the status quo, but more importantly it taught me a valuable lesson about the skills and abilities that new graduates have as they enter the workforce and taught me to never underestimate their capabilities, but give them extreme challenges, as they don't know what "CAN'T" be done.

Challenge the status quo...make a difference!

As you leave this outstanding establishment of higher learning and enter the next phase of your career, it is very typical to be focused on getting things right, focusing on not "messing up". However, the fear of failure can be debilitating to achievement and success. My secret number 3 is don't let the fear of failure stop you from success.

History is full of successful failures...Thomas Edison tried 10,000 filaments before he found tungsten, and we all know that Orville and Wilbur failed numerous times before finally flying.

Many of you young people may be sitting here thinking.....oh fine...easy for him to say....but I didn't get through Embry Riddle by failing my classes!...that's true, that's why this point is about striving to excel and succeed without fearing failure.

To be able to strive for the highest level of achievement without the paralysis and indecision that fear of failure can invoke.

Along my career path, I have had many failures.

However, I painfully remember one of the most “spectacular” ones. In 2001 I was called back to Phoenix to run the development team tasked with certifying and going into production with our first “all new” jet engine in 30 years. I was leaving my “dream job” at the time...running the fuel control business in North Carolina.

In Phoenix we had a team of over 400 engineers, we were significantly late to customer needs, we had customer airplanes ready to enter production, with no certified engines available. We were burning through over \$1M a week. We established a very aggressive plan, a daily schedule of analysis completions, report submittals and approvals and were making real progress. However, as we closed in on about 3 months remaining before our “certification” target.....we still had a very visible, highly unpredictable test to complete.

The bird test...where you demonstrate to the FAA that your engine can hit a flock of birds and still retain a certain level of power and control. My structural analysts of course wanted to do more analysis, more refinement and more delays...as they felt we weren't ready...we had fully assembled production airplanes waiting for powerplants....so I leaned on the team to get the test ready...stop the analysis paralysis. As the day of the test neared, a steady stream of engineers came into my office begging for more time...more “pre-tests”.....and my answer was always no...we had done the work...the analysis was clear...it was not without risk...but additional delays were not acceptable.

On test day, we had a full crew of FAA engineers and inspectors, we had the engine fully assembled and calibrated at our outdoor test stand in the desert outside town. We had hand picked the birds (yes....they were humanely euthanized) to meet FAAA specifications of size and weight. We had an air cannon that launched the birds into the engine at the speed and power just prior to takeoff.

As you might suspect by now, the engine was running at full power, the birds were “launched” and the engine erupted in a spectacular fireball and violent vibration. The engine did not continue running, and was not controllable in fact it shut down rapidly as it shook violently and spewed enormous flames out the tailpipe.

You could cut the silence with a knife as we all watched in horror...knowing full well that another iteration of such a test typically takes 12-18 months.....As I stood there....roughly calculating the 12 months, times \$1M/week burn rate...and how I was going to break that to the President.....thinking...maybe selling used cars wouldn't be that bad.

As it turns out...after a week of so...with the benefit of high speed photography and our 3 dimensional structural models, we found that with a small variation of the fan blade design (hard to believe considering the fireball disaster we had witnessed) that we might be able to pass the test. We pulled the team together into a totally focused, round the clock effort and was able to get an engine back on test in 6 weeks. An unheard of cycle time. We successfully completed the test and achieved the certification target date

The fear of failure paralyzed many on the team, but in the end, real failure galvanized a collective effort to achieve a remarkable cycle time and an ultimate success. Don't let the fear of failure paralyze you from succeeding.

My fourth and final secret is...remember what brought you here...stick with your passion...earlier I mentioned find your passion..this secret is **STICK** to your passion.

Everyone in this graduating class is here because of a burning passion for aviation and aerospace. As I mentioned earlier, this passion is often fueled by experiences during our childhoods, reading books, watching videos or TV or going to the local airport or military base.

There will come times in your career when you may be tempted to sacrifice your passion for what appears to be a better role at the time...a better promotion, more money, better location. All of these are valid reasons, however, if you move to a role away from your passion, how will you have the energy, the drive, the motivation, the creativity to demonstrate the highest expression of your unique talents.

In the year following the engine certification we were ramping up production, we were going into service and the engine was well on its way to being the most reliable engine entry into service in the industry. However, there was change around me and my path forward looked uncertain as I longed for an integrated business with full profit and loss responsibility as I had before I left North Carolina.

In those months I had a variety of opportunities, running businesses designing, building and selling products as diverse as electrical generators, oil well equipment and air conditioners, However, as I

struggled with the decision, I knew something was missing...I wasn't sure that this would be things I would be passionate about. Then I thought about what this meant to me..."passion" for aerospace...and as I thought about some of the events, some of the milestones, some of the key events in my career up to then...what did they have in common.....chills up my spine, the hair on the back of my neck standing on end, and 'goosebumps" on my arms and legs.yep,,,that's right...as I thought about those key milestones.....

the light off and successful test of a new engine core

the successful flight of a critical technical fix on a regional airliner,
breaking output and cost records in our engine production facility,
the first flight of the aircraft with our newest propulsion engine...

the list goes on

all of these milestones had a common impact on me....chills up my spine...the hair on the back of my neck stood up,...and I had goosebumps on my arms and legs.

Now I am not a doctor, but I chalk these affects to the emotional connection that I had with these products and customers...an emotional attachment borne of the passions for aerospace.

However I tried to convince myself that I could find certain aspects of each of these other opportunities that had the same impact on me...that gave me the same feeling and demonstrated the same emotional connection.

About that time, my daughter was having a “take your dad to school day”...this is where the students bring in their fathers or mothers to school where they give a brief talk about what they do. During the time before class I was meeting other parents, talking with the teacher and I could overhear my daughter talking with her friends...they were telling her what their dads did...to which they asked my daughter...what does your dad do?...this both piqued my interest and terrified me since it was just a few years earlier when she came to work for take your child to work day...and after wards professed...all dad does is talk on the phone and goes to meetings!!!!

However, when asked what her Dad did...she answered...my Dad makes airplanes fly.....my dad makes airplanes fly. In that moment...and out of the mouth of babes.....it was clear....this was what I do..this is what grabbed my imagination..this is what fueled my passion...this wasn't about making generators or air conditioners..this was about making airplanes fly.

As I look around this group and see the list of degrees...this is also what you all do...you make things fly....aerospace design.....spacecraft design.....airport management...you all make airplanes fly...stick with your passion

So, as you are here, on the threshold of the next phase of your lives, consider my 4 time-tested secrets to a happy and productive career in aerospace....

- 1) Don't be a Marvin...find your specific passion early
- 2) Don't let fear of failure paralyze your efforts to succeed?
- 3) Challenge the status quo...make a difference,
- 4) Stay the course...stick with your passion...nowgo...make airplanes fly!!!!!!