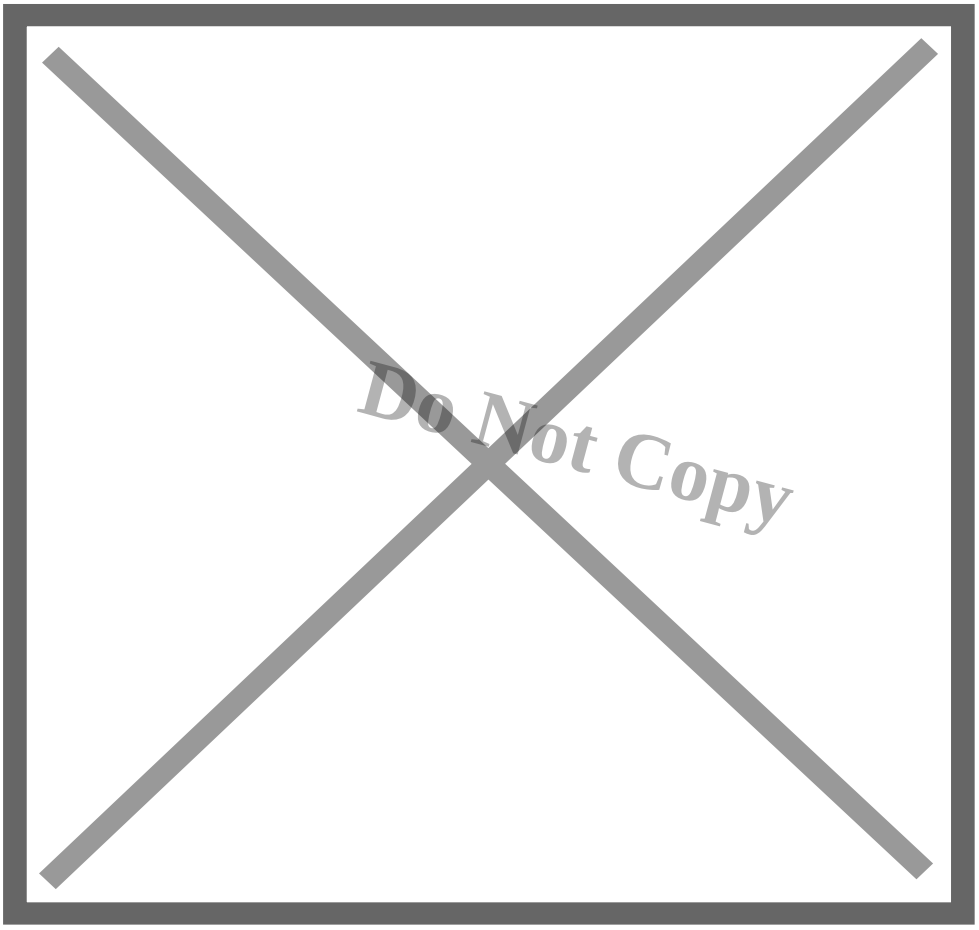
Why the aerospace industry is heading for massive disruption

Description



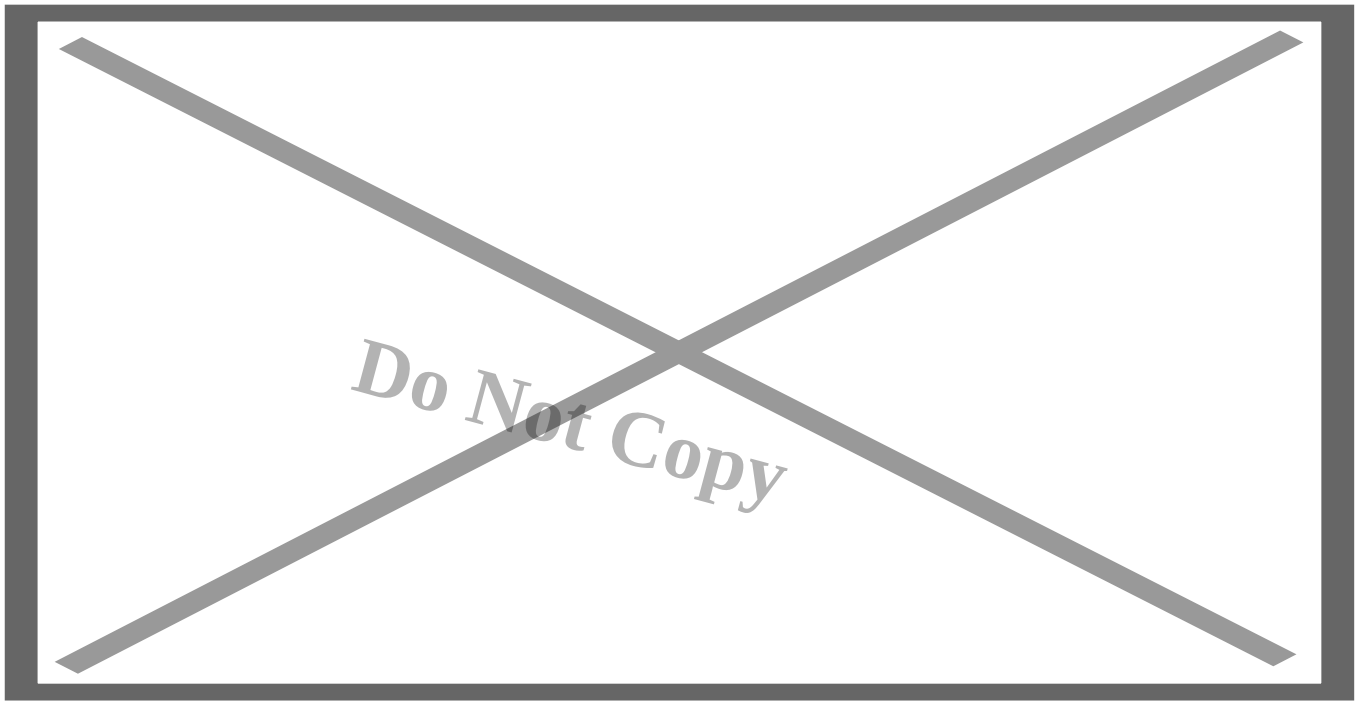
As someone whoâ€™s dedicated most of my career to Aerospace, Iâ€™ve seen a lot. The ridiculously bullish days of 2007 and the crash thereafter; optimism in the late 90â€™s followed by 9/11 (I still remember exactly where I was at de Havilland in Toronto on the second floor when I heard) and the aviation industry downturn that followed. Product development and all its drama and chaos, to end of production of the Dash 8 Q200 and the sadness of a time gone by. Throughout all those years something started to pop out at me: just how many paradoxes there are in this industry that is supposedly so sexy and cutting-edge to the outside world. And real innovation in air travel has slowed significantly. The industry has focused on optimizing whatâ€™s there, improving efficiency, and reducing costs.

Aerospace I believe is ripe for disruption. Industry regulators are incredibly conservative and slow-moving (some for the right reasons, especially public safety). Manufacturers are slow to innovate and adapt to the world. Industry consolidation is swallowing up competition (I remember dealing with an enterprise that started as an independent and then went from Emteq, to B/E Aerospace, to UTC and then to Collins through a bunch of mergers in the span of 4 years). Costs to develop new aircraft are

skyrocketing and yet offer little revolutionary ideas to push the industry forward.

In such an industry true innovators are considered heretics for wanting to break the rules. But that is exactly why we need disruption.

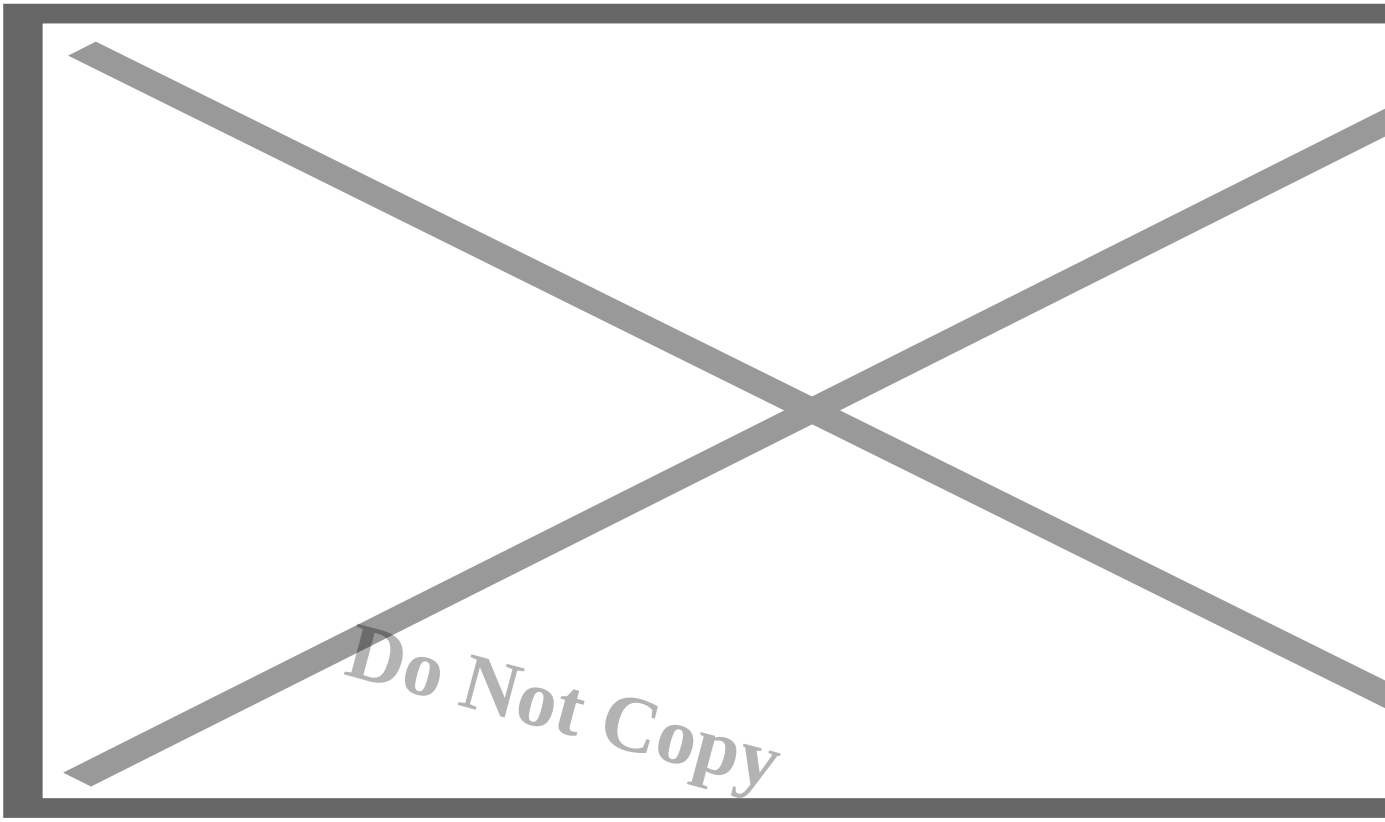
Hi-tech vs. old-school



This could be last week or 70 years ago

To the average person on an airplane, flying is a thing of wonder, technology, and an icon of modern society. Inside the industry though, things are done reallllly old-school. Sure there have been advances in aerodynamics, engine performance and efficiency, navigation and comfort, but you can still find workers bucking rivets like the 1940â€™s, grinding metal to make parts fit, and endless streams of paperwork to keep track of every grommet, screw and can of paint. The industry is so slow to change that I am convinced it is ripe for a massive disruption on manufacturing technology and also in design. Ideas like hyperloop have the potential to make aircraft flight redundant for many routes. And yet manufacturers are focused on getting another 500 nm of range, or a few extra seats on a cabin layout to squeeze the last drop of revenue out of a route.

Mass production expectations vs low-volume reality



Taiichi Ohno: God of Lean

In around 2007 my bosses all fell in love with the Toyota Way. For anyone not familiar it is a systematic continuous improvement system invented at Toyota and credited with a big part of their incredible success in the 1980â€™s and 90â€™s. At the same time, they were looking at robots for riveting, welding, assembling and cutting. All of these big ideas that worked when youâ€™re building millions of cars a year donâ€™t translate directly when you build 50 aircraft a year. And yet many leaders of the time and still today believe these systems translated to aircraft will revolutionalize the industry. But 15 years later and it hasnâ€™t paid off as it should. The reality is the cost of automating processes doesnâ€™t have the ROI for such low volumes. The leaning out of processes is a great practice but building aircraft still feels in many ways like a hand-crafted business. Maybe itâ€™s different in the massive Boeing Renton facility but I doubt it.

What is a real puzzle to solve is how to handle the high degree of customization in the business aircraft industry in particular, while keeping robust and repeatable production. And keeping costs of production to a minimum. Toyota believed in organizing everything, solving root cause problems and continuous improvement. These are great lessons for anyone. The things that donâ€™t apply directly: airplanes have much lower volume and much higher complexity, so the investment to apply all of the process design is enormous and drive aircraft costs higher; and the Toyota system is a continnuous gradual improvement that took decades to master. We want a quick fix. If additive manufacturing or other technologies can drastically lower costs of manufacturing, it can generate another surge in cheaper aircraft that are more accessible to all.

On-ground pricing vs in-the-sky reality

Arenâ€™t you excited? Itâ€™s 10 times the price and 5 generations behind!

Consumer technology moves in about 6-month cycles. The new 4K tv I bought last year now looks ancient to me; why didnâ€™t I wait for 8K? Owners of business jets expect the same cutting edge technology on aircraft, especially in their interiors. And the $4000 8K OLED display should be available and for the same price on an airplane right? Wrong. Certifying any consumer technology is difficult and expensive and because of the low-volume reality, amortizing this effort over 50 units makes that tv $100,000. Iâ€™ve had hundreds of conversations with owners over this reality and itâ€™s always amazing how hard it is to make this work. By the time something is qualified itâ€™s obsolete. And too expensive. So tvâ€™s on the most expensive business jets in the world look like the ones gathering dust in your basement storage. Coffee-makers are $20,000 when they are bulky, unreliable, and make coffee that tastes worse than from your local dive diner.

Every spare part on an aircraft is ridiculously expensive. Mostly because of the same reason as above: it takes billions of dollars to develop, test, and certify a new aircraft. And great programs may produce 1000 units (especially in Business Aircraft). So how do you get that investment back? Spreading that cost over every actuator, relay, rivet, and panel that you sell as a spare part. Also, with the competitiveness on aircraft pricing nowadays companies may sell the aircraft at single-digit margins, knowing they can get 40 or 50% on their spare parts.

Anyone who can integrate consumer electronics at the pace its created and closer to the pricing for that at your local Best Buy is sure to change the game in business jet interiors.

The glamour of travel vs the reality of security, delays, lost luggage, and crappy hotels

I miss travelling during this quarantine, but not this partâ€¦

Having had the opportunity to fly on business jets for work many times, I am the biggest advocate for this luxury if you can afford it. Nothing feels better than driving right up to your airplane, handing someone your keys and bags and walking onto the airplane, and taking off. Contrast that with endless frustration of finding parking, checking bags, paying for baggage, check-in kiosks that never work, line ups to fix your boarding pass and check-in, baffling security line ups and rules, and the person in front of you who looks like theyâ€™ve never been on a plane and take 30 minutes to empty their pockets and argue why they have to take their shoes off, and lining up to get on a cramped seat with no bin space, no food, watery coffee (with nasty airplane water), delays, cancellations, overbookings, etc. And people who donâ€™t regularly travel imagine the glamour of it all.

The commercial air travel industry has lost the sense of wonder and excitement it can generate in people and has turned it into a smelly, painful and mundane bus-ride, pushed up against someone who looks like they havenâ€™t showered in weeks. More opportunities for disruption. Make travel fun and exciting again; the journey can be just as fun as the destination.

Intense processes vs stunning lack of efficiency

In a meeting about transforming processes, I remember seeing a couple of videos that really struck me about just how far Aerospace is from being efficient. One was an F1 pitstop, an amazing choreography of precision, process, and practice all in under 2 seconds (going back to the 1930â€™s pitstops were a blistering 33 seconds!). Look how good a well-organized process can be!

The other one that was truly amazing was of a hotel in China being built from the ground up in 6 days! Totally disruptive thinking in a very mature industry.

Great visuals that can inspire you to transform how you do things right? Then why hasnâ€™t anyone yet? I believe these pricniples are entirely applicable to the aerospace world, but it requires the mental fortitiude to push through the enormaous inertia in our industry. Could we make a 60 month check on an aircraft take 5 days instead of 5 months? Sure we can. If you eliminate all the disorganization, looking for parts, paperwork, resources, experts, tools. Do all the manpower planning to choreograph the work so no time is wasted between tasks. That would be revolutionary for the in-service world woulnâ€™t it?

How about doing a development program in half the time, and half the costs? There is so much waste in new programs it is truly mind-boggling. It isnâ€™t intentional but it is so complex and so poorly defined upfront that so much time is spent just figuring out the status and what needs to happen next that things often get done, undone, and redone 3 times.

Size doesnâ€™t matter

There have been a lot of studies and debates about whether large organizations can innovate and a good article is here on the subject. I personally donâ€™t believe that size is the contributing factor on whether a company can innovate and disrupt the market.

What is most important is the mindset of the leadership and the recognition of the gaps that are avaiable to exploit in the market. Our team on the Global 7500 accomplished some great innovation within a huge organization because the leadership of the program recognized the need and allowed the freedom to explore and invent and try new things.

One of the main problems in this industry is the prevailing force is the consolidation of the industry to eliminate competition. This is good news for the organizations merging in the short term because it generally leads to improved margins, and less competition allows for better bargaining with OEM customers. But it stifles innovation when these companies have little incentive to disrupt a market theyâ€™re thriving in.

There are lots of good reasons and opportunities to disrupt aerospace. Itâ€™s just a matter of time before an Elon Musk clone comes along and crushes the status quo. I canâ€™t wait.

Category

1. Uncategorized

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