

### The X Report

This is the inaugural X Report where Academy will feature our [Advisory Board](#)'s insights into AI, cyber, space, and other cutting edge topics where we can bring our experience and insights to bear. While these subjects will still be included in our [Macro Strategy](#) and geopolitical pieces ([SITREPs](#) and [Around the Worlds](#)), we want to highlight these themes and give them the attention that they deserve.

We hosted some webinars on these subjects as well, including the ones titled [21<sup>st</sup> Century Space Race](#), [AI - The Power, the Potential, and the Risks](#), and [Invasion Related Cyber Concerns](#).

We will build on these topics over time and as the stories develop, we will dig our teeth into the subject matter at hand. This initial report will be a starting point for what should be a dialogue that evolves and develops. We haven't established a cadence for this report, but we will adapt to the information flow and client interest.

### Space

Let's start with space. In today's report we rely heavily on **Navy Captain (ret.) Wendy Lawrence** (a former **NASA Astronaut**) and **Air Force General (ret.) David Deptula**, whose bios can be found on the [Advisory Board](#) page.

The first thing that Captain Lawrence said to me was that she cannot believe **how little attention the biotechnology industry gets when discussing space**.

**Commercial space travel is exciting** and may even be a viable business, but that pales in comparison to what we could see in other fields (away from "hospitality") as we experiment in space. There are many **interesting technological advantages of producing items in space** – zero gravity, a natural vacuum, etc. – and all create interesting opportunities to design products to be built in space. The potential for purity beyond anything that can be made on earth is amazing (fiber optics, semiconductors, etc.), but it is far from clear how, when, or if these can become commercially viable. Building the "construction" facilities themselves will be time-consuming and costly. Shuttling raw materials into space and finished goods back will also be expensive and require a fleet of vehicles capable of space travel (beyond anything that we currently have or are forecasted to have).

**Stem cells, as one example in the biotech field, could be life-changing** (literally). While this isn't new ([WAPo from Dec 2020](#)), it doesn't seem to get the attention that it might deserve. From my conversations, it seems like there is evidence that stem cells retain their ability to morph into a variety of cells far longer in space than on earth. Part of the explanation seems to be that stem cells grow in "three dimensions" in the human body, but on earth (outside of the human body) they seem to be limited to growth in "two dimensions." That problem goes away when they are being grown and cultured in zero gravity. I want to understand why this might be the case but found it eye-opening and can understand Captain Lawrence's excitement. Unlike a large manufacturing facility that would be required to build many things in space, things like stem cells (and presumably other biotechnologies) require far less "space" and can be worked on with today's capabilities. **When I think of space, I don't think of biotech first** (images of Richard Branson waving from the cockpit of some shuttle or a sports car floating through space come to mind – thank you mass media), but **maybe I should**.

**We also discussed India landing on the moon.** I'll admit, it didn't capture my attention, but I'm reconsidering that view. Yes, the U.S. was there first (a long time ago), but that might miss two important points:

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1. **India just did it (and in a very cost-effective manner), so their technology is freshly tested.** This seems a bit subtle, but it is a valid point. Their technology should be on the leading edge and should possibly spur activity from other nations – not just from those trying to be the 5<sup>th</sup> or 6<sup>th</sup> nation to land, but also from those who have been there before. This is a good time to mention that Russia (formerly part of the Soviet Union), which landed on the moon almost 50 years ago, recently saw its Luna-25 spacecraft crash. Given the performance of the Russian military, this seems less surprising than it would have been before the invasion of Ukraine, but it does highlight the feat that India achieved.
2. **India landed on the lunar south pole.** This meant nothing to me, as the only thing that I really know about poles is that Santa Clause apparently lives at Earth’s North Pole. But that downplays the significance of landing on the lunar south pole. **This is the first landing at the south pole.** While India is “only” the fourth country to land on the moon, they were the first to do it in this difficult and strategic location. More importantly, that is where scientists have **detected traces of water ice.** I’m not sure why it isn’t just called ice, but I assume that this “distinction” is meant to clarify that if unfrozen, it would be water and not all “ice” in space is formed by water. The viability of human settlement on the moon would be greatly enhanced by having local supplies of water, which is interesting and something that doesn’t seem to get much attention.

At the other end of the spectrum is the topic of “**space junk.**” This is increasingly an issue that needs to be dealt with. Little has been done to keep space clear of debris. Apparently, that debris is becoming more and more of an issue as it threatens flights and functioning orbital systems (satellites, space stations, etc.). If the full potential of space is to be achieved, then this is something that needs to be addressed. Apparently, the U.S. government is starting to take a more serious look at this (along with other global agencies) to create rules governing what can be sent up and how to manage it once it is there. On the surface, this sounds a bit boring, but could well create some interesting business opportunities in space.

**This is a good time to segue to the global nature of space, both from a cooperative and competitive standpoint.**

**General Deptula** takes us back to the preamble of the U.S. Constitution which states that the federal government was established to first “**provide for the common defense,**” and subsequently “promote the general welfare.” How does space fit into our defense policy? **Maybe the better question is, where isn’t space part of our defense policy?**

At a basic level, GPS, communications, and other things that we take for granted in our daily lives (which are critical for a functioning military) rely on satellites in space. One form of “protection” goes back to the earlier discussion of “space junk.” As the ability to launch “things” into space becomes more widespread, how do we control that? Not just within the U.S., but with other nations and increasingly with corporations. Is it in “our” interest to hypothetically ask North Korea to join the “space race” and start shooting more things (relying on potentially dubious technology/workmanship) into space? But mere regulations and rules do little to nothing to protect us, especially if we don’t have any ability or willingness to enforce it (a subject that we’ve discussed in cybersecurity many times).

**To quote General Deptula:**

*“With respect to the U.S. Space Force, every military service, defense, and intelligence agency in the Department of Defense is critically dependent on our space enterprise. This means that each of these stakeholders must contribute resources that align with their*

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*space mission requirements that are provided by the Space Force. At present, this is not the case. The entire Space Force budget comes from the Department of the Air Force. The Space Force is underfunded, undersized (~10,000 people), and the consolidation of the nation's fragmented multitude of space organizations into the Space Force has not occurred. That was a key point of establishing the Space Force—to align, streamline, and focus efforts to boost mission effect and efficiency.”*

**As our desire to exploit space, use it more effectively, and create businesses grows and gathers momentum, we will need rules and the ability to enforce those rules.**

I don't want to go down this path, as so much about space seems to move beyond geographic boundaries and represents “humanity” at its finest, but little about the history of the world suggests that space will be altruistic and won't need governing and policing.

As technology and the development of new tactics related to space travel becomes more commonplace, we will need to explore them and the businesses that will develop around them.

**From Earth, we can look at the heavens and see stars and satellites and watch spacecraft take off and land, but some of what was once almost “magical” is becoming the norm and is creating opportunities for business and investment!**

I didn't get to mention UAPs (Unidentified Anomalous Phenomena), but I'm hoping that this section of the X Report will create that opportunity in the future.

My takeaway, as relatively new to exploring space, is that much of what I thought was important (or certainly garners the lion's share of media attention), isn't as important as new opportunities that are coming to fruition!

## AI

With NVDA having another blowout quarter and hitting new highs, AI is once again front and center for market participants. Interestingly, Google searches for generative AI have resumed their decline.

**General (ret.) Groen** and I spent a lot of time on this in the past several weeks (adding to the great contributions made by **Admiral (ret.) Barrett**). I suspect that this is an area where Academy's Advisory Board will shine and surprise because so many of our members were not just involved with AI and cyber in the military, but are also still actively involved with companies in the field or on the policy side of things.

Weirdly enough, I'll start the AI section by admitting that I don't fully understand it. **I continue to struggle with the question of “When does fast processing (with lots of data available) turn into AI?”** At what point does regression analysis on a massive scale transform into something that we can call artificial intelligence? Part of me struggles with applying the “Turing Test” to various forms of AI. I guess at its simplest, the Turing Test states that to be considered AI, a computer must be able to mimic human responses under certain conditions. Somehow, I see Data from *Star Trek* facing the Turing Test and passing, but I guess if the test is just designed to grade the effectiveness of mimicking human behavior in certain conditions, it is a much lower hurdle.

In any case, before I drive myself (and you) crazy trying to establish what is or isn't AI, let's use a broad definition – **processing large amounts of data at extremely high speeds**. That will leave many of the AI purists disappointed and will seem like a cop-out to those who question the state of AI. At the risk of sounding incredibly naïve, for someone who is supposed to be writing about state of the art

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technology and the future, I'll admit that I've been thinking about "calculators" a lot.

Calculators would have seemed "magical" just a few hundred years ago. Even 20 or so years ago, students could not use calculators during tests. Calculators provided such an advantage (allegedly) that they were deemed unfair, but now it seems like lugging a calculator into an exam is standard practice. What was once "magical" has now become merely a tool.

As we debated back and forth on AI, three key questions came to mind repeatedly:

- **Generative AI.** This captured so much attention earlier this year, but in reality, it is only a small part of AI. It seems to tip the scales into what I imagine AI to be, which is why my broader definition might be more useful at the moment. For investors and companies, generative AI might be all the buzz, but it isn't necessarily the biggest opportunity set in the space.
- **Manual Intervention.** What level of manual intervention or "override" is necessary? Or (and this is a very different question), what level of manual intervention or "override" will be deemed necessary?
  - I think a lot about **FSD** (full self-driving) in this context. My vision is of reclining in the backseat and reading research reports (while possibly sipping a drink) as the car takes me to my destination. I want to live in a world (described by **Admiral Barrett**) where we won't own cars and we won't learn to drive. The current reality of FSD for most of us is being "beeped" at because our hands are not on the steering wheel. If I'm going to have to sit in the driver's seat with my hands at 10 and 2, what is the point? I don't enjoy driving (I know many people do), but I can't really see the point of monitoring something when just doing it myself would not require much more effort. This experience is something that comes up when discussing AI.
  - In **generative AI** I hear (and have experienced) frustration because proof-reading and fact checking can take up almost as much time as doing it from scratch. That is not the case in every example (coders, in particular, seem to like it a lot). The coding makes sense as you can get the code, run it, and see if it works (at least for simple tasks). But even then, there are complaints about it including links to non-existent routines, etc.
  - **What level of control will we hand over?** The paradox (from this standpoint) is that the more data and computing power the AI (broad definition) has access to, the better decisions it should be able to make. However, this process is far less transparent to the human operators. If you've done everything right (in terms of programming and data availability), will you put AI's recommendations into action? Sure, for smaller/easily fixable things, people will experiment. **But if AI (under this broad definition) tells you to only order one size of a dress in some seemingly obscure color, would you bet your season (and maybe your company) on it?**
- **The Metaverse.** I had to ask if AI is just another incarnation of the metaverse – i.e., something that can attract a lot of attention, but doesn't seem to be going anywhere. Across the board, the view is that while AI is in its infancy, it is already in use and will continue to grow and evolve. It is a part of our world and is a tool that is improving and will be adopted with more frequency. **At best, the metaverse was an abstract construct, unlike AI which is a real tool.** At its worst, the metaverse was a construct that attempted to incorporate as many of the buzz words (and fads) of the day into something that could create more interest (and presumably \$\$\$) around

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those buzz words. Who wasn't left wondering which "Bored Ape" or "Cyberpunk" would make someone (else) rich? Classes were being disrupted as kids checked their phones to see what they got on the latest Top Shot drop. There was excitement surrounding digital ownership. Maybe that will return, but the use case of the metaverse is only a fraction of the size of the AI use case. It is easy to see AI existing without the metaverse, but the metaverse probably requires AI. **The bottom line is that while there is some trepidation that AI is just "another fad" in a long list of tech themes that have failed to deliver (so far), the fear seems misplaced!**

**AI has many pitfalls and hurdles to cross, but it is a technology that is already in use and is only getting better.**

### AI Regulation

**Sadly, we are brought back to another recurring theme – regulation!**

**General (ret.) Hernandez** has led many of our conversations on regulation in the cyber space. Defining what is an acceptable activity in cyber versus what constitutes a breach is crucial. Even more important, at least from my perspective, is defining the consequences of such breaches. The "digital" nature of cyber seems to give cyber criminals an edge. Cybercrimes don't "feel" as visceral as robbing someone at gunpoint, and there seems to be hesitation in responding "appropriately" to cybercrimes when many of the criminals live outside of our "physical" jurisdiction but have access to our "digital" footprint.

**General (ret.) Groen** highlighted our need to regulate cyber "appropriately." Obvious questions that have been raised before include how to control "datasets/inputs" used by generative AI. Other questions include how to limit, control, monitor, or even disclose the biases of those "training" the AI. But the concerns here go well beyond that, and often cycle back to the fact that AI (under a variety of definitions) performs better if it has access to "better" data (more accurate, timelier, etc.).

- On the one side you have **China**, where it isn't too far off the mark to label it as a "free for all." Personal privacy rights will not be allowed to get in the way of the broader goal.
- On the other side, **has the EDPS (European Data Protection Supervisor)** gone too far? Are they going to restrict data usage to the point that it cripples AI development?

I don't know the correct answer here, but General Groen believes that we have to get serious about AI regulation and ensure that we balance the risks with not just the opportunities, but also (and more importantly) with the competitive landscape to make sure that we don't fall behind.

That brings me to a story that **General (ret.) Stewart** (who sadly passed away earlier this year) liked to talk about regarding AI: **the heart attack warning shirt**. Let's say that someone is able to design a shirt that can give you an early warning sign that you are at a high risk of an imminent heart attack. Presumably the more the shirt "knows" about you, the better. Your medical history and what drugs you are on would likely be helpful. How you slept, what exercises you've done, and what you've recently eaten would also add to the accuracy of the shirt. Knowing your current heartrate, pace of breathing, body temperature, and the air temperature would also help this shirt be a better predictor of risk. **So far, so good**. Having a warning could lead to faster treatment and not just save lives, but also limit complications. This shirt seems like a good idea, especially for anyone who considers themselves at risk. But two problems arise:

- **The security of the data "owned" by the shirt**. This is more of a cyber issue than an AI issue, but the more data provided to the shirt, the better it operates. However, that also means that

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the data becomes more valuable to someone who wants to use it for other reasons.

- **What does buying or owning this shirt tell others?** How will your health insurance company react? If you are a high risk candidate (and have been consulting with a doctor) this might be something that they encourage. But what if you aren't on their radar screen? What if you have avoided physicals and lied about your weight? Does the purchase of this shirt suddenly make you pop up on their radar screen as a potential fraud case? Are the insurance companies undercharging you given the potential conditions that they didn't "know" about (but now think that they "know" about), because of the purchase of the shirt?

**AI is as much about data as anything else, and that is going to lead to some difficult decisions for individuals, companies, investors, and regulators.**

### Cyber

I think that we've covered enough already in this initial report. However, we will end on this one note regarding cyber. Back in December 2020, after the Solar Winds hack, we published [Cyber, Be Concerned if Not Afraid](#). The points that this report raised are incredibly relevant today and will continue to be important.

### Bottom Line

These fields (space, AI, and cyber) are not going away. While space may not be relevant to everyone and most companies have some sort of cyber plan in place, AI (and its usage) is truly at an early stage for many companies.

I think that we've hardly scratched the surface on how companies can benefit from these technologies and how investors can profit from them.

**Our goal (over the coming X Reports) will be to help you navigate and prosper in this environment by bringing you the unique perspectives of our advisory board members!**



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