VISASQ / COLEMAN

Aerospace & Defense Market Seminar

Our Expert :

David Yom

Managing Director at EGT Global Technologies Consulting

About Our Expert:

- Asia Pacific and Americas Global Executive at Raytheon Company (Jan 2023 – Nov 2024)

David S. Yom is a highly accomplished aerospace and defense expert with over 25 years of experience, including leadership roles in business development, capture management, program management, operations management and engineering management at Raytheon. David's expertise encompasses delivering advanced, end-to-end solutions—including sensors, C2 systems, weapon systems, and sustainment solutions—to all branches of the U.S. military and allied nations across the Asia-Pacific, Middle East, and the Americas. He currently has his own consulting company called EGT Global Technologies, providing strategic advice on competitive capture and Go-To-Market strategies for the aerospace/defense market.

Moderator:

Max Le Sieur

Founder & Managing Partner at Rosemont Legacy

- MBA, Harvard Business School - 2022
- Investment Banking Associate at BMO Capital Markets (07/2016 – 08/2020)

Expert Insights On:

- Overview of the Aerospace & Defense market
- Which technological gaps the US and allies are focused on - and why
- How geopolitical factors shape the defense supply chain
- Challenges in Maintenance, Repair, and Overhaul (MRO) in the defense sector
- Why the U.S. defense industry is dominated by a few major contractors
- How defense contracts are awarded and structured
- Evaluating the health of defense contractor backlog levels
- How capital investment and new technology enabled challengers to gain traction
- Key risks to investing in the aerospace & defense industry
- Challenges of navigating the RFP and acquisition process
- Constraints on building production capacity and inventory before contract awards
- Great investable opportunities in Aerospace
- The evolving role of unmanned systems
- Why MRO Consolidation could add value

Max: Okay. David, nice to have you on the call with us today. My name is Max and I'll be leading this call on behalf of VisasQ and Coleman Research today. As you know, the purpose of the discussion is to learn about the aerospace defense market, including key players and trends in the industry. Before we begin, I would like to remind you that we are in no way soliciting any material non-public information or any information that is confidential and related to any company or organization that you are currently or have ever been affiliated with. If you believe the answer to any question involves any non-public information, please just let me know right away and I'll take us in a different direction. Does that make sense?

David: Yep. Sounds good, Max.

Max: Okay. Perfect. David, just in terms of an introduction, before we dive into the agenda today, would you mind providing a short overview of your background and experience as it relates to the aerospace defense market?

David: Yeah. Max, I've been in the aerospace defense industry for more than 25 years. I've wore different leadership roles in business development, capture management, program management, operations management and engineering management. Working with all services of US military, the Air Force, Army, and the Navy as well as allied countries to the US. Currently, I have my own consulting company called EGT Global Technologies.

Max: Perfect. That was super helpful. Today's agenda, we're going to cover these four topics, the first of which is an overview of the market.

David: Sure..

Max: Kicking things off, I just want to be sure we're clear on definitions. When we say aerospace defense, can you describe what that means to you and give us some high-level benchmarks in terms of the size of the industry and projected CAGRs.

David: Sure. Since my experience is in the defense sector, I'll just define what defense market size is. I define defense market as a subset of defense budget that each nation allocates. As far as defense budget goes, it's usually the percentage of the GDP. Essentially there are two elements to the addressable market, if you will. One is the percent allocation of the budget and the GDP size of the country. For instance, the US has the largest defense budget. US is spending approximately 3.4% of GDP per year. As the US's GDP grows, the market size will grow. As I indicated, even though the total budget is defined by the percentage of GDP, there is also a subset of the funding that is available for the defense industry. There's a budget for procurement, there's budget for research and development, and there are budgets for sustainment or logistic support. That subset includes those budgets allocated for those different activities.

Max: Got it. That's super helpful. When we talk about defense aerospace, the US is the largest player. What other countries are we talking about?

David: Other countries that we're going to be talking about are the countries that the US have alliance with. We're not going to be talking Russia or China, but as far as, the other key countries are Germany, Japan, India, the UK, Saudi Arabia, et cetera, or in the Allied Nation list.

Max: Got it. That's super helpful. And so just linking these two concepts to market size, among the alliance you described, the US is 50% of total spend less than that, more than that?

David: I mean, I didn't look at it from the total size, but just rough estimate without looking at the details, I expect US defense budget to be bigger than the next 10 combined. Yes, the US defense market is the largest.

Max: Got it. That's helpful. When we talk about defense aerospace, can you give us some examples of what that means and what capabilities or programs represent most of what folks are interested in or spending on?

David: Well, I mean if you look at the defense capabilities, it can range from all kinds. If you look at the Air Force, probably the most symbolic program is the combat aircraft or fighter aircraft, like the F35s. With the Navy, it's going to be the ships, and for the army it's going to be the ground vehicles, artillery systems, and air and missile defense systems.

Max: Okay. That's super helpful. Thank you for that. Moving on to key trends and drivers as a topic here, I want to start with this concept of technological gap. Can you describe whether there are specific technological gaps that the US and its allies are racing to close or does the industry view it in different terms?

David: Well, I think the industry follow the customer's needs. As far as the key technological gaps that US and the Allies are trying to close are hypersonics, integrated air and missile defense, as you were seeing in Ukraine, JADC2 or the fully integrated command and control. Because right now many of the various weapons systems at different levels of hierarchy are siloed and the information sharing is not as integrated as it can be. Also the space domain awareness and resilience, because there are so many assets that are currently in the space that are vulnerable to either destruction or disability or compromised by the enemy assets that can significantly impact the awareness capabilities that are being provided from the space.

Max: Okay. That's helpful. Can you help us understand why those are the things that the US is focused on? Is it because enemies are perceived to have superior capabilities in these things or because these things are perceived to be the impactful technologies of the future? How are some of those determinations made?

David: Well, it's a combination. You've got the emerging threats with the hypersonics. Traditionally, the conventional threats are tactical ballistic missiles or cruise missiles that are currently being addressed by the current area missile defense systems, and then now we've got the hypersonics. Now, even in the past there has been some systems that are developed in support of intercontinental ballistic missiles. You have the ground midcourse programs by the USG. There has been some capabilities that were developed for ICBMs. Now those threats are changing with hypersonic threats.

The US and allies have to develop systems to counter those threats as well as have similar capabilities. As far as integrated air missile defense, I think at this particular point is more of the capacity issues. There aren't enough. Again, we're seeing some of the stockpile issues resulting from the recent conflicts in Ukraine. Those are the gaps that were identified. As far as JADC2 or fully integrated command control, it definitely gives the commander and the war fighters the ability to decide on their actions quickly because they can make decisions with more accurate information. It's more of the capability enhancement, but again, the challenges is the side load architecture of the legacy systems.

Max: Got it. That's super helpful. Moving on a little bit, I'd like to ask about supply chains, specifically supply chain localization. There's been talks about rare earths in the context of this trade war with China. It brings up the question of other sensitive parts of the supply chain for things like defense and aerospace defense. Are there segments of the supply chain for this industry that are at risk or that are sensitive or that we should be paying attention to or not? How do you think about that?

David: Well, I think the supply chain in general for the defense sector is one of the challenging areas. You talk about the supply chain localization. As far as the localization with respect to the requirements that are being imposed by other countries, I'm not talking about the rare earth, but I'm talking about localization and offset obligations that are being imposed by some of these allied nations who are procuring systems from the US or other nations. They like to have the offset localization requirements involving establishing supply chain in their country. To comply with these type of offset localization requirements, the prime contractors who are going after these businesses in other countries have to develop such programs in order for them to compete for those opportunities. We're saying that all over the place.

Max: Okay. Let me make sure I understand, David. You didn't use these exact words, but if I'm understanding correctly, there's this political element to where nodes of the supply chain are localized because each allied country wants that production in their country presumably for its trickle-down economic benefits. And so manufacturers have to comply with these politics around the supply chain. Am I understanding correctly?

David: Yeah. As far as the offset localization, let me just give you a very quick overview. Many of these countries, they're saying, hey look, since we're spending their own national budget, they're trying to get something in return as an offset. Part of that offset, in the past it could have been other economic projects, certain capabilities that particular country is interested in. But with the recent changes in this environment, a lot of the countries are now asking for direct defense-related projects. To your point, establishing, manufacturing or development capabilities in their own country so they can have that sustainment and also safeguard their sovereignty if you'll.

Max: Right. Right, right, right. That makes a lot of sense. That's helpful on supply chain localization. I guess just one more follow up on this. Manufacturers in the space then, how do you adapt to this? Do you have to effectively wait until those types of deals are decided upon and then ensure that you have agile capabilities or do you pre-build supply chain capabilities all over such that it doesn't really matter how the deal shakes out, you can service or produce however it looks?

David: Yeah. I mean, that's a great question because most times it's an afterthought. Many of these companies are not thinking ahead. One of the challenges for these companies is to satisfy those offset or localization requirements for early well-established programs. It's essentially sending up a new supplier in that given country. Someone's work share has to be given up, whether it's through your operations or your supplier's scope. That's always the challenge. And then there's also the ITAR compliance. Not all technologies are releasable, the US contractors will have to work closely with the US government to receive approval to share that particular technology with that particular country. With that, you have many of the challenges, internal challenges, as well as external challenges. Now, if you're really thinking ahead and strategic about this, then to your point, it can be pre-planned. But throughout my career in the defense sector, I haven't really seen that level of forward-thinking.

Max: Got it. Super helpful. Just to make sure everybody's on the same page, ITAR compliance, can you spell out ITAR for us?

David: International trade. Give me a second. I'm just used to saying ITAR, I don't want to...

Max: It's okay. We can move on. It's International Trade Alliance something?

David: No, it's International Traffic in Arms Regulations.

Max: Got it. Perfect. That's what you mean when you say ITAR compliance. Thanks for that. Perfect, David. Moving on, I want to talk about another, call it a sub-segment of defense aerospace that I think is interesting for a lot of investors and the types of listeners we're going to have to this content. Maintenance, repair, and overhaul. I guess this concept of maintenance in defense aerospace, at a really high level, is it provided by the OEMs? Is it this entire or not? Why not? Is it thought about differently or the same? Can you just speak a little bit about how that works at high level.

David: Yeah. It depends. Now, a lot of the depot level type of maintenance will be either provided by the OEM or if the service itself has that depot level maintenance, then service, meaning the military service will conduct those depot level maintenance. From my perspective, I'll just divide MRO into three different levels. One is the operational level maintenance, which is being done out in the field. These are preventive maintenances like replacing filters or replacing the modular units that can be replaced on the field. You have intermediate level maintenance, meaning you have some capabilities to repair a sub-assembly of the system at where you are, whether you're overseas or et cetera, you have that intermediate level repair capability where you're deployed. And then finally the depot level maintenance where you are basically overhauling the entire system. That can again be done at the OEM facility or at the customer's facility that are owned by the service.

Max: Got it. Got it. That's super helpful. That's the same across Navy, Army and Air Force?

David: Yep. To generalize, yes. Each services may have different terminology, but I see it as three different levels of maintenance.

Max: Got it. Super helpful. David, I want to move on now to key players in this space. You mentioned a few minutes ago companies in this space. I'd like to just start with you just rattling off a bunch of names just to help level set our listeners on who the set of participants is we're talking about.

David: Yes. Sorry, Max, before we move on, did I answer all your questions related to MRO? I defined the MRO, but was the question related to the challenges to the MRO in the defense airspace sector?

Max: Sure, sure. We can double click on that. Let's double click on that. What are the key challenges in MRO?

David: One of the key challenges of the MRO in the defense sector is the long product life cycle. Many of these systems are operational for decades, many decades, 30, 40 years. Throughout the life cycle of that particular product, there will be multiple configurations. Now, if all the configurations are updated to the latest configuration, then you'll have only one configuration to support. But unfortunately that's not the case, especially supporting international allies. They may not have the budget to upgrade their assets to the latest configuration. In that case, the OEMs have to support all these different configurations. The other challenge in the defense sector is the obsolescence. The technology evolves and changes. Many of the suppliers who are supporting the defense sector, they have to maintain that capability. What they're seeing is they're seeing reduction in the revenue per square feet to support.

Then they will have to make a business decision whether they will continue to support that particular line for that weapon system. The other one is the loss of corporate knowledge. As I mentioned, because of the long product life cycle, a lot of the subject matter experts have 30, 40 plus years of experience and not necessarily. Those corporate knowledge gets transferred down because there isn't enough opportunity. When these aging subject matter experts decide to retire, that particular corporate knowledge goes with them. Those are some of the challenges that are being faced due to the long product life cycle. As I mentioned, the operational intermediate and depot level maintenance. The other challenge is the long time to repair. For instance, you can have some intermediate level maintenance, but that also requires capex and whoever is investing, whether it's the allied nation or the USG or even the OEMs themselves, it has to make a business case, and oftentimes it's not easy to make that business case to establish either the intermediate level or the depot level maintenance capability.

Max: Yeah. That's super helpful. Thanks for clarifying. Just to link this to the market size as we discussed before, what proportion of annual spend on defense aerospace is MRO versus I guess new?

David: I mean, I don't have that. This is sort of a guesstimate on my part, I'll probably have to say 30%.

Max: 30%. Okay. 30% of that GDP. GDP times percentage of GDP on defense spend times 30% would be the rough rule of thumb estimates for MRO.

David: I can try to get more accurate information, but that's just-

Max: No, that's okay. That's super helpful. That's super helpful as is. When we talk about MRO like this and the challenges you described. Again, that's the same across the three branches of defense. It'd be the same for Air Force, Army and Navy?

David: Well, also it depends, because of the systems that are being deployed and the level of maintenance it has to have. The highest level of MRO expenses will be with the Air Force, anything that flies because you need to ensure that these are fly qualified to be flown. The Air Force assets are going to see the highest level of MRO spending followed by the Navy and followed by the Army.

Max: Got it. Super helpful. We may come back to some of these concepts, David, but that is super helpful overview of MRO. I want to move on to key players in this space. Again, I'll ask the same question. You alluded to players in the industry, but I'd love to have you just rattle off some names just to make sure that the listeners know roughly what is the participant set that we're referring to here.

David: Yeah. I will just rattle off some of the top suppliers in the industry like Lockheed Martin and Boeing, Raytheon, Northrop Grumman, General Dynamics, BAE Systems, L3Harris, Leonardo Leidos are probably some of the key players, but also there are other international players as well. Even Leonardo is an Italian company. BAE Systems is a UK company. Both Leonardo and BAE Systems have operations here in the US. Companies like Thales and Airbus from Europe, you have Hanwha from South Korea. Those are some of the key industry players in the sector.

Max: Got it. Super helpful. And so I want to introduce this distinction between incumbents and maybe newer or challenger companies. I want to stay on incumbents for now. Again, at a high level, are there incumbents that are trending up? Are there incumbents that are trending down? What are the narratives around either of those potential trends?

David: As far as the big fives don't necessarily change here in the US. The big fives are Lockheed, Raytheon, RTX, Northrop Grumman, Boeing, and General Dynamics. It depends on how the competition goes. For instance, the latest aircraft competition for NGAD Next Generation Air Dominance, the award went to Boeing instead of Lockheed Martin. Lockheed Martin has won last two fighter aircraft F-22 and F-35, F-47 went to Boeing. But then at the same time, if you look at the true just the revenue from the defense sector, Lockheed has the biggest market share in terms of the defense sector. For these five companies, they have been steady for past decades. And then you got L3Harris who has been moving up the food chain, if you will. And then the latest growth movement was when L3 and Harris merged. And then also Leidos is up and coming as they won the US Air Force's AVMS program, which is part of the JADC2 architecture we discussed. And then you have the new entrants like the Palantir and Anduril of the world.

Max: Got it. That's really helpful. Can you elaborate on the structural reasons why there are five incumbents in the US that are "locked in" in your perspective, what are the reasons for that?

David: Well, I think one of the key reason is, sort of the streamlines are a little bit different amongst these top players. If you look at the capabilities, the fighter aircraft is either Lockheed or Boeing. When you look at missiles, it's going to be Raytheon and Lockheed, although Boeing has some, Northrop has some, but if you look at the missiles market, it's going to be Raytheon and Lockheed primarily dominating that market space. Sensors, it's Northrop, Raytheon, Lockheed, Leonardo. I think one of the reason why you have these big fives is to ensure that you don't have a single point of failure from the U.S government's perspective. Having that level of diversification and not relying on one particular supplier for one particular capability. That way in case if that particular company fails for whatever reason, the US government has a second supplier to go to.

Max: Okay. That inherently makes sense. But then does that mean when countries make purchase decisions, do they split a specific purchase type across multiple vendors or they'll purposefully choose to buy their missiles from one vendor and the fighter jet from another? It sounds like you're saying the diversification happens in the buy decision, the countries will purposefully and the US will purposefully diversify, but then does that happen within the same product type or does that happen just across products?

David: I'm trying to better understand your question, Max. Go ahead. Go ahead.

Max: I guess, would the US buy all of the one product from the same vendor and just change vendors for the different products, or will they split their missile order for example?

David: No, no, no, it's per system. For instance, F-47 is a platform of its own. It's not like you'll have two suppliers for F-47, it's going to be Boeing. It was going to be providing F-47 aircrafts to the US as well as Ally nations when it becomes available. F-35, US as well as other Ally nations are buying F-35. Well, the prime contractor is lucky. It's not like Boeing can build F-35s. Now, US government in the past has given the ability to the second source if they're struggling with the current supplier. They have taken that action. It is possible, but very unlikely to second source the same system to under their supplier because it's economy of scale.

Max: Yeah, that makes sense. Maybe we could talk a little bit about this later in the conversation, but can you just describe briefly how long in advance those supplier decisions are made for a specific system? Presumably the manufacturer needs some sort of commitment in order to deploy all of the resources needed to fill orders, and so is that a three-year lead time, five-year lead time, that that contract is negotiated? How does that work?

David: Max, I mean, the defense sectors are built to contract, they don't build in advance, they won't start the manufacturing until the contract is at hand. It's very much like the construction business, that's why in the defense sector there's another financial term called bookings. It's not a revenue. You book the contract and the sales actually happen when the costs are incurred. Bookings is a term that the defense sector has been using to show the new business and the backlogs of new business they have.

Max: Got it. That's helpful. Excuse me. What's a high level? Excuse me.

David: Take your time.

What is a high level typical backlog? Is it two years, three years, five years for these OEMs?

David: Well, it depends because of the production capacity. If you have a production capacity to satisfy your backlog, then that backlog timeline shrinks but many of these, if you listen to the earnings calls for a lot of these big defense companies, they usually say they have backlog of three to four years right now, because of a lot of the orders they've been getting, but it's more due to the capacity rather than the, I mean, it is a combination. It is a combination of new business that they're getting plus the limited capacity to produce.

Max: Yeah. But they would never want to have just six months of backlog. That six months would be a negative signal and then four years is probably above average. It'd be typical to see two to three years of backlog.

David: I think the healthy backlog to have is about two years.

Max: Two years.

David: Anything beyond that, I think you have capacity issues if you have backlog of more than two years.

Max: Got it. Okay, perfect. That's what I was looking for. That's helpful. Thanks David. And so a few minutes ago we introduced the distinction between incumbents and challengers. You mentioned two of the challengers, I think Anduril and Palantir. Would love to hear you describe how these two companies came to achieve the success they've achieved. What have they done differently? What are the barriers that they seem to have been able to overcome and how they do that?

David: Yeah. Max, I think the big difference between Anduril and Palantir versus the other companies we've been trying to enter this market is, from my perspective, two elements. One is the advancement and introduction of AI into this particular sector, which is a brand new technology, if you will. And then the second is the capital investment. Traditionally, the capital investment for any type of development activities were funded by the governments, defense contractors had to win R&D contracts or science and technology contracts.

For small businesses, the US government has also issued the small business innovation research awards, but these type of spear awards are one to $2 million. Now, when you look at Palantir and Anduril, Palantir raised two and a half billion before they went public. Anduril raised more than 3.7 billion so far. There is a significant capital influx that are going into these companies, which has not been the case in the past. A lot of the private investors were shying away from defense sector, but now with this advancement and introduction of AI, they are believing in these companies who are leading that particular technology in this particular sector, those you see the capital investment.

Max: I see. You're saying the one thing they seem to have done differently is they tapped the, call it venture capital market in an aggressive way such that they were able to achieve scale to overcome the barrier to entry that was the capital intensity of the industry?

David: Yes.

Max: Okay. That's super interesting. Do we expect that to happen again then if Anduril and Palantir have paved the way, what's preventing more private market capital and technology focused capital from doing the same thing?

David: Well, in other parts of the aerospace defense sector space, you're seeing that as well as advanced propulsion that can be used for military application as well as space or even commercial applications. I think there are subset of technologies, but if you're looking at traditional type of military technology, I think it's still very difficult to justify a look. I have this new emerging technology that's just going to be displacing all the existing technologies, not seeing that right now. Palantir and Anduril are positioned perfectly with the time and also the readiness of the technology.

Max: Okay, that's helpful. And so you also mentioned that they emphasize artificial intelligence, new technology. Can you double click on whether Anduril and Palantir were also thoughtful in the systems they chose to compete in? Did they just choose to offer a bunch of the same things that all the OEMs offered or did they choose a specific system category that they knew that they could apply advanced technology to? In your view, was that part of the decision or not so much?

David: I think so. I mean Palantir got into the C2 or C4I type of market.

Max: What's the C2 and C4I

Command and control. And then the C4I is communications. There's one more C, and then intelligence. There's a term where the market or the technology area. If you look at the kill chain, there's sensors. You have radars, you have infrared, or you have other sensors that are sensing out there. And then you have the C2 systems which uses that information or the input from these different sensors to come up with particular actions. And then you have any effects, whether it be missiles or directed energies or non kinetics that can have an effect on whatever you're addressing. Those are three main elements of the reference systems. Now, where Palantir went after is the C2 elements. Because of advancement of AI, you can use a lot of different data and then come up with the faster analysis through the AI. And then as far as Palantir goes, they went on the effects type of segment specializing in sort of the UAV market. Now that one is, even from an effects perspective, that's a low barrier entry type of area. I believe that's how Anduril chose that particular segment over others.

Max: Got it. That's super helpful. Thank you. David, we've begun talking about it, but I'll move us on to our last section, which is investment risks and opportunities. Obviously the listener base are focused on investment characteristics of this industry. I want to start with risks. In your view, what are the biggest risks to investing in aerospace defense?

David: Well, Max I think is the market size. Like I said, from the beginning, market size is very well-defined. You cannot really use the market creation strategy. The companies will have to use the market expansion strategy taken away other incumbents market share from that particular market. I think that is the biggest risk is you just can't create market, but then there's also in a way upside, if you will, because of the, the geopolitical environment can be both risk and opportunity now. Defense budget for most nations increased after the end of Cold War, but then with the current environment that we're currently in with the heightened tensions geopolitically, you're seeing an increase in defense budgets. The geopolitical environment is the double-edged sword. It can be a risk and opportunity, but then the primary risk in my opinion is just the very well-defined market size.

Max: Got it. That makes sense. Anything other than market size? We talked about off the cuff. There's capital intensity. Sounds like challengers have been able to overcome that one. It sounds like applying technology as a challenger has worked for companies like Anduril and Palantir. I mean, I'm sure there's a plethora of companies who've tried and haven't had as much success. Typically, I guess it makes sense that challenger companies tend to innovate faster than incumbents. I think that's well documented. What about this concept of the long lead times? That would be somewhat of a challenge, especially if some of those relationships or those contract negotiations require, I guess, is there always an RFP? Does the RFP always allow for not someone that isn't an incumbent to participate? What is that opening in terms of how the contracts are moved forward and negotiated that would allow a non-incumbent to participate?

David: Well, I think it comes down to the confidence in your offering. If you're confident that you're going to win, of course the company can invest in advance and building events, but then now that requires internal capital investment and there is no guarantee that the investment that you have made will be liquidated. If you do not win the contract then what do you do with all the hardware that you just built? Those are some of the challenges in the defense sector, is building advance. Long lead time essentially is due to unwillingness of these defense companies to invest early in anticipation of the demand. Because the demand signal varies from year to year. What if you overbuild and you have all these assets sitting on your inventory? It's more of financial decisions.

Now, as far as the Palantir or the Anduril of the world, as you mentioned, they bring the agility because they're not encumbered by the legacy or the bureaucracy that has been built around these major big prime contractors in the defense sector. However, I think one of the challenges that they're going to face is navigating the complex and bureaucratic acquisition processes and systems of US government as well as the ally nations. All these other primes or the companies who have been in the sector for a while, they have stood up these functional organizations specializing to handle those complex processes and Andurils and the Palantirs of the world, they'll have to build that from scratch.

Max: What about primes having an upper leg in terms of helping define an RFP? This is common in all industries where there's well-defined incumbents. How real is that or is that just an outsider's perspective that doesn't hold true inside the industry?

David: My response is going to be, it depends. It depends on how the incumbents utilize their relationship with the customer. I've seen contracts taken away or given to another company because the incumbent did not listen to the customer. Customer had a particular requirement, but because they've been incumbent, they thought they're smarter than the customer, they didn't listen and the competition listened to the customer and they developed a solution around what the customer wanted or needed, the competition won the competition. I don't think incumbents necessarily have lagged up on the new entry players. It's just a matter of maintaining that positive relationship with the customer and willingness to listen to the customer instead of, a lot of the incumbents, their ego kicks in after they've been in incumbent for a while.

Max: Got it. That's helpful. You alluded to something earlier with regards to inventory on your balance sheet from unfilled orders, which brings up an interesting point. What are options when you have inventory in excess of what the demand signal was in a specific year for a specific system? Is there some sort of secondary market or parts market or is that just like there's nothing you can do and therefore that is why you have to avoid it at absolute all costs?

David: Well, again, I think it depends, Max. If that particular system that you're building has multiple users and multiple venues to liquidate that capital that is sitting on your balance sheet, then better. But then let's say if your only liquidation option is to secure that particular contract, if you don't win that contract, then basically it has to be a write-off because you don't have any other means to liquidate.

Max: Got it. Got it. That's helpful. And so moving on from risks a little bit, David, what do you see as the greatest investable opportunities within aerospace defense over the next five years?

David: That is a tough question. I mean, right now we're seeing a lot of new entry players in the smaller group, unmanned systems and associated counter UAS systems because they have relatively low barrier to entry cost. I see, but then is that a blue market? I don't think it is. It's turning more red because you just have a lot of companies trying to enter that particular market. I mean, as far as the smaller players to enter, I think that is the lowest barrier entry kind of market.

Max: Sorry. What market is that?

David: That's a smaller group, unmanned systems.

Max: Unmanned systems, that makes sense. You said blue and red, why do you use that terminology? What does that mean?

David: Blue ocean versus red ocean.

Max: Got it.

David: From market, definitely.

Max: Got it. That makes sense. I do want to stick on this for a second because I noticed you did not mention Unmanned systems in your earlier description of the technological gaps pursued by the US and some of its allies, is that because Unmanned systems are perceived as being not that important? I mean, they've gotten some media coverage with-

David: Sorry, I didn't mention the system because you asked for specific that, but there is a lot of emphasis and prioritization going towards Unmanned systems. In the US you got the Collaborative Combat Aircraft or the CCAs. These are to be flown with the new F-47 that are going to be developed. Likewise, other countries are developing their own version of CCAs or the Loyal Wingman. With Japan, they're partnering with the UK and Italy to develop their own Collaborative Combat Aircraft. So no, that's where a lot of the technologies are going go is the Unmanned systems. Now, as far as, go ahead.

Max: No, no. Sorry, finish your thought. Sorry.

David: Yes. Then I didn't mention these for new entry opportunity, because for these larger Unmanned systems, the barrier to entry cost is much higher than the smaller group Unmanned systems.

Max: Okay. That makes sense. That's helpful. I see your point about Unmanned systems being a lower barrier to entry because of their cost. However, it does seem, at least based on some of the press coverage it's gotten over the last six to 12 months. Unmanned systems seem to have demonstrated, at least for outsiders potential or perceived long-term obsolescence of some of the larger capital intensive manned systems, whereby how cheap Unmanned systems can be and how effective they can be at disrupting expensive manned creates this advantage. Can you talk a little bit about that. Is the perceived potential obsolescence of large, expensive, slow manned systems real in a world where you can just create and produce much higher volume for much cheaper unmanned systems?

David: Well, I think it's going to be combination, but as we discussed earlier, because the market size is well-defined. I believe the unmanned systems will be taking away the budgets that were once allocated for manned systems. I believe that's true.

Max: There will be, in your view, a slow erosion of budget towards manned systems in favor of unmanned systems?

David: Yes.

Max: Okay. In your professional opinion, can you give us some benchmarks of your expected speed of that erosion? Is it 1% per year, 5% per year? Do we get to 50/50 before 2030? What is your sense for what that's going to look like?

David: I think it's going to be decades. Like I said-

Max: Decades?

David: A lot of these, yeah, because like I mentioned, the life cycle of these products are very long. Now even from the US with the largest defense budget, the switching cost is pretty extensive because it's not just simple as, oh, let me just get a new iPhone and just use the new iPhone. That's not how it works. You have to develop trained people who can operate. You have to train people to maintain. There's entire infrastructure that has to be built around new weapons systems. It's not like, oh yeah, let's just switch to this particular system and then voila, everything works perfectly. It doesn't work that way. I think it's going to be slow migration. I don't think it's going to happen overnight. In a few decades, I think you'll see a lot more unmanned systems than manned systems.

Max: Got it. That's helpful. Another potential investable category is MRO consolidators. Have you heard of that? Is that in your view, a real opportunity? I'm curious to get your opinion on this concept of MRO consolidators.

David: Yeah. It's definitely something that is needed because you have all of these silo MRO capabilities for all these different systems. It makes sense for turnkey solution or provider who can provide MRO for let's say all ships or all aircraft, or all, whatever the system it is. Because even though that particular MRO consolidator may not be the OEM of that particular product. If you have this MRO consolidator, you're definitely going to have some savings from an efficiency gained, from functional expertise and the best practices. Now, the challenge is how do you structure that MRO consolidation, because then these MRO consolidator will have to work with OEMs and develop this, consolidating the capability to the customer. Once that is resolved, I think there's definitely a value that this MRO consolidator will bring to the market.

Max: Got it. That's helpful. That's super helpful. David, we've covered a lot of ground today. This has been super helpful. We have just a couple of minutes left. I just wanted to open it up. Is there something we haven't touched on today that you feel is relevant or a driver for aerospace defense moving forward?

David: We covered a lot, but as far as, one probably thing is, the key players right now in the defense sector, there are too big to fail. If something happens, then the associated country will come in and help out. For instance, when Boeing was struggling, USG came to help them out. We'll probably see the same behavior from other countries like Airbus or Thales. They will get their support from their countries because it's tied to the national security side. That's the one key element that also differentiates from other sectors is this defense industry is directly tied to the national security.

Max: I see. That's interesting. You would expect, and you have seen, I guess we saw it with Boeing, that national governments have a vested interest in supporting their aerospace defense industry if those companies began to show weakness.

David: Yes.

Max: Got it. That's super interesting. That's a great place to cap the conversation, David. Thank you for adding that. Listen, we really appreciate you taking the time today. This was super insightful. It's exactly the conversation we were looking to have. We thank you very much for taking the time. Please enjoy the rest of your evening.