Augmented Reality for the Aviation Industry:

Getting ready for take off

A PUBLICATION OF ATHEER

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Chapter One

The changing landscape of the aviation industry demands new solutions

The aviation industry is undergoing huge change. Although the industry is experiencing high demand for new aircraft, competition is stiff. Meanwhile, both manufacturing and aircraft maintenance have become far more global, while skills shortages are making it harder to hire operations and maintenance staff.

According to the most recent long term market outlook from leading aircraft manufacturer The Boeing Company, the aviation industry has enjoyed strong growth in recent years - buoyed by lower fuel prices, increased efficiency and international market expansion (particularly in Asia).

That growth is expected to continue, with the Boeing report predicting demand for 39,620 new airplanes over the next 20 years. The company estimates the value of these planes at a staggering $5.9 trillion.

High demand and consolidation

So while that kind of demand (which represents a 4.1 per cent increase over the company's previous year 20-year forecast) is very positive, it's also set against a backdrop of consolidation in both the number of air carriers and aircraft manufacturers.

One example of that consolidation can be seen in a recent report from UK-based international travel industry analysis firm EyeforTravel, which notes that over the last 10 years, the number of major US air carriers has dropped from 18 to only 10.

" The Boeing report predicts demand for 39,620 new airplanes over the next 20 years.... with an estimated value of $5.9 trillion. "

A GROWING NEED

FOR MAINTENANCE TECHNICIANS

Boeing's report, meanwhile, also highlights the growing demand for pilots and technicians. In particular, it suggests that the industry will need 679,000 new commercial airline maintenance technicians between July of 2016 (when the report was released) and 2035.

Region	New Technicians
Asia-Pacific	268,000
Europe	118,000
North America	127,000
Latin America	50,000
Middle East	66,000
Africa	24,000
Russia / CIS	26,000

Source: 2016 Pilot and Technician Outlook from The Boeing Company

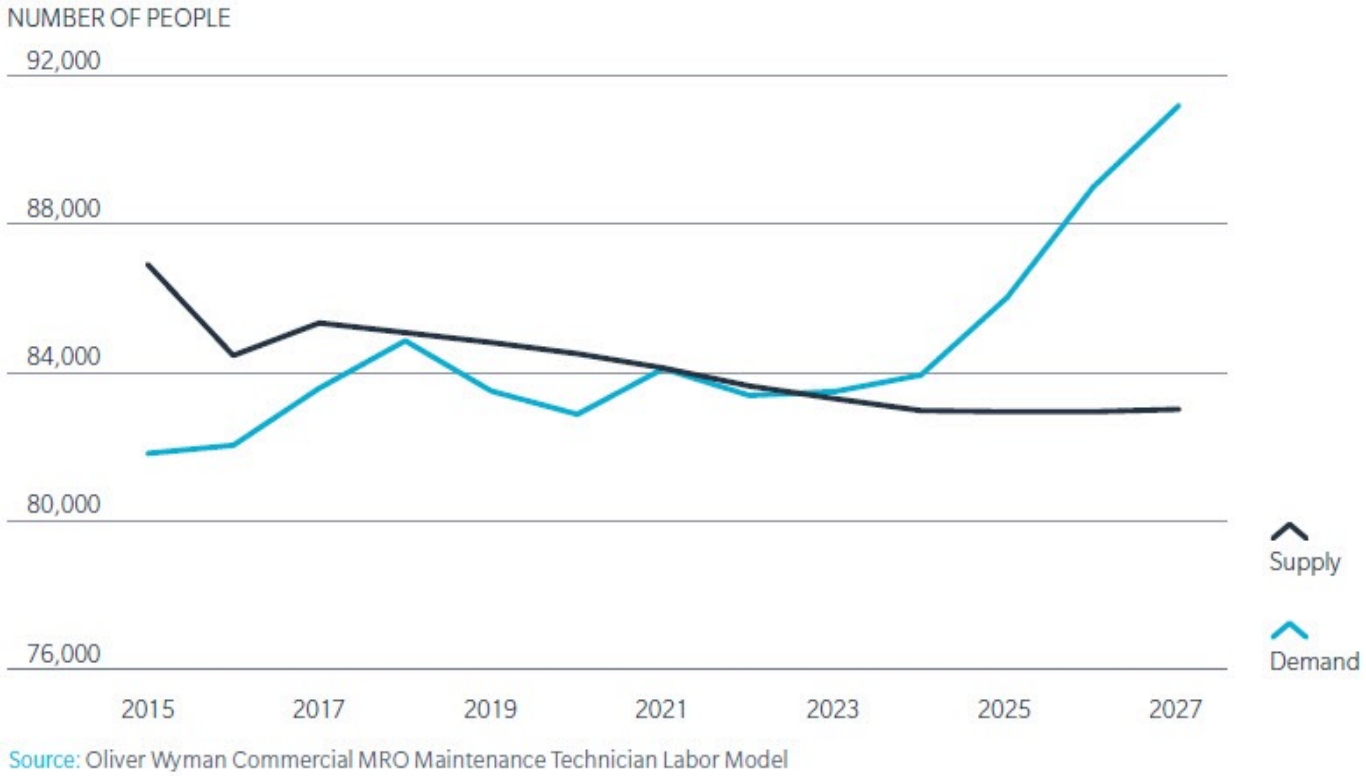
Yet the supply of maintenance, repair and operations (MRO) staff does not look like it will be enough to meet demand.

The 2017 annual MRO survey of aviation industry executives from global management consulting firm Oliver Wyman lays out the scale of the challenge quite starkly.

According to Brian Prentice, partner with Oliver Wyman, the twin challenges of strong growth and an aging workforce are creating a skills shortage.

“It is a double whammy. Over the next decade a record number of maintenance technicians will retire, outpacing the total number of new mechanics entering the market,” he said. “At the same time, the global fleet is growing significantly. Additionally, the shortfall is expected to create expertise gaps as the industry finds itself having to service a fleet that will be almost equally divided between older and newer technology aircraft. This is one situation in the US, where the jobs are available, but the people are not.”

The company also offered this chart, which demonstrates the scale of the demand:



Source: Oliver Wyman Commercial MRO Maintenance Technician Labor Model

The report also suggested that the "aging of the mechanic workforce and anticipated retirements could not come at a worse time for the industry, as it gears up to accommodate the larger fleet".

The Oliver Wyman survey also reports that the median age of aviation mechanics in the United States is 51 years old, which it says is nine years higher than the median age for the broader US workforce according to the Bureau of Labor Statistics.

The need for technical expertise is global

This is not only a U.S. problem. The biggest demand for new aircraft technicians could come from regions that have the smallest national training infrastructure to support that demand. Evidence of this need comes from a recent announcement by another leading aircraft manufacturer: Airbus.

In June of 2017, Airbus announced that it was making a significant investment in addressing this issue with the development of a new training center for pilots and maintenance engineers at Aerocity in New Delhi, India and it provides details in the highly instructive infographic below.

Source: Airbus S.A.S. 2017

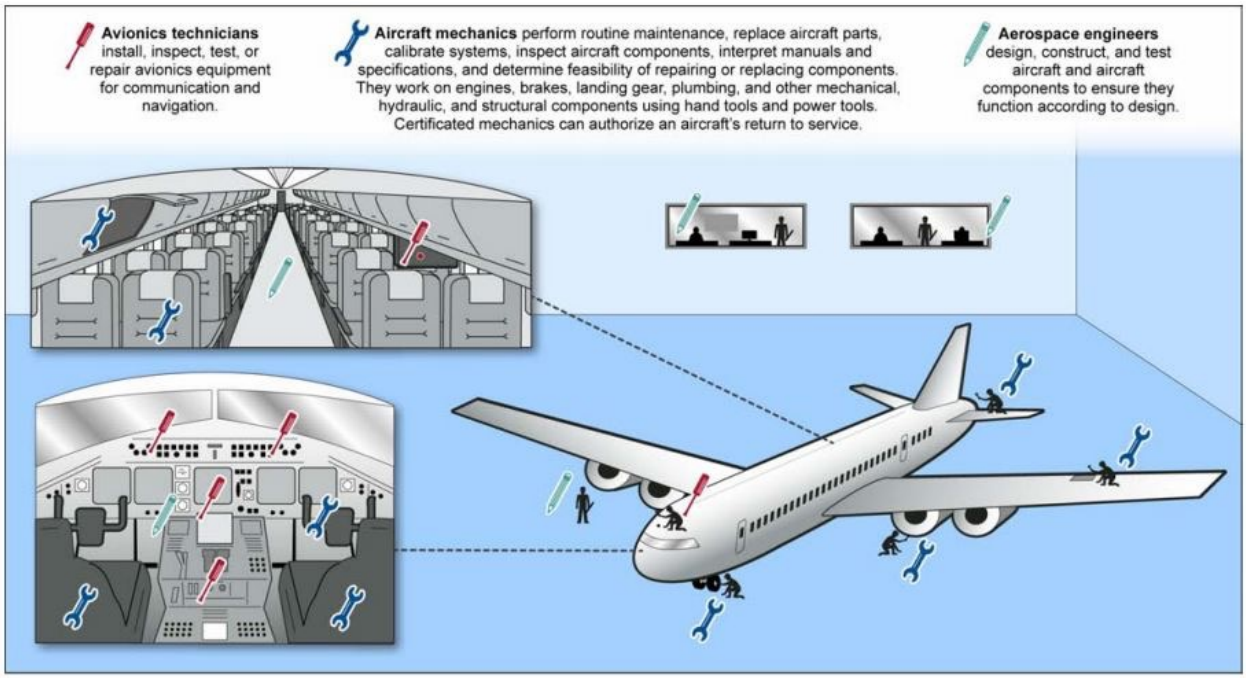
What skills are needed?

A 2014 report to the US Congress by the United States Government Accountability Office did observe that that the aviation industry executives it interviewed for the report "remained concerned about future needs" and that "most employers and stakeholders stated that maintaining a qualified workforce will be difficult, in part because of a perception that fewer people are interested in aviation careers".

The GAO itself was a little more conservative in the report, concluding only that there was "mixed evidence" for future possible shortages of aerospace engineers, aircraft mechanics, and avionics technicians.

It also concluded, however, that even for those who are trained, competition with other industries for the skills of those trained people could still put pressure on the availability of engineers, mechanics and technicians.

One of the most useful aspects of the GAO report was its definition of the work undertaken by these three groups of people:



Source: United States Government Accountability Office

It's clear from the GAO report that predicting future demand for skills in aircraft design, maintenance and repair is a complex task.

Aviation industry pre-flight checklist

So for the industry to fully meet the welcome challenges of high demand and high growth, it’s clear that any solution will need to:

• Provide on-going access to skilled, experienced MRO staff in a way that is scalable and builds for the future.

• Address the fact that the greatest growth in the aviation sector is coming from international markets (notably the Asia-Pacific market).

• Be deployed quickly, as the “baby boomer bulge” in the MRO workforce is already starting to retire - and that will only accelerate over the next decade.

Chapter Two

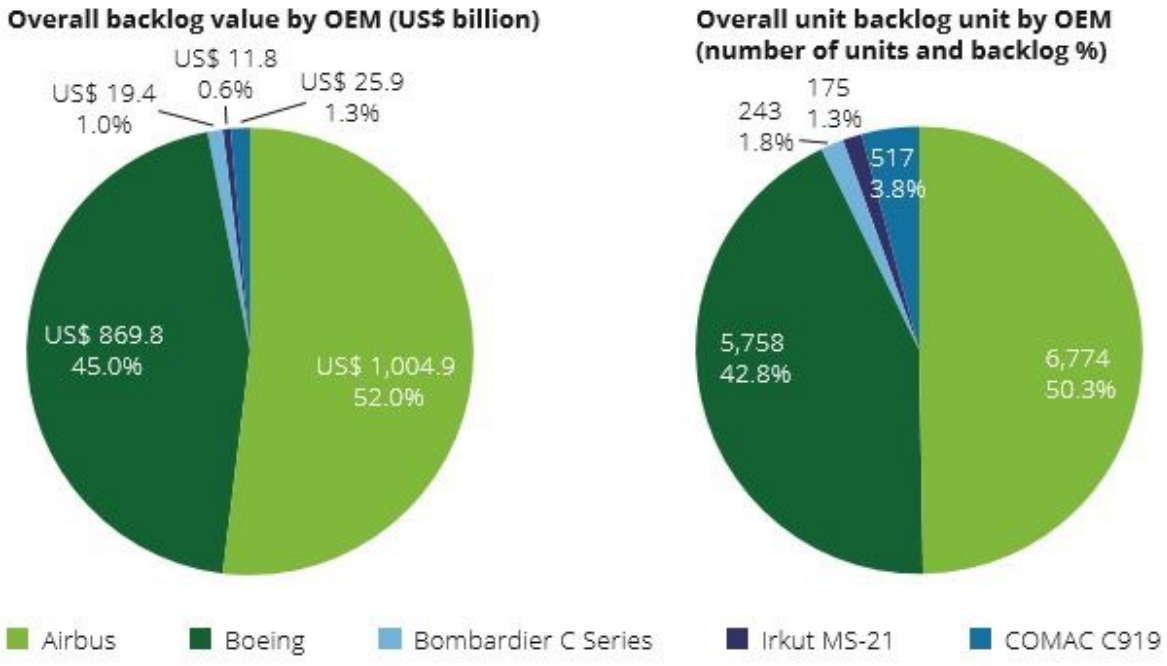
Augmented Reality (AR) can offer a way to bridge the MRO skills gap, while improving productivity, quality and safety for aviation companies

The challenges facing the aviation industry are complex - and no single "magic bullet" will solve all of them.

In fact, many of the challenges are closely tied to one another. Consolidation in both the airline industry and aircraft manufacturing, for example, has meant that the companies that have survived this consolidation face huge global demand and an urgent need to scale.

A big backlog

In 2016 a study of commercial aircraft backorders by Deloitte provided strong evidence of this need - showing a huge growth in backlogged orders for commercial aircraft. The report cited an increase in the backlog "from 6,913 units in 2009 to 13,467 units in 2015 (or 9.6 years of aircraft production backlog at current production rates)".



It further concluded that some 97 per cent of the value of backlogged aircraft orders lay with two dominant players: Boeing (45 per cent) and Airbus (52 per cent). And, as other studies have concluded, the biggest single area for demand growth is Asia Pacific.

Staff shortages present a huge challenge

Meeting that demand, however, requires qualified MRO (manufacturing, repair and operations) professionals. And there's plenty of data to show that there's a growing shortage of staff in this area. Industry research firm Oliver Wyman concluded in its 2017 MRO survey that over the next decade, the "record number of maintenance technicians eligible to retire will outpace the total of new mechanics entering the market globally".

It further predicts that by 2027 in the US, demand for maintenance technicians will outstrip supply by 9 per cent.

Technology offers an answer

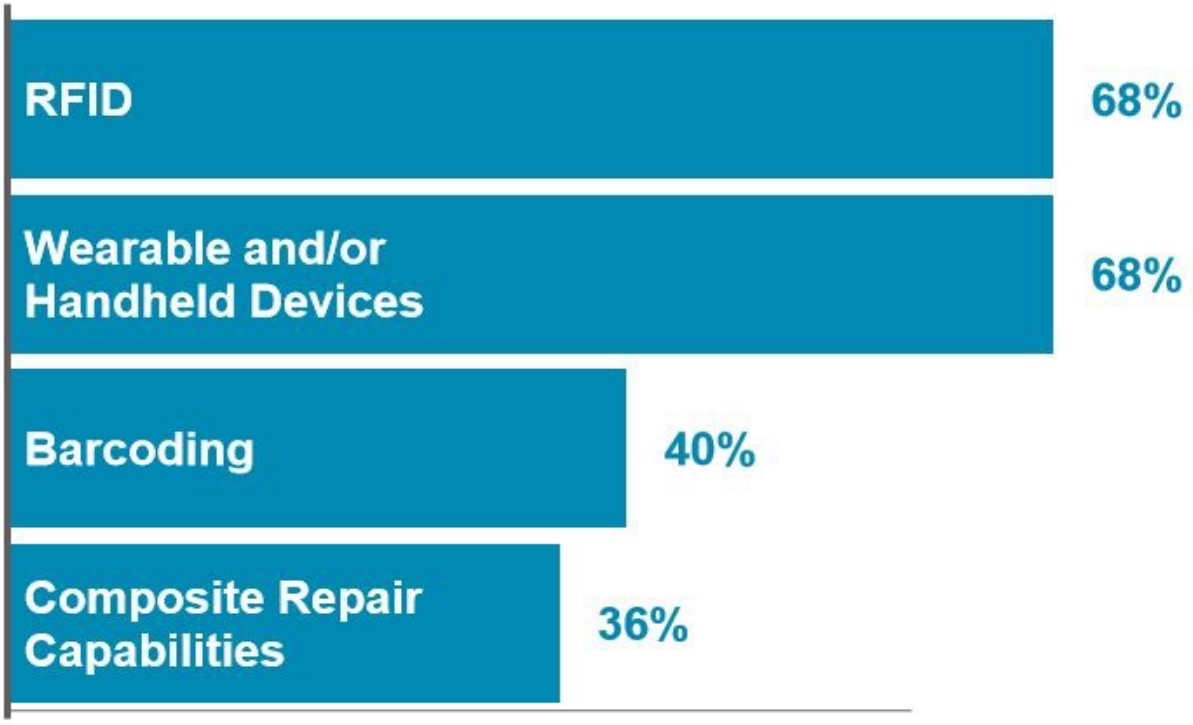
Oliver Wyman's survey does suggest, however, that technology may offer a way to address some of these shortfalls. More than 75 per cent of respondents to the 2017 MRO Survey said they were planning over the next three years to implement:

• paperless shops/hangars (ie. introduce digital technologies to manage the gathering and use of information in both manufacturing and maintenance) and;

• predictive maintenance (which leverages flight data and sensors to more accurately gauge when aircraft need maintenance).

The survey says these technologies are aimed at increasing technician efficiency and productivity, while maximizing aircraft availability.

Q: Indicate which new technologies your company is planning to deploy in the next three (3) years?



Source: Oliver Wyman 2017 MRO Survey

"…these technologies are aimed at increasing technician efficiency and productivity, while maximizing aircraft availability."

Oliver Wyman 2017 MRO Survey

The survey further identifies wearable or handheld devices as an area that 68 per cent of survey respondents will be making investments in over the next three years - suggesting that the industry is already aware of some of the value that these technologies can provide.

Augmented Reality provides a unique solution

One very specific application of wearable and handheld technologies lies with Augmented Reality (AR) solutions - which provide a way to mitigate many of the challenges outlined above.

Before we start looking in detail at the ways in which AR technology can help the aviation industry, let's take a step back and define what Augmented Reality is.

AR is best described as the real world augmented by computer-generated sensory input. It is commonly delivered through head-mounted displays (also known as "smart glasses”), that are connected both to a phone-sized computer and to a collaborative network.

This allows people to interact with:

• content that is displayed "virtually" in front of them via the smart glasses (which can include task lists, shop manuals, videos and online content)

• the functions of the computing power in the smart glasses or attached smartphone or tablet - using voice commands, head movements, the trackpad that's built into the side of some smart glasses or "gestures" (ie. commands delivered by hand movements of the smart glasses wearer and picked up by the front-facing on-board camera in the smart glasses)

• remote users through video-conferencing capabilities that offer a "see what I see" function that lets everyone on the video conference call see what the person who is speaking sees through their smart glasses

An AR scenario for aviation

To understand how this might be used in aviation, consider a scenario where a mechanic is repairing a custom jet engine.

The mechanic is on the ground with the plane in Boston, and she is using AR technology (particularly "see what I see" video conferencing features) on the repair with an engineer in San Jose who worked on the original design of the engine. The engineer can use smart glasses and to electronically "circle" a part that needs attention.

The engineer in San Jose can provide more detailed guidance to the mechanic in Boston, getting her to look more closely at various aspects of the aircraft part that she is working on - and provide real-time feedback to the mechanic on the next steps that she needs to take.

> *“ Through video-conferencing capabilities that offer a "see what I see" function, everyone on a video conference call can see what the remote person in the field sees through their smart glasses. ”*

Many challenges solved at once

This one simple scenario encompasses solutions to a number of the challenges facing the aviation industry by:

• Allowing the engineer in San Jose to deliver detailed, contextual guidance that allows him to see and interact with the malfunctioning aircraft part, so that he is able to scale the delivery of his highly-valued skills to the mechanic in Boston (without having to travel in-person to do so). This could be just one element of a strategy to help mitigate the increasing shortage of skilled MRO staff by allowing the time of existing staff to be used most effectively.

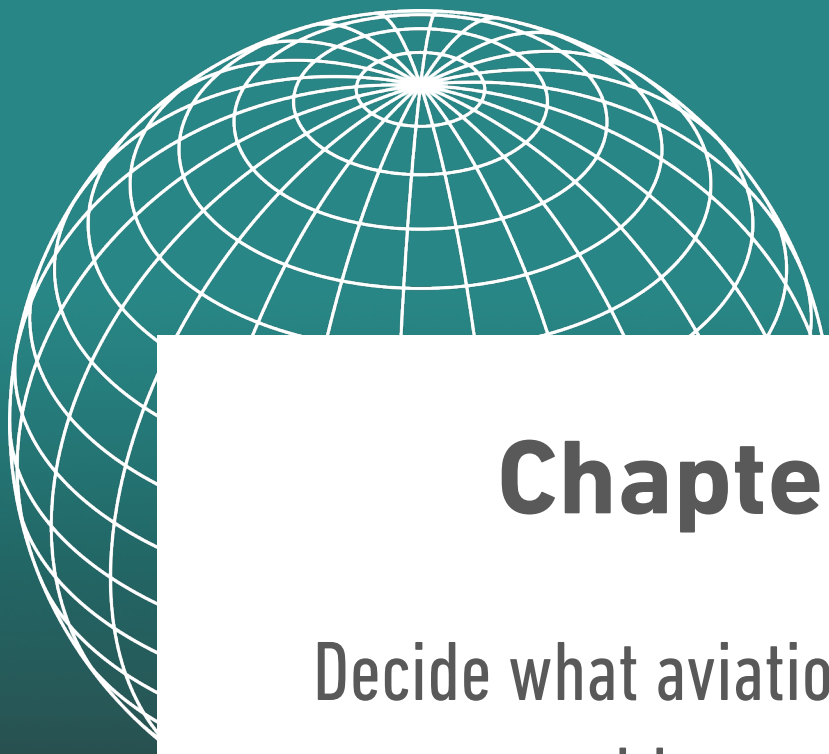
• Using an engineer in San Jose to troubleshoot an MRO issue in Boston, which helps provide national and international scale for the engineer's employer.

• Offering the mechanic in Boston immediate access to the latest task checklists (for working on the troublesome part) - and any existing training videos - directly via her smart glasses before initiating the video conference call to the engineer in . This ensures that valuable aviation engineer time is only sought when other support avenues have been exhausted.

• Getting the right information to the right place - quickly and easily. Using smart glasses (and either voice, gestures or head movements to access the information and remote experts she needs), the mechanic is safely able to get at all the information she needs without having to remove work gloves, move away from the part she is working with or otherwise be distracted from the task at hand.

Just the beginning

This scenario is just one of many ways in which AR technology can be used by aviation companies. Next, we'll look at how aviation companies can evaluation which AR solution will work best for them.



Chapter Three

Decide what aviation business problem you want to use AR to tackle first

As you have seen in previous chapters, there are a number of aviation business problems an aviation company could use AR technology to tackle. So how does an organization assess which problems to tackle first?

Here are some principles (and these apply to any business considering AR solutions, not just aviation):

• Make sure it's a "worthy problem" - one that will make a significant, measurable difference to the business. If the problem doesn't meet that criteria, it will be tough to get your organization to invest the necessary money – and the effort that meet be needed to change the work culture and processes to effectively leverage the promise of AR.

• Be clear about how the organization will measure the impact of the AR project – This requires that both the team wanting to do the deployment and the team deploying it will measure the metrics on which the organization is trying to improve. That needs to happen before proof of concept tests or pilot deployments (to provide a baseline against which to measure results) and, of course, after. To bring this kind of effective, step-change to an organization - you've got to have the data to prove that it was worthwhile.

• Large manufacturing operations (such as manufacturers of commercial aircraft components) are a big sweet spot for AR solutions due to the huge cost of delays and downtime, which AR technology can help significantly reduce. Do the homework to calculate the current costs of delays and downtime.

In short, the rule of thumb is not unlike carpentry: measure twice (or more), so that you only have to cut once.

The more accurate and proven your pre-deployment data is, the more likely that your organization will have an accurate assessment of its benefit (more on this in the next chapter).

Where does AR work best?

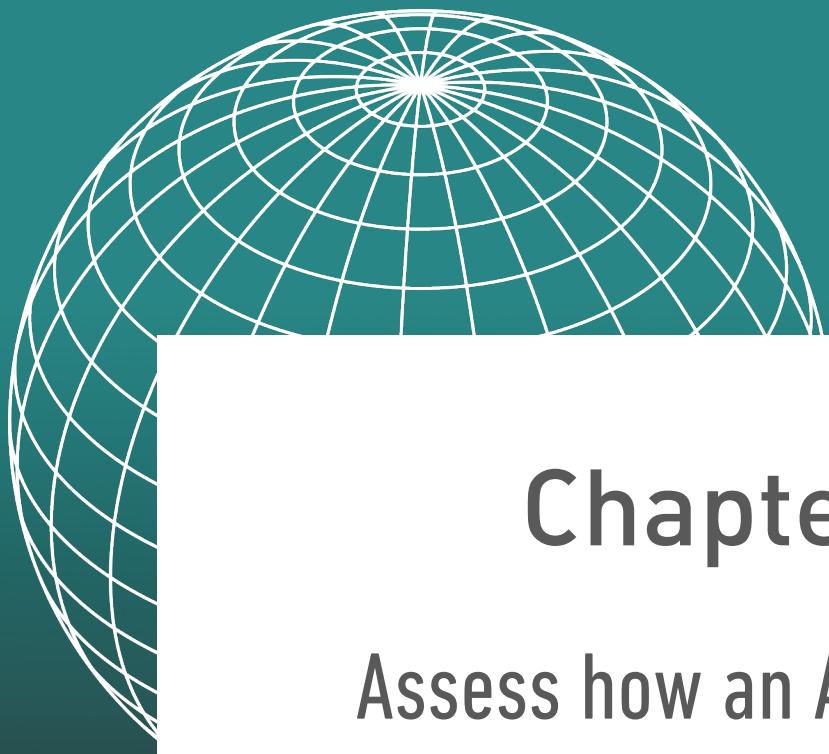
The real question isn't about the kind of real world environment that's best-suited to AR. Instead, it's about what qualities you should look for in an AR solution that conforms to the needs of your business.

If your workforce is operating in a noisy environment, for example, the kind of voice control used in some AR applications may not always work. It may work beautifully, but could only really be useful below a certain level of ambient noise. So if your workplace is noisy, you'll want to make sure that voice is not the only way of providing input to your AR devices.

Likewise, a tablet, smartphone – or even the trackpad controls used on some smart glasses – may not be helpful if the employee has a tool in his or her hand - or is wearing gloves. Therefore, a solution that involves needing to use a touchpad won't be the most intuitive or the most useful.

AR solutions are supposed to supposed to speed up operations - and those limitations are going to slow them down.

So, as suggested earlier, the supplier of any AR system has to meet the needs of *your organization* at its current state - and not require you to make major changes to your business or business process in order to use a particular device.



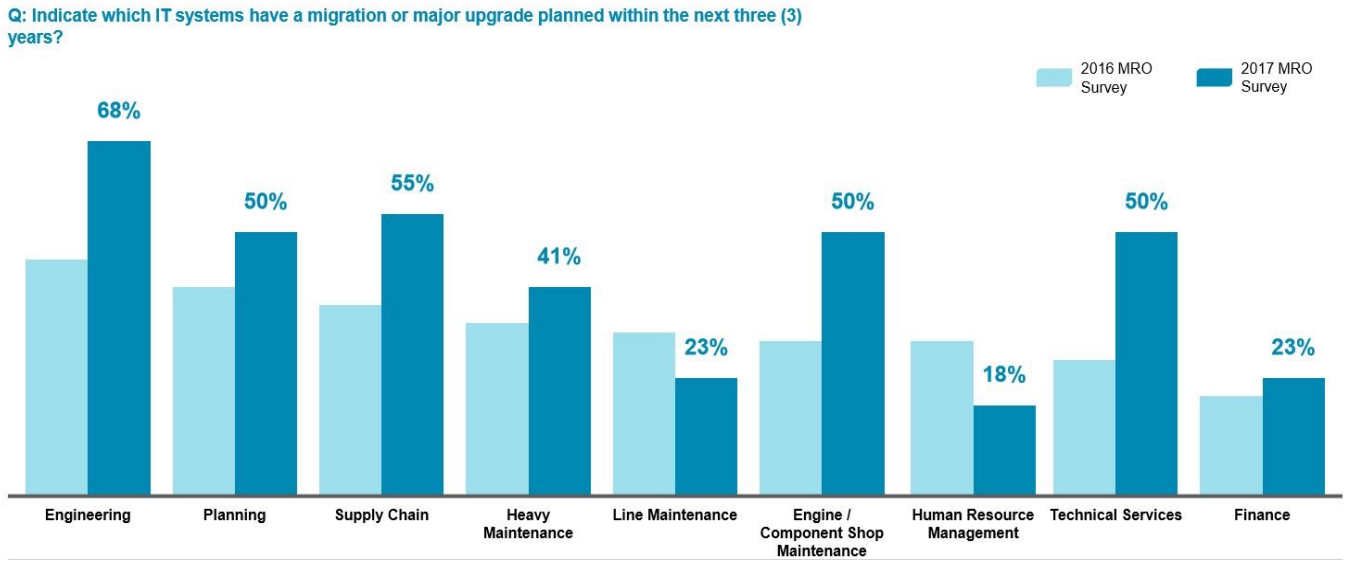
Chapter Four

Assess how an AR system could benefit your business

Assessing how an AR system could benefit your business is not just a question of looking at a few reviews in industry journals and then recommending the purchase of a few tablets, smart glasses or smartphones – along with AR applications - to evaluate.

Done properly, you need to take a broader look at the real underlying needs of your business, what other changes you may be making in the business (in the short, medium and long term) and how AR solutions could intersect with all of those changes to provide effective, reliable benefit.

Looking again at the Oliver Wyman 2017 MRO survey, you can get an idea of how other aviation companies are looking at this issue.



Source: Oliver Wyman 2017 MRO survey

You'll see from the survey results that a greater number of aviation MRO organizations show significant year-over-year increases in planned IT system migrations or upgrades over the next three years in the areas of engineering, planning, supply chain, engine component and shop maintenance – as well as technical services.

The broader point here is that any decision to deploy AR technology within an aviation company needs to fit within the overall IT plan of the organization. It may well start as an independent pilot in a lab – or a limited trial in the field – but for broad deployment, it should fit within the organization's broader plans and goals.

Downtime should be part of your calculation

Whether you're running a factory, a warehouse or a maintenance operation, downtime of any major piece of equipment or the production line itself can be hugely expensive.

A 2006 joint survey of 101 manufacturing executives in the auto industry by Nielsen Research and Advanced Technology Services (ATS) found that, at that time, the cost of stopped production was an average of $22,000 per minute (which comes to an eyebrow-raising $1.32 million per hour).

Suffice it to say that for some parts of the aviation industry, that hourly downtime number would also be significant. So how should you think about downtime – and how you can reduce it – in the context of AR?

Let's say you're building or fixing something large (such as a major component of a new aircraft) and you realize that you can't do that job without the skills of a particular person. If that person isn't standing next to you, but actually works across town, across the state or in another country, then you would typically have to fly them in to help you deal with the issue – and that takes time. And time, as we've established here, is money.

If the lack of on-site expertise is costing your company $1 million or more an hour, you are going to fly someone out on a very fast plane to fix it. Wouldn't it be better, however, to just virtually "beam someone in" to solve it without spending the time and money to fly someone in (with all of the waiting and additional expensive downtime that represents)?

A lot of field services groups report that they actually fly people twice. One person goes out and realizes they can't fix a problem, but they have a colleague who can - and that person needs a different tool. Then you've got two people who had to fly in - and you've taken three or four days to get there. And, in the meantime, millions of dollars in downtime have stacked up.

That’s why accurately calculating downtime should be a part of how you plan for AR – and think about the return on an AR investment. It’s where AR can really make a huge, measurable difference.

AR can help significantly reduce the need to fly people around the world to fix stuff that breaks. You can "teleport" them virtually to see the problem, rally a lot of smart people around and see if you can solve it - or at least bring the right team and the right tools to solve it.

If nothing else, someone can put a pair of smart glasses on, call back to their more experienced, senior colleagues and then have some really smart people collaborating on the solution to an issue.

Chapter Five

Strategies for success with AR

To properly evaluate the benefits of an AR implementation, it's also important to recognize that it's a journey – and one that can be more than an incremental change for your company.

AR solutions offer the potential to provide a real **step change** that can fundamentally improve the product and services that you can offer – and the speed with which you can respond to change.

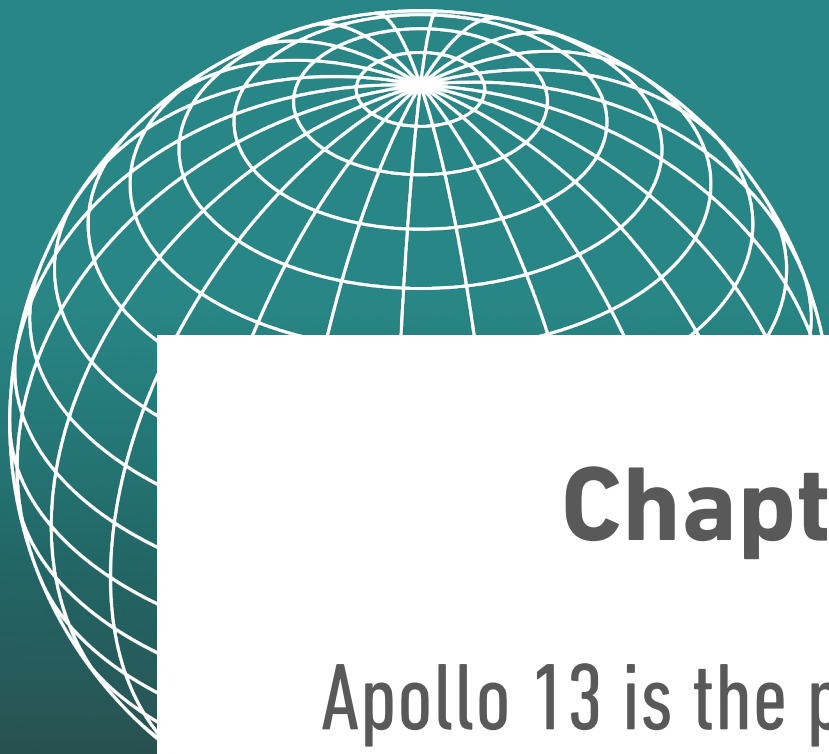
Here are a few strategies that can help ensure the success of your experience with AR:

• **Know that it is a journey** – which will start with demonstrations from AR companies and your own internal evaluations of what each of them has to offer. From there, you might move to a proof of concept (to ensure that it can work in your business), a trial in an internal lab, a field trial and then an "early adopter" deployment. You'll learn from each of those steps and bring everything you've learned to the eventual design and deployment of your solution.

• **Get someone to adopt and sponsor the project on the business side of the company** - You don't want AR to be simply an investigation by the IT department. Operations, for example, can be a great business owner for this kind of project. Manufacturing can also be a logical home for the project. But ideally, ownership of an AR project should rest with a business element of your organization - so that true buy-in of the return on investment (ROI) measurements you'll put in place for the project can happen in an effective way.

• **Involve the teams who will use AR on the front line** - Field services, for example, is the perfect example of the type of team from whom you need to get feedback and suggestions about any AR implementation. All those groups will listen because they have the kinds of pain points that AR can potentially relieve.

One other key thought is that you will get the most from an AR solution when you "think big" about the kinds of business problems you want to tackle. AR solutions provide the most benefit when they are used to help tackle large, meaningful business problems.



Chapter Six

Apollo 13 is the proto-AR scenario

Probably the best and most extreme historic example of a remote problem-solving scenario was the work done by the on-board and ground crew of the famous Apollo 13 abortive mission to the moon – launched on April 11, 1970.

Credit: NASA

As any space buff will tell you, the mission was thrown into complete disarray at 9:08 PM on April 13, 1970 when oxygen tank No. 2 blew up and oxygen tank No. 1 also failed as a result. Shortly after that, the crew realized that the crew's normal supply of electricity, light and water in its command module was lost. They were 200,000 miles from home – and they needed to come up with a backup plan.

Working closely with Mission Control in Houston, the crew feverishly sought to find a way to get safely home. They decided to use the lunar landing module (which was not designed for such a purpose) as a "lifeboat" for the astronauts until they came close enough to Earth.

One of many tough challenges that the ground crew worked through was how to properly remove carbon dioxide from their makeshift craft. And this is where the link to augmented reality comes in.

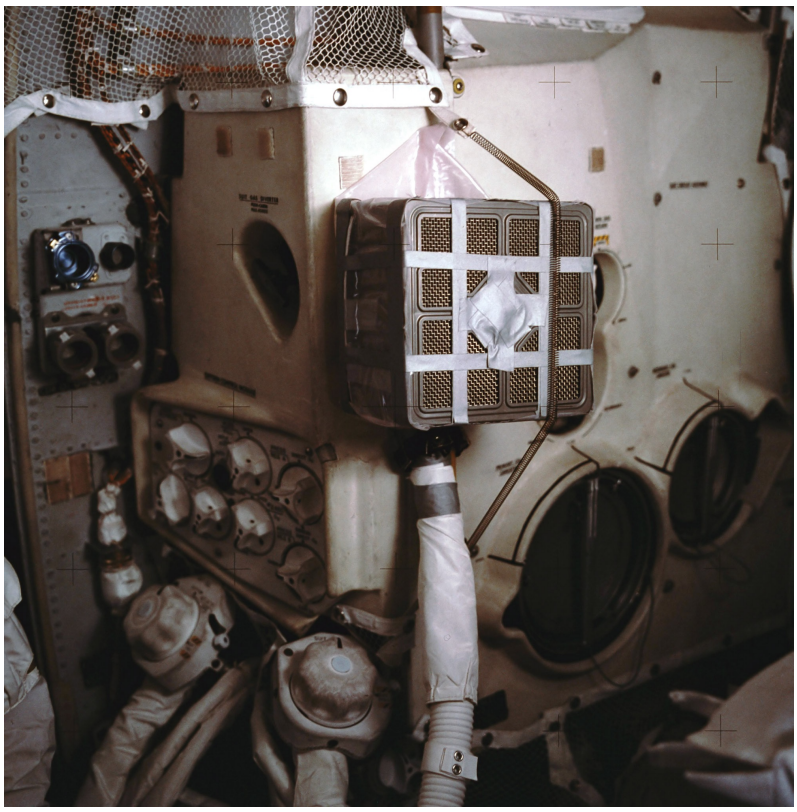
In order to figure out how to help the astronauts aboard Apollo 13 to “scrub” the carbon dioxide from their cabin, engineers in Houston gathered in a conference room with a collection of the materials that they knew the Apollo 13 crew had on-board and cobbled together a solution using cardboard, plastic bags and tape.

They had to recreate the “virtual environment” aboard the ship and then communicate the instructions via radio on how to build the carbon dioxide scrubber from those raw materials. How much easier it would have been with smart glasses!

The story is legendary and far more complex. There are plenty of great books, documentaries and even a fantastic movie (starring Tom Hanks) that tells the full story. But it’s a fantastic illustration of the power of remote collaboration.

With a little imagination, it’s clear how the power of the augmented reality "See what I see" feature might dramatically shift this kind of scenario.

If you're implementing an AR solution and the "see what I see" feature is not part of it, you are going to start getting surpassed by competitors in the coming year who are using this feature. If you start now, you're not late. If you're not doing it in the next 12 months, and really doing it outside a lab and in the field, there are people who will work faster than you.



Inflight photo of the device constructed by the crew from duct tape, maps and other materials they had on hand as per instructions provided by Houston. This device allowed use of box-shaped Command Module lithium hydroxide canisters in conjunction with the LM Environmental Control system, which is the large white unit that fills most of the frame. – NASA photo

Chapter Seven

The right intuitive, interaction model is key

History is littered with examples of technologies that were ahead of their time – including the videophone and the handheld computer. Both have been available, in one form or another, since the 1980s – but neither of them achieved widespread use and popularity until they morphed into a form that was easier to use and provided the right applications.

Not only was the original videophone of the late 1980s expensive and heavily constrained by the limited bandwidth of the day, but it wasn't easy to use. It would take another two decades before computer-based videoconferencing (and eventually smartphone phone and tablet-based apps such as FaceTime, WebEx, Skype and Facebook) become commonplace.

Meanwhile, although the handheld computer achieved some limited success in industrial settings and amongst tech enthusiasts, it wasn't until the smartphone arrived (and notably the Apple iPhone) that handheld computing came into its own. When the right hardware was combined with an intuitive, gesture-based interface and high-speed wireless communications, consumers really started to buy and use these devices - and make the most of applications for them.

In both of the above examples, the underlying technology needed the right interaction model to make it broadly useful. The same is true of AR – where the right interaction model can make all the difference between something that provides a great demonstration of potential and a solution that can be tested, piloted and rolled out in a real-world setting.

"It wasn't until the smartphone arrived (and notably the Apple iPhone) that handheld computing came into its own. When the right hardware was combined with an intuitive, gesture-based interface and high-speed wireless communications, consumers really started to buy and use them."

There are four common ways to interact with Augmented Reality technology:

• **Gestures** – Most smart glasses used in AR have front-facing cameras that offer the ability for the glasses to "see " what a user sees – and be able to interpret the motion of a hand in front of them. Gestures are a great way to precisely interact and are perfect for dirty or loud environments. To be effective, an AR solution needs a precise and efficient hand tracking algorithm. This enables smart glasses to take advantage of an on-board RGB camera or depth sensor to recognize and respond to gestures. It will provide a true hands-free working experience.

• **Voice** - There are some situations when gestures are not ideal. These include situations where a user's hands may be occupied with tools. In that case, voice commands provide an important and safe alternative for interacting with smart glasses. Ideally, you want to be able to add voice commands to your smart glass system actions and allow your developers to define voice commands to extend their apps.

• **Head motion** - In situations where voice commands and gestures are not suitable, (such as noisy environments), head motion is a great alternative. If your AR solution provides multi-display and sphere view technologies, it will allow workers to access and scroll between content (including video feeds) and drill into images, maps, and 3D models with a simple motion of their heads.

• **Touch –** Good AR solutions should provide support for industry-standard touchscreen devices so that workers using popular phones and tablets can leverage AR features (including video conferencing, on-screen guidance and documentation such as shop manuals) when they are working in environments where they don't have to use work gloves or carry tools in their hands.

It’s vital to note here that you should look for an AR solution that includes ***all of these methods of interaction*** (often known as 'multi-modal' solutions) in order to provide maximum flexibility so that you can deploy the technology in a broad range of scenarios. Augmented Reality is not a 'one size fits all' business.

To achieve the best success in the testing and rollout of your AR system:

• Make sure that you deploy AR devices to a select set of users early and get feedback from them before undertaking a broader rollout.

• Be proactive about offering detailed feedback to the provider of any AR hardware or software you use. Augmented Reality is still a young industry and any good provider will want to know when something doesn't work for your company and why.

• Pay close attention to reliability during your lab and trial phases. Have high standards. If your AR system falters or flickers or in any way doesn’t work properly when you roll it out broadly - even if it's just a case of the WiFi signal being lost - skepticism can creep in and your workforce may decide it's too early to be deploying this technology. You never get a second chance to make a first impression.

Chapter Eight

Let's review:
your pre-flight AR checklist to
making AR real

Just as you would have a pre-flight checklist before putting any new aircraft into service, there's also a defined process for getting an Augmented Reality into the hands of your workforce in a way that's going to deliver the maximum possible return on investment.

To help provide clarity on that process, here's our checklist:

1. Define the business problem you want to use AR to tackle first - Companies in the manufacturing industry are now starting to see that they have applicable 'use cases' for AR.

2. Define your use cases without limits. Be bold and consider the broadest possible applicability – from production line to MRO shop floor to training scenarios. There are a great many places where AR technology could offer value.

3. Identifying the right problem is important. Until you find that problem with high impact on your company, you're on the fringe and at some point, someone's going to step in saying 'this doesn't work for us' or that it's too expensive, it's too slow or there's another priority.

4. Detail your current state: look at how you approach your business problems now and what that approach costs you – In order to accurately measure the benefit of any planned AR deployment, you'll need a strong understanding of your existing processes and approaches.

5. You'll also require data about how well things work (or don't work) now, with measurements of downtime, time to resolve issues, maintenance costs, training costs, new employee ramp-up times, safety and productivity all forming part of that data set.

6. Recognize that one size does not fit all – As discussed earlier, know that you may need different parts of an AR solution to meet the varying needs within your business.

7. Make your assessment of your 'current state ' as broad as possible, so that you can gain a comprehensive view of how AR will benefit your industrial enterprise.

8. Try it and measure the results in the lab or the field - You need to come up with a plan that covers who is going to do the testing in a lab and then who is going to do the testing in the field. Have those people be the early advocates for the solution – and pick people that care about change and want to try new things.

9. Learn and refine from your trials – Once you have a solution that works well in the lab, take it to the field. This can be a controlled environment with real users. If that field trial delivers (or exceeds) the expected results - and you're tracking how well it works from a hardware and software perspective (and you're confident that you are using AR to solve the right problem), you can now truly deploy it.

10. Plan for success by involving users early: the smartest person in AR deployment is all of us – AR represents a big change in how your company works. It promises a lot. By involving everyone in the AR deployment (once you've undertaken all the prep work outlined above), you can make sure that it will deliver in its great promise – truly transforming the way your company works.

So start researching your AR solutions now.

Book a demonstration with Atheer today to begin exploring where Augmented Reality could take your company.

Atheer works with some of the world's largest and most respected industrial enterprises across manufacturing, construction, heavy industry, aerospace, logistics, retail, medical, energy, and field services.

Let's talk about how we can help you in your AR journey.

With Atheer AiR™ Enterprise, leading organizations around the world are re-envisioning the way they work and finding new and transformative ways to improve the productivity, accuracy, quality, and safety of their skilled industrial workforces.

Request a Demo