



2023 State of the VITA Technology Industry



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by: Ray Alderman, Chairman of the Board, VITA

This report provides the reader with updates on the state of the VITA Technology industry in particular and of the board and system industry in general, from the perspective of Ray Alderman, the Chairman of the Board of VITA. VITA is the trade association dedicated to fostering American National Standards Institute (ANSI) accredited, open system architectures in critical embedded system applications. The complete series of reports can be found at [Market Reports](http://www.VITA.com/Market_Reports). (www.VITA.com/VITA_Technology_Industry)

Introduction

World economic conditions are wobbling. Europe’s primary export now is new laws against tech companies and corporations. Their primary import is money from fines for violating those new laws. The EV disaster continues to get worse. There are four slow-motion train wrecks underway that are worth watching. AI’s primary target seems to be the entertainment industry. The war in Ukraine takes a back seat to the Israel-Hamas war in the Middle East as world military spending surges. When you start to think that things cannot get any worse, they get worse.

Economic Conditions

World GDP growth for 2023 is predicted to be 2.8%, down from 3.4% in 2022. Global inflation will be about 6.8% this year, down from 8.7% last year. Global unemployment should be somewhere above 6%, with South Africa leading the world at 35.6%. Economists are not optimistic when considering all the problems affecting world GDP prospects. The world-debt-to-world-GDP ratio hit 337% in Q2.¹

Q2 U.S. GDP grew at 2.1% (up from 2.0% in Q1), inflation rose to 3.2% in July (up from 3% in June), and unemployment came in at 3.8% in August (up from 3.5% in July). The Federal Reserve raised interest rates for the 11th time in July (to about 5.5%). To get inflation down to 2%, the Fed may raise rates again in the next month or so, and push GDP growth down (to below 2%) and

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¹ Rodrigo Campos "Global debt hits record \$307 trillion, debt ratios climb -IIF", Reuters, September 19, 2023, <https://www.reuters.com/markets/global-debt-hits-record-307-trillion-debt-ratios-climb-iif-2023-09-19/>

unemployment up (to over 4%). Credit card debt rose by 4.5% in Q2, to a new high of \$1.03 trillion, so consumers are financing their spending using credit. As you would expect, payment delinquencies are now rising.²

But the U.S. looks great compared to China. China's Q2 GDP grew at only 6.3%, up from 4.5% in Q1, after decades of 10% growth.³ China's inflation rate was -0.3% in July which means prices there are falling (stagnation). Their unemployment rate was 5.3% in August, mostly among young people (unemployment rate in the 16-24 age group was more than 20% and rising). They heavily invested in construction and infrastructure projects with borrowed money, and that segment is collapsing. China's debt-to-GDP ratio is now at 280%. Many economists say they will go into a deflationary period of declining prices and asset values (like Japan), with lower GDP growth and rising unemployment in the future. China's Central Bank has lowered interest rates to 3.45%, to spur GDP growth.

Now, let us look at Europe. EU GDP grew at 0.6% in Q2, up from 0.1% in Q1. Germany's GDP declined by -0.2%, Italy declined by -0.3%, Ireland grew at 3.3% (after declining -2.7% in Q1), Spain grew at 0.4%, and France grew at 0.5%.⁴ These numbers are pretty anemic.

EU inflation was 6.1% in July (down from 6.4% in June). Inflation rates by country range from 38.3% (in Turkey, an EU trade partner and candidate for membership) to 1% (in Luxembourg), so it is best that you look at the charts referenced in the footnote.⁵ Most of the larger countries are experiencing 5-6% inflation. EU unemployment was 5.9% in June, with Spain and Greece leading the pack with both over 11% unemployed. The European Central Bank raised interest rates to 4% in September.

UK GDP grew at 0.2% in Q2, after growing 0.1% in Q1. Inflation fell to 6.8% in July, down from 7.9% in June.⁶ The unemployment rate was 4.2% in June. The Bank of England has raised interest rates to 5.25% to push inflation down.

Japan's GDP grew by 6% in Q2, after growing at 2.7% in Q1. Inflation in Japan was 3.3%, and unemployment rose to 2.7%. The Bank of Japan held interest rates at -0.1% in July (yes, depositors actually lose money). Japan is still climbing out of the hole of stagnation since asset prices crashed years ago. The government borrowed and pushed money into the economy to boost growth, raising their debt-to-GDP ratio to 263%. Economists suggest that China might be on the same economic path as Japan: deflation.

If you believe the numbers, Russia's GDP grew by 4.9% in Q2 (after a decline of -1.8% in Q1), their inflation rate is about 4% and rising, their unemployment rate is 3.1%, and the central bank raised interest rates to 13% in September. Russia is now trying to buy artillery shells and missiles from North Korea for the war in Ukraine, since they cannot get the raw materials to build them internally.⁷

There is the macro situation. Now, let us look at the micro. There are four slow-motion train wrecks presently underway: the collapse of the auto industry, the media and entertainment industry, the Metaverse, and the IoT (Internet of Things) industry.

“There are four slow-motion train wrecks presently underway: the collapse of the auto industry, the media and entertainment industry, the Metaverse, and the IoT (Internet of Things) industry.”

2 Natalie Campisi "Americans' Credit Card Debt Tops \$1 Trillion, Hitting All Income Levels", Forbes, August 17, 2023, <https://www.forbes.com/advisor/credit-cards/credit-card-debt-hits-new-high/>

3 Keith Bradsher, "China's Rebound Falts, Tripped Up by Debt and Weak Exports", NY Times, <https://www.nytimes.com/2023/07/16/business/economy/china-gdp-q2.html>

4 "Euro zone growth picks up in Q2", Economist Intelligence, <https://www.eiu.com/n/europe-chart-of-the-week-euro-zone-growth-picks-up-in-q2/#:~:text=In%20the%20second%20quarter%20of,0.1%25%20in%20the%20first%20quarter>

5 "Harmonized index of consumer prices (HICP) inflation rate in Europe in June 2023, by country", Statista, July 27, 2023, <https://www.statista.com/statistics/225698/monthly-inflation-rate-in-eu-countries/>

6 Larry Elliot, "UK inflation falls sharply to 6.8% as cost of living pressures ease", The Guardian, August 16, 2023, <https://www.theguardian.com/business/2023/aug/16/uk-inflation-falls-sharply-as-cost-of-living-pressure-ease#:~:text=The%20UK%27s%20annual%20inflation%20rate,of%20living%20since%20February%202022>

7 "Russia Is Buying North Korean Artillery, According to U.S. Intelligence", NY Times, <https://www.nytimes.com/2022/09/05/us/politics/russia-north-korea-artillery.html>

In past reports, I have explored some of the negative aspects of owning an electric vehicle (price anxiety, range anxiety, vapor-cloud battery explosion anxiety, battery fire anxiety, repair cost anxiety, battery life anxiety, loss of vehicle control anxiety, vehicle lock-out anxiety, charging station location anxiety, charging time anxiety, etc.). And new ones keep popping up every day. In the latest hurricane in Florida (Idalia), exposing an EV to salt water in a flood caused battery combustion.⁸ Driving an EV through water in the streets, to get away from a flood, could turn the vehicle into a mobile incinerator. So, add “water anxiety” to the list.

“Driving an EV through water in the streets, to get away from a flood, could turn the vehicle into a mobile incinerator.”

EV sales are still growing (despite all the anxieties), but one look at U.S. EV sales in the first half of 2023 show bigger problems.⁹ It seems that the “innovators” and most of the “early adopters” that can afford an expensive EV already have one (look at the technology adoption curve and its 5 phases) The “early majority” phase is stalling and EVs are piling-up on dealer lots, just waiting to inflict all the anxieties mentioned on its new owner.¹⁰ The carmaker’s solution is to cut prices (a price war) to move those cars and lose even more money on each EV. Except for Tesla and the Chinese EV companies, the other automakers lose about \$7,000 or more on each EV they sell. They can trade margins for market share right up to the point where they file for bankruptcy (like Lordstown Motors did in June). In the midst of all this, the UAW (United Auto Workers) went on strike for better pay and benefits.

In July, a cargo ship carrying 3,784 new cars (with 498 EVs onboard), from Bremerhaven, Germany to Singapore, caught fire and burned for a week near the shipping lanes off the Dutch coast.¹¹ Back in February 2022, another cargo ship carrying 3,965 new expensive luxury cars (with 281 EVs onboard), left Emden, Germany for Rhode Island. It caught fire and burned for 13 days before it sank near the Azores. EV batteries are the primary suspected cause in both fires. So, add “shipping anxiety” to the list. If you order a nice new expensive foreign EV, there is a good chance it will end up at the bottom of the ocean.

It costs more to charge an EV than to fuel-up a gas-powered vehicle, when considering the cost of registering the vehicle and the home charging equipment.¹² Gas taxes pay for the roads, and collecting what an EV would have paid in gas taxes up front, in the registration fees, is coming to EV owners. A home charger installation will cost you \$2,500 or more depending on where you live. So, put this one under “ownership cost anxiety.”

If your EV breaks down, you may have to wait days or weeks to get it fixed.¹³ Seems there is a shortage of EV technicians and the independent auto repair shops will not spend thousands of dollars for special EV maintenance equipment yet. Additionally, EV’s run on 400 to 800 Volt electrical systems, so independent shops are not as enthusiastic about getting their employees electrocuted as the dealerships. This situation fits nicely under “repair anxiety.” I could go on and on, but I do not want to be perceived as overly negative here. Let us move on to the next train wreck: the collapse of the media and entertainment industry.

Cable and satellite TV customers have been cutting the cord and moving to online streaming for years. Ad revenues have been falling for the networks, streamers, and TV stations for a while now. All the previous mergers of the movie studios, TV studios, and cable/satellite TV providers are turning into really bad decisions. Their new streaming service

8 Jeffrey Rodack, "Florida Officials: EVs Flooded by Idalia Go Up in Smoke", NewsMax, September 1, 2023, <https://www.newsmax.com/newsfront/ev-idalia-fire/2023/09/01/id/1132931/>

9 Paul Lienert and Joseph White, "Tesla's rivals scrap for thin slices of US EV sales", Reuters, September 27, 2023, <https://www.reuters.com/business/autos-transportation/teslas-rivals-scrap-thin-slices-us-ev-sales-2023-09-27/>

10 Joseph White and Ben Klayman, "US EV market struggles with price cuts and rising inventories", Reuters, July 11, 2023, <https://www.reuters.com/business/autos-transportation/slow-selling-evs-are-auto-industrys-new-headache-2023-07-11/>

11 Leslie Eastman, "Ship carrying electric vehicles burns for nearly a week", Hot Air, August 7, 2023, <https://hotair.com/headlines/2023/08/07/ship-carrying-electric-vehicles-burns-for-nearly-a-week-n569569>

12 Alexa St. John, "Most cars still cost more to charge than to fill up with gas — when you take other expenses like home charging and fees into account", Business Insider, August 1, 2023, <https://www.businessinsider.com/ev-charging-cost-versus-gas-car-truck-suv-2023-7>

13 Nick Carey, Paul Lienert and Giulio Piovaccari, "EV broken? Finding a technician to fix it may take a while", Reuters, September 6, 2023, <https://www.reuters.com/business/autos-transportation/ev-broken-finding-technician-fix-it-may-take-while-2023-09-06/>

initiatives are failing to attract paying customers.¹⁴ As the entertainment revenue streams dry-up, the writers and actors went on strike, wanting more of the declining cash flow (and some protection against AI writing scripts and avatars doing the acting). This industry is starting to lose money faster than the auto industry.

As an example, actor James Dean will star in a new movie, "Back to Eden," even though he died in 1955 in a car crash.¹⁵ AI algorithms have learned his image, his mannerisms, and his voice from previous films. They also learned from the scripts of those movies and can write dialog for the new movie.

Think about new movies starring John Wayne, Jimmy Stewart, Humphrey Bogart, Lauren Bacall, Marilyn Monroe, Steve McQueen, and Gregory Peck (if the studios can license their name, image, likeness, voice, mannerisms, etc.). That is why the Hollywood studios are looking at AI-trained people and algorithms for their future.¹⁶ Actors and writers are a squirrely bunch of expensive creative types, and they are trying to stop the inevitable.

Next on the train wreck list is the spectacular collapse of the Metaverse. Industry researchers said that it would be worth \$13 trillion within a week, but Meta's (Facebook) Horizon Worlds of virtual reality had thirty-eight active daily users and received \$470 in global revenue.¹⁷ The money to be spent in the Metaverse was cryptocurrencies and they collapsed into a massive pile of financial goo, currency exchange bankruptcies (FTX, Voyager, Blockfi, etc.), and jail terms for the exchange owners (Sam Bankman-Fried). Cryptocurrencies lost \$2 trillion in value in 2022. Billions of dollars were invested in Metaverse real estate, avatar designer clothes, \$3,000 VR goggles, and digital artwork (NFT's). That all went down the drain. Yet, the EU has started a new program to develop their version of the Metaverse.¹⁸ Good luck with that.

It might be a stretch to say that the IoT (Internet of Things) market has collapsed, but it sure is not living up to the original hype. So, let us just say it is down on its knees.¹⁹ Billions of IoT devices were going to be built and deployed by the big tech companies but that did not happen. A lot of the IoT stuff has been built by small companies and start-ups. Up to 75% of the IoT products and projects fail.²⁰

The "smart home," where your doorbell talks to your refrigerator and your toaster never made sense. The only segment that seems to be doing well is the IIoT market (Industrial IoT), for energy use and manufacturing monitoring. However, the medical industry could benefit from Wi-Fi-enabled and camera-enabled body sensors (Telemedicine), that can talk to your doorbell, refrigerator, and toaster. Collectively, they might automatically send the body sensor readings and revealing pictures to your doctor (and to your Facebook page if you mess-up the internet settings).

So, there you have it. Globally, economic conditions are wobbling. China and Europe have some tough problems in front of them. The U.S. is doing well but high interest rates will dampen growth. Some countries will borrow more money and spend it on projects to spur growth, but that just contributes to the world's debt problems. And we are watching the slow collapse of old business models in automotive, entertainment, and the Metaverse. That is more fun than watching anything on TV these days.

14 Lillian Rizzo, "The media industry is in turmoil, and that's not changing anytime soon", CNBC, July 17, 2023, <https://www.cnbc.com/2023/07/17/media-industry-turmoil-strikes-streaming-losses-ad-slump.html>

15 Elizabeth Stanton, "James Dean reportedly appearing in new film with AI, experts weigh in on benefits for stars after death", Fox News, August 18, 2023, <https://www.foxnews.com/entertainment/james-dean-reportedly-appearing-new-film-ai-experts-weigh-benefits-stars-after-death>

16 Adrian Horton, "'Embrace it or risk obsolescence': how will AI jobs affect Hollywood?", The Guardian, August 21, 2023, <https://www.theguardian.com/film/2023/aug/21/ai-jobs-hollywood-writers-actors-strike>

17 Kate Wagner, "Lessons From the Catastrophic Failure of the Metaverse", The Nation, July 3, 2023, <https://www.thenation.com/article/culture/metaverse-zuckerberg-pr-hype/>

18 Foo Yun Chee, "EU looks to take lead in metaverse world, avoid Big Tech dominance", Reuters, July 11, 2023, <https://www.reuters.com/technology/eu-looks-take-lead-metaverse-world-avoid-big-tech-dominance-2023-07-11/>

19 Zac Amos, "Has the IoT Industry Failed? Early Predictions vs. Reality", IoT For All, March 28, 2023, <https://www.iotforall.com/has-the-iot-industry-failed-early-predictions-vs-reality#:~:text=IoT%20Would%20Lead%20to%20Massive%20Job%20Loss&text=However%2C%20this%20prediction%20did%20not,%2C%20cybersecurity%2C%20and%20software%20development>

20 Brian Gilmore "Why can't IoT get out of its own way?", TechTarget, September 2, 2021, <https://www.techtarget.com/iotagenda/post/Why-cant-IoT-get-out-of-its-own-way>

I highly recommend that you read Tim Wu's book, "The Master Switch." He goes through the history of telecom, radio, the movie industry, TV, and the Internet in detail. You will be amazed how certain technologies destroyed their business models rapidly in the past. And it is happening again.

Technology

Despite all the issues with EV's, there are some positive effects. All EVs today are primitive prototypes, and they perform badly enough that engineers have developed axial-flux motors (as opposed to the radial-flux motors in use today). Those motors can be smaller, lighter, and cheaper....and might be more efficient.²¹

Additionally, since the lithium-ion batteries are great at spontaneous combustion, the engineers have been working on several new battery technologies. There is lithium ferrous phosphate, sodium-ion, carbon electrodes, silicon anodes, and solid-state batteries (that use a solid electrolyte instead of the liquid used in lithium-ion batteries today). Whatever they can take to mass production will benefit other energy storage applications and reduce the number of EV fires.²²



Tesla Model S caught fire and burned while charging at a Supercharger
Photo courtesy of Electrek

In September, a bunch of engineering students in Germany built an EV that smashed the record for range on a single charge. It went 1,599 miles. They got 102.3 miles per kilowatt hour while traditional EVs get about 4.2 miles per kilowatt hour. The car weighs just 374 pounds (without the driver), can reach top speeds of twenty-six miles per hour, and could best be described as a shoebox with wheels.²³

Tesla has sold over 4.5 million cars during their short life, but their self-driving software keeps running into other objects. Each of those vehicles send back reams of video while on the road. So, Tesla has built a massive supercomputer (Dojo) to process that video, to make additions and corrections to their code. Dojo is the undeclared fifth fastest supercomputer in the world right now, and they are expanding its capabilities dramatically.²⁴ With Tesla's new D1 chip, they expect the machine to execute 20 exaflops using 1,062,000 processing cores. Back in 2022, HP-Cray and AMD ran the new Frontier supercomputer at Oak Ridge at just 1.1 exaflops. So, Tesla could be the leader in supercomputing in the next few months and send HP-Cray-AMD, IBM, Intel, and NVIDIA back to the drawing boards.

In a previous report, I threatened to include a "legal section" in the future. So, let us dig into all the techno-legal issues streaming out of governments these days. First is MICA (Markets in Crypto Assets) regulations. Even though the cryptocurrency markets have collapsed, the EU feels compelled to create some regulations after the FTX crypto exchange went bankrupt. These new regulations protect cryptocurrency users and require greater disclosure and transparency of the transactions. That will make it easier for EU countries to tax the sender and receiver of the currency since it eliminates some anonymity.²⁵

21 Pete Holderith, "Why Axial Flux Motors Are the Key to Small, Fun EVs", The Drive, September 6, 2023, <https://www.thedrive.com/features/why-axial-flux-motors-are-the-key-to-small-fun-evs>

22 Peter Johnson, "Toyota claims solid-state EV battery tech breakthrough could offer +900 miles driving range", electrek, June 13, 2023, <https://electrek.co/2023/06/13/toyota-claims-solid-state-ev-battery-tech-breakthrough/>

23 Jonathan M. Gitlin, "This EV smashed the world record for distance on a single charge", ARS Technica, September 14, 2023, <https://arstechnica.com/cars/2023/09/1600-miles-on-a-single-charge-student-built-ev-sets-new-world-record/>

24 Steven Dickens, "Tesla's Dojo Supercomputer: A Paradigm Shift In Supercomputing?", Forbes, September 11, 2023, <https://www.forbes.com/sites/stevendickens/2023/09/11/teslas-dojo-supercomputer-a-paradigm-shift-in-supercomputing/?sh=7a14fc227bc2>

25 Huw Jones, "EU states approve world's first comprehensive crypto rules", Reuters, May 16, 2023, <https://www.reuters.com/technology/eu-states-approve-worlds-first-comprehensive-crypto-rules-2023-05-16/>

Not to be left behind, President Biden included a 30% tax on all electricity used for the mining of cryptocurrencies in the 2024 federal budget. The tax would start in 2024 and be progressive (10% in 2024, 20% in 2025, and 30% in 2026). The Europeans want to tax the cryptocurrency itself while the U.S. wants to tax the electricity the currencies use.²⁶

In 2018, the EU's new GDPR (General Data Protection Regulation) laws went into effect. Basically, this law says that data on users of the major internet platforms must be collected under certain legal restrictions and that personal data must be protected from misuse or exploitation by anyone in the universe.²⁷ Fines for even the slightest infraction are 20 million Euros, or 4% of the company's worldwide revenue, whichever is greater.

In March, the EU's new DMA (Digital Markets Act) law went into effect. It makes it easier for users to move between social media websites, browsers, search engines, and app stores and have access to their history.²⁸ It also makes it easier for users to change their default settings for those applications. Fines for even the slightest violation are 10% of the company's worldwide revenue (20% for repeat offenders).

In August, the EU's new DSA (Digital Services Act) law went into effect. It makes the big online platforms legally accountable for all content posted on their platforms. It also bans targeted advertising to users based on race, religion, ethnicity, sexual orientation, or age (children). And the platforms must share their data with researchers and authorities for auditing purposes.²⁹ Fines for even the slightest violation are 6% of the company's worldwide revenue. Repeat offenders will be locked out of the European market altogether.

In June, the European Commission, the European Council, and the European Parliament started editing the final EUAI (European Union Artificial Intelligence Act) laws. Banning or restricting the use of AI technologies by law enforcement, liabilities for misuse of AI, protection of copyrighted materials, and compartmentalization of high-risk AI technologies are in their sights. At this point, it looks like the fines for even the slightest infraction of these new AI laws will be whatever money the internet companies have left after paying their fines for violations of the GDPR, DMA, and DSA.³⁰

Let us take a break from the legal stuff for a moment. In my last report, I showed you images of the U.S. presidents with mullet haircuts and as muscular professional wrestlers, all created by AI algorithms. Want to hear some AI-generated music? Stability AI has tweaked their algorithm and fed it 800,000 audio files (19,500 hours of audio) as training data. Now, you can enter text prompts and the algorithm will create music for you (piano, string instruments, drums, horns, etc.).³¹ This sure beats years of painful and expensive piano lessons when you have zero talent. If you are a musician, you might want to pay attention to this development.

Then, there are all the new voice duplication AI algorithms in the market. Give them a few minutes of anyone's voice and they can duplicate it perfectly.³² This has shocked the voice artists who narrate documentaries, speak in commercials, provide the voices of animated characters in cartoons and video games, audio book readers, and singers. On the surface, it looks like AI is targeting the entertainment industry for some reason. Maybe it is because you cannot copyright a voice under present law. You can only copyright a recording of a voice.

26 Kelly Phillips Erb, "White House Proposes 30% Energy Tax To Address Environmental Crypto Mining Costs", Forbes, May 4, 2023, <https://www.forbes.com/sites/kellyphillipserb/2023/05/04/white-house-proposes-30-energy-tax-to-address-environmental-crypto-mining-costs/?sh=2003e112b9eb#:~:text=The%20White%20House%20has%20announced,the%20electricity%20used%20in%20cryptomining>

27 Danny Palmer, "What is GDPR? Everything you need to know about the new general data protection regulations", ZDnet, May 17, 2019, <https://www.zdnet.com/article/gdpr-an-executive-guide-to-what-you-need-to-know/>

28 Martin Coulter, "How the EU's Digital Markets Act challenges Big Tech", Reuters, September 6, 2023, <https://www.reuters.com/technology/how-eus-digital-markets-act-challenges-big-tech-2023-09-06/>

29 Emma Roth, "The EU's Digital Services Act goes into effect today: here's what that means", The Verge, August 26, 2023, <https://www.theverge.com/23845672/eu-digital-services-act-explained>

30 Shana Lynch, "Analyzing the European Union AI Act: What Works, What Needs Improvement", Stanford University HAI, July 21, 2023, <https://hai.stanford.edu/news/analyzing-european-union-ai-act-what-works-what-needs-improvement>

31 "Stable Audio: Fast Timing-Conditioned Latent Audio Diffusion", Stability AI, September 13, 2023, <https://stability.ai/research/stable-audio-efficient-timing-latent-diffusion>

32 Jeremy C. Owens, "'We're literally being stolen from, in plain sight': Musicians are tired of venues taking their T-shirt money, and they're fighting back.", MarketWatch, October 9, 2023, <https://www.marketwatch.com/story/were-literally-being-stolen-from-in-plain-sight-musicians-are-tired-of-venues-taking-their-t-shirt-money-and-theyre-fighting-back-5b3b5a57?mod=home-page>

In September, a bunch of college students created a fictitious game software company and generated all the code for developing the game software and for all the administrative functions in 7 minutes (70 application programs), at a cost of \$1. It was done with prompts to ChatGPT. The code was 86% clean and the algorithms went back and fixed some of the bugs.³³ If you are a code-grinder, you might want to pay attention to this development.

Now, back to the legal stuff. Efforts are underway in the EU to require international digital IDs that contain a person's driver's license, passport, credit cards, and other personal information. Additionally, the EU has proposed that AI should be regulated by a global committee like the United Nations, and not allow individual countries to pass their own AI laws.³⁴ There are an infinite number of things wrong with both these ideas.

This next EU initiative hits close to home here at VITA. Back in June, the EU created draft regulations concerning patents used in open standards (SEPs, or standards essential patents). These rules state that the EU Intellectual Property Office will decide what a patent owner can charge for licenses and royalties, regardless of pricing agreements previously made in the open market or under the standards developer. That could invalidate VITA's ex ante patent policies where the licensing fees and royalties are disclosed in the VSO (VITA Standards Organization) meetings.³⁵ No word from ANSI (American National Standards Institute) about how to deal with these new proposed EU laws. Basically, this new initiative could overrule existing patent law and some standards developer's long-established policies.

Finally, there's CSRD (Corporate Sustainability Reporting Directive) effective in 2024. These are new ESG (environmental, social, governance) reporting laws for companies doing business in the EU. This places more administrative burdens and costs on companies and could drive the smaller companies out of the EU market.³⁶

Meanwhile, the EU fined Meta (Facebook) \$1.3 billion for violations of the GDPR in May.³⁷ Seems that Meta sent data on EU users to the U.S. for processing, and the EU fears that data is being shared with U.S. intelligence agencies. Meta transferred that data under the EU-US Privacy Shield agreement, adopted in 2016. But the EU Court of Justice declared the EU-US Privacy Shield law invalid in 2020. In 2022, the EU authorities claimed that they had a new data transfer law, TADPF (Trans-Atlantic Data Privacy Framework). In July, they announced adoption of a new EU-US Data Privacy Framework. This looks like a cluster of legal mousetraps. TikTok was fined \$367 million in September under GDPR, for their handling of children's data.

Looks like Meta got caught in the transition of all these new agreements and laws, and the EU's fears that U.S. intelligence agencies have access to data collected on their citizens. This is a huge legal Gordian knot that will be hard to untie, which seems to be the primary characteristic of all these laws. There are twenty-six internet companies that have been fined over \$2 billion for GDPR violations (as of the July report).³⁸ Look for a future list of companies fined for violations of the DMA, DSA, and the new EUUSDPF soon. Google is under a \$2.6 billion fine for EU antitrust violations. In September, the EU fined Intel \$400 million for antitrust violations.

"This is a huge legal Gordian knot that will be hard to untie, which seems to be the primary characteristic of all these laws."

Step back and look at EU economic metrics. Then, look at the decline of the worldwide auto industry. Imagine what the Internet, technology, AI, and robotics can do to other old industrial-age industries. The EU does not have big tech

33 Aaron Mok, "AI chatbots were tasked to run a tech company. They built software in under 7 minutes — for less than \$1.", Business Insider, September 11, 2023, <https://www.businessinsider.com/ai-builds-software-under-7-minutes-less-than-dollar-study-2023-9>

34 Kurt Zindulka, "'Future Is Digital' — EU Chief Calls for Global Digital IDs and New U.N. Body to Govern Artificial Intelligence", Breitbart, September 10, 2023, <https://www.breitbart.com/europe/2023/09/10/future-is-digital-eu-chief-calls-for-global-digital-ids-and-new-u-n-body-to-govern-artificial-intelligencefuture-is-digital-eu-chief-calls-for-vax-pass-style-ids-and-u-n-global-body-to-govern/>

35 Patrick Moorhead, "EU Draft Regulations Are A Nightmare For Intellectual Property—And Innovation", Forbes, June 12, 2023, <https://www.forbes.com/sites/patrickmoorhead/2023/06/12/eu-draft-regulations-are-a-nightmare-for-intellectual-property-and-innovation/?sh=5622ec8c73aa>

36 Mike Viola, "ESG Laws in Europe Will Hurt American Businesses", The National Interest, October 9, 2023, <https://nationalinterest.org/blog/esg-laws-europe-will-hurt-american-businesses-206900>

37 Jessica Melugin, "Europe's Meta fine could limit the continent's access to social media giant Facebook", Washington Examiner, June 2, 2023, <https://www.washingtonexaminer.com/news/european-union-meta-fine-facebook-data-privacy-sharing>

38 Osman Husain, "51 Biggest GDPR Fines and Penalties So Far", Enzuzo, July 27, 2023, <https://www.enzuzo.com/blog/biggest-gdpr-fines>

companies with big R&D budgets like Meta (Facebook), Amazon, Netflix, Apple, Alphabet, Google, Microsoft, IBM, and others. They do not have venture capital going into technology development like the U.S.. They must protect their old industrial-age industries from disruption and massive unemployment, so their biggest export is new laws. And their biggest import will be the money from fines, for violating those laws. If you want to understand what is really happening here, read economist Joseph Schumpeter's book "*Capitalism, Socialism, and Democracy*" and understand his concept of "creative destruction," where innovation and new technologies destroy old industries and replace them with new ones.³⁹ This is a clash between EU governmental power and U.S. economic power. The U.S. culture is more legally reactive (using the courts) to manage the downside of innovation while the EU culture seems to be more legally preemptive (issuing a constant stream of new laws) to deal with the anticipated downside. In June, they announced their European Economic Security Strategy, so we will see how that plays out.⁴⁰

I have been picking on Europe here, but U.S. lawmakers are also going after the big tech companies too. In September, the U.S. Department of Justice and some state attorneys began Google's anti-trust trial in federal court. They claim that Google made deals with the owners of web browsers and the phone makers, to establish Google as the default search engine on their products. Consequently, Google illegally gained market dominance.⁴¹ Remember when Apple introduced the iPhone, and it would only be available on the AT&T network? There have been lots of questionable relationships between the internet companies, the telecom companies, the phone makers, and the entertainment industry for years and they all got away with it.... until now. And the FTC filed antitrust charges against Amazon in September.

Further, some lawyers have done a study showing that venture capital companies may be involved in a pump-and-dump scheme using predatory pricing. They use Uber, Lyft, WeWork, and Bird as examples. A start-up company with an idea is funded by venture money, it underprices competitors, it grows like crazy but loses lots of money. As the company becomes a unicorn with huge market share, it gets valued in the billions of dollars by Wall Street and the VC takes the company public. The VC sells their shares, gets a huge return on their investment, the unicorn continues to lose money like crazy, the stock price falls, and the new investors lose their money instead of the VC.⁴² Watch for the EU to issue a flurry of new laws concerning venture capital soon.

As a sidenote, a Canadian judge has ruled that sending a "thumbs-up emoji" constitutes agreement in an email or text and is as binding as a signature on a contract.⁴³ A farmer agreed to sell 86 tons of flax at \$13 per bushel and asked the buyer to send the contracts by email. When he received the contracts, he sent back a thumbs-up emoji to the sender, to acknowledge receipt. After reading the contract, the farmer decided not to sell. The buyer took him to court, and the judge ruled that a thumbs-up emoji was as good as a signature on the contract and the farmer must sell the flax to the buyer under the original terms. So, a thumbs-up emoji is now the equivalent of your signature. You are now warned.

Meanwhile, The European Space Agency has proposed that the moon needs its own time zone.⁴⁴ A day on the moon is 29.5 earth-days long since the moon only rotates once in that period due to tidal lock. And clocks on the moon run faster than earth-clocks. Today, countries that put people or rovers on the moon use their own time zones and earth-clocks for the missions (earth-moon time synchronization). I can only surmise that the EU owns the essential patents, and they are rapidly converting some of their declining auto manufacturing plants into moon-clock factories. This

39 David Adler, "*Schumpeter's Theory of Creative Destruction*", Carnegie Mellon University, September 30, 2019, <https://www.cmu.edu/epp/irle/irle-blog-pages/schumpeters-theory-of-creative-destruction.html>

40 Valbona Zeneli and Joseph Vann, "*The Promise of the EU's New Economic Compass*", The National Interest, September 24, 2023, <https://nationalinterest.org/feature/promise-eu-s-new-economic-compass-206819>

41 Christopher Hutton, "*DOJ and Google clash in federal court: This is a monopolist flexing*", Washington Examiner, September 12, 2023, <https://www.washingtonexaminer.com/policy/technology/doj-and-google-clash-in-federal-court>

42 Adam Rogers, "*The dirty little secret that could bring down Big Tech*", Business Insider, July 18, 2023, <https://www.businessinsider.com/venture-capital-big-tech-antitrust-predatory-pricing-uber-wework-bird-2023-7>

43 Lawrence Bonk, "*Canadian judge rules the thumbs up emoji counts as a contract agreement*", Engadget, July 7, 2023, <https://www.engadget.com/canadian-judge-rules-the-thumbs-up-emoji-counts-as-a-contract-agreement-190026176.html>

44 Denise Chow, "*Should the moon have its own time zone?*", NBC News, February 27, 2023, <https://www.nbcnews.com/science/space/moon-time-zone-rcna72459>

would be consistent with their history of timepiece innovation since they invented the cuckoo clock in Germany back in 1629. And do not forget the Swiss watches (Rolex, Cartier, Patek Philippe, Omega, etc.).

Back in August, an intelligence official revealed to Congress that the U.S. government has been conducting a UFO recovery and reverse engineering program for decades.⁴⁵ He gave the locations of the recovered UFOs and their extraterrestrial pilot's bodies to the inspector general of the intelligence community. On September 14, NASA released their UFO report.⁴⁶ They claim that UFOs are just misunderstood natural phenomena and that extraterrestrial space aliens do not exist. Shortly after the report was released, UFO researchers showed members of the Mexican Congress the bodies of two dead extraterrestrial space aliens.⁴⁷

However, space aliens are the least of our worries. There are four fundamental forces in physics: the weak nuclear force, the strong nuclear force, the electromagnetic force, and gravity. Gravity is the weakest force and has puzzled physicists for decades. In 1998, a theory was proposed that earth's gravity is actually leaking into a fourth spatial dimension rapidly, and that is what makes it weak.⁴⁸ So, forget about global warming, the collapse of major industries and their business models, and the hoard of new EU technology laws. As this interdimensional gravity leak progresses, we will all float off this planet.

Military

Since my last report, there have been two major reports released on the military markets. First, SIPRI (Stockholm International Peace Research Institute) released their report on worldwide 2022 military arms production and arms transfers.⁴⁹ Secondly, Defense News released the top 100 defense companies list (based on 2022 numbers).⁵⁰ If you are even remotely connected to the defense industry, you should study both reports in detail.

These two reports might give you a macro view, but we need a more micro-focused perspective to understand our markets. I have written two articles on the MIL markets, based on the worldwide demand for combat platforms. The first article covers the worldwide market for ground combat vehicles and tanks.⁵¹ The second article covers the worldwide market for fighter planes and bombers.⁵² The next articles in this series will cover the worldwide markets for naval warships, unmanned aerial vehicles (UAVs), naval unmanned surface vehicles (USVs), naval unmanned underwater vehicles (UUVs), and military satellites. Finally, I will look at the military budgets of all the major countries. Since the first of this year, I have discovered over forty new market research reports released, concerning the different segments of the military markets and the platforms. Those will be integrated into the articles mentioned above.

Starting at the top, world military spending will grow at 4.9% through 2028 according to reports.⁵³ Breaking that down, we can see that any war in Europe will be primarily an air-ground war. EU countries will be buying fighter planes, tanks, and ground combat vehicles (GCV). About 67% of EU GDP comes from five countries (Germany, France, Italy,

45 Marik von Rennenkampff, "A monumental UFO scandal is looming", The Hill, August 4, 2023, <https://thehill.com/opinion/technology/4134891-a-monumental-ufo-scandal-is-looming/>

46 NASA, "NASA Shares UAP Independent Study Report; Names Director", September 14, 2023, <https://www.nasa.gov/news-release/update-nasa-shares-uap-independent-study-report-names-director/>

47 Isabel Keane, "UFO expert displays supposed 'non-human' alien corpses in Mexico's Congress: 'We are not alone'", New York Post, September 13, 2023, <https://nypost.com/2023/09/13/supposed-non-human-alien-corpse-shown-in-mexico-congress/>

48 Ethan Siegel, "Ask Ethan: Could gravity operate in extra dimensions?" Big Think, September 8, 2023, <https://bigthink.com/starts-with-a-bang/gravity-extra-dimensions/>

49 SIPRI, "Arms and military expenditure", <https://www.sipri.org/research/armament-and-disarmament/arms-and-military-expenditure>

50 Defense News, "Top 100 Defense Companies", <https://people.defensenews.com/top-100/>

51 Ray Alderman, "The worldwide market for military ground combat vehicles and tanks", Military Embedded Systems, June 29, 2023, <https://militaryembedded.com/comms/vetronics/the-worldwide-market-for-military-ground-combat-vehicles-and-tanks#:~:text=The%20market%20for%20ground%20combat,to%20some%20market%20research%20reports>

52 Ray Alderman, "The global market for fighter planes and bombers", Military Embedded Systems, August 30, 2023, <https://militaryembedded.com/avionics/computers/the-global-market-for-fighter-planes-and-bombers>

53 Dan Taylor, "Global defense budgets to exceed \$2.5 trillion by 2028: report", Military Embedded Systems, July 6, 2023, <https://militaryembedded.com/avionics/computers/global-defense-budgets-to-exceed-25-trillion-by-2028-report>

Spain, and Netherlands). They will be the major platform buyers (other than the UK) since they have the economies to support major purchases. There are 9 EU countries buying F-35 fighter planes today. I am guessing that Luxembourg, with 0.49% of EU GDP, will not be buying many F-35's for \$80 million each. Their economy might let them buy one tank and two GCVs. Germany and France started the MGCS (Main Ground Combat System) Euro-tank project back in 2017. After 6 years, they do not have a prototype yet and the smaller EU countries are still waiting.

A war in the Pacific will be primarily an air-sea war. The major weapons buyers in this area will be Australia, Japan, South Korea, Indonesia, and Taiwan. They will be buying fighter planes and war ships. Australia, Japan, and South Korea are buying F-35 fighters today. Other counties, which feel threatened, will be smaller buyers of aircraft and ships (Vietnam, Philippines, Thailand, and Malaysia). Most of the smaller countries will be buying coastal patrol boats instead of destroyers, and many of them have adequate shipbuilding facilities for these craft. For instance, Taiwan just built their first homegrown submarine.⁵⁴

For the small countries defending very shallow waters around their country with small navies, they can buy 3-man polyethylene kayaks with grenade launchers mounted on the bow for \$2,500.⁵⁵ If they have a small air force, they can buy cardboard surveillance and attack drones for a few thousand dollars each.⁵⁶ No matter how big or how small a country may be, there is a weapons system that will fit within their budget. It is pretty clear that developed nations will buy big advanced-technology platforms and weapons while the smaller nations will buy smaller primitive platforms and weapons.



Two unidentified Ukrainian soldiers test the Poloz-M16 combat kayak.
Courtesy of Adamant Verf

Looking at the volumes of the military platforms is interesting to metal-bender military contractors, but to us, it is the electronics inside that holds our attention. Back in 2006, Lockheed-Martin said that 31% of the original cost of the F-35 fighter plane was in the electronics onboard. According to MarketsandMarkets (a research firm), the global market for military electronics will grow from \$220 billion in 2023 to \$289 billion by 2028, a CAGR of 5.6%.⁵⁷ This includes communications, radar, electronic warfare, ISR (intelligence, surveillance, and reconnaissance) sensors, and weapons fire control systems.

There are other MIL market reports that break this segment down in more detail. For instance, Research Dive (another market research company) says the military embedded systems market will grow to \$3.26 billion by 2031 with a CAGR of 7.9%.⁵⁸ It will cost you about \$250,000 to buy all the reports since the market research companies have subdivided the MIL markets into smaller and more obscure segments. However, you can get a general idea about the markets by just reading the executive summaries of the reports online.

Now, let us talk about artificial intelligence. According to a recent report from Exploding Topics, there are 58,000 AI companies in existence. About 25% of those (14,700) are in the US.⁵⁹ According to MarketsandMarkets (a market

54 Mike Yeo, "Taiwan launches its first homemade submarine", Defense News, September 29, 2023,

<https://www.defensenews.com/global/asia-pacific/2023/09/29/taiwan-launches-its-first-homemade-submarine/>

55 Yulia Drozd, "It's a kayak with a grenade launcher. And it could be game-changer in Ukraine.", ABC News, September 22, 2023,

<https://abcnews.go.com/International/ukrainian-special-forces-combat-kayaks-fight-russian-army/story?id=103411391>

56 Vivian Lam, "Ukraine war: Australian-made cardboard drones used to attack Russian airfield show how innovation is key to modern warfare", The Conversation, August 31, 2023, <https://theconversation.com/ukraine-war-australian-made-cardboard-drones-used-to-attack-russian-airfield-show-how-innovation-is-key-to-modern-warfare-212629>

57 Lisa Daigle, "Defense electronics market to reach \$289 billion by 2028, study predicts", Military Embedded Systems, April 26, 2023,

<https://militaryembedded.com/radar-ew/power-electronics/defense-electronics-market-to-reach-289-billion-by-2028-study-predicts>

58 Lisa Daigle, "Embedded systems for military use will rise 7.9% per year by 2031, report predicts", Military Embedded

Systems, February 24, 2023, <https://militaryembedded.com/company/research-dive>

59 Fabio Duarte, "How Many AI Companies Are There?", Exploding Topics, July 10, 2023, <https://explodingtopics.com/blog/number-ai-companies#:~:text=According%20to%20the%20latest%20available,based%20in%20the%20United%20States>

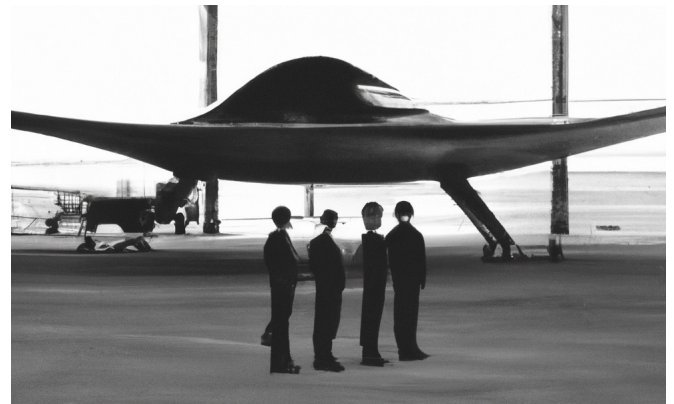
research firm), the AI market in 2023 was \$150.2 billion and will grow to \$1.3 trillion by 2030, a CAGR of 36.8%.⁶⁰ The Government Accountability Office report in 2021 said that the Pentagon has over 685 AI projects underway. Some of those are for administrative data management systems, not for weapons systems and sensors, so we have to sort those out by platform. There are AI projects for autonomous aircraft, EW (electronic warfare), radar, jam-proof communications, optical targeting systems for weapons, and other ISR systems

That brings up another interesting topic: enemy spoofing of our advanced ISR sensors. Back in 1998, during the Kosovo War, the Serbs rigged \$75 microwave ovens to operate with their doors open, plugged them into AC outlets, and ran like crazy. Shortly afterwards, a \$300,000 NATO-fired HARM (high-speed anti-radiation) missile would hit the microwave, thinking it was an enemy radar system.⁶¹

In the Ukraine War, Russian soldiers put old tires on the wings and fuselage of their attack aircraft and bombers sitting on the ground, to break-up their outline and fool the optical sensors on Ukrainian attack drones.⁶² Now the Russians are painting the silhouettes of their aircraft on the tarmac of remote airfields, to fool Ukrainian optical sensors into attacking them.⁶³ The Russians have been using inflatable tanks as decoys, and they are making mock-ups of artillery pieces out of plumbing pipe to make Ukraine waste their missiles and munitions.⁶⁴ Obviously, the sensors and AI software in the weapons are looking for a specific outline of an enemy weapon. To overcome this tactic, future weapons need to use multispectral sensors (optical, radar, infrared) together, to eliminate firing expensive weapons at enemy decoys. But you cannot cram all those sensors, software, and computers inside a small kamikaze drone for a few thousand dollars.

That brings up the biggest platform project at the Pentagon: "Replicator." The goal of this project is to create thousands of small weaponized drones and be able to attack 1,000 targets in 24 hours.⁶⁵ At a cost of a few thousand dollars each, it does not matter if a few of them hit inflatable tanks or microwave oven decoys. To give you an idea of the potential volumes, Teledyne Flir has already shipped 14,000 PRS (Personal Reconnaissance Systems) micro-drones for use by soldiers on the ground.⁶⁶ It is not that far-fetched to say that we will probably see millions of these drones built and deployed in the future.

The F-35 is a fifth generation (5G) fighter plane, the best in the world. 6G fighter planes are in development by the U.S. Air Force (NGAD) and the U.S. Navy (F/A-XX). Europe (with FCAS and GCAP), Turkey and Azerbaijan (with KAAN), India (with AMCA), and South Korea (with KF-21) are all designing 6G fighters. Want to see some 7G and 8G fighter planes?⁶⁷ These images have been created by AI algorithms, and the planes are starting to look like flying saucers. By the time



The 'TOP SECRET AIRCRAFT AT AREA 51'
DALL-E 2'S generative AI created

60 Lisa Daigle, "AI market to grow at CAGR of 36.8% to 2030, according to market study", Military Embedded Systems, August 17, 2023, <https://militaryembedded.com/ai/machine-learning/ai-market-to-grow-at-cagr-of-368-to-2030-according-to-market-study>

61 William Dorich, "Crisis in Kosovo", Toward Freedom, May 27, 2005, <https://towardfreedom.org/story/archives/europe/crisis-in-kosovo-1299/>

62 Thomas Newdick, "Russia Is Using Tires To Protect Its Bombers From Aerial Attack", The Warzone, September 4, 2023, <https://www.thedrive.com/the-war-zone/russia-really-is-using-tires-to-protect-its-bombers-from-attack>

63 Stetson Payne, "Tu-95 Decoys Are Being Painted On Russian Air Base's Apron", The Warzone, September 30, 2023, <https://www.thedrive.com/the-war-zone/tu-95-decoys-are-being-painted-on-russian-air-bases-apron>

64 Chris Panella, "Drone video appears to show inflatable Russian tanks on the battlefield, highlighting the role decoys and deception are playing in the war", Business Insider, September 25, 2023, <https://www.businessinsider.com/ukrainian-drone-video-captures-field-full-of-inflatable-russian-tanks-2023-9>

65 Patrick Tucker, "'Hellscape': DOD launches massive drone swarm program to counter China", Defense One, August 28, 2023, <https://www.defenseone.com/technology/2023/08/hellscape-dod-launches-massive-drone-swarm-program-counter-china/389797/>

66 Dan Taylor, "1,000 nano-drones to be sent to Ukraine from Teledyne FLIR", Military Embedded Systems, July 18, 2023, <https://militaryembedded.com/unmanned/isr/nano-drones-to-be-sent-to-ukraine-from-teledyne-flir>

67 Alex Hollings, "We asked AI to show us the secret aircraft hidden in Area 51", Sandboxx, August 15, 2023, <https://www.sandboxx.us/news/we-asked-ai-to-show-us-the-secret-aircraft-hidden-in-area-51/>

the 6G fighter planes come into service, they will be obsolete compared to the 7G and 8G fighters being explored by AI algorithms.

After years of service, the U.S. Navy is about to replace their AEGIS combat system on surface ships with a new system: ICS (Integrated Combat System).⁶⁸ Presently, AEGIS is installed on destroyers, cruisers, and LCS boats, but amphibious ships and aircraft carriers use a different system. ICS will be smaller, more powerful, and be installed on all Navy surface ships as a common system if it all works out. Also, ICS could be installed on U.S. Coast Guard vessels and replace the AEGIS Ashore systems already installed in Rumania and Poland for missile defense. But, don't get too excited about this, considering the Navy's past history (the Tailhook scandal, the Fat Leonard scandal, the LCS boat failures, the Zumwalt destroyer failure, the Ford carrier elevator and electro-magnetic launch failures, Navy ships banging into other ships regularly, Navy subs running into underwater mountains, huge leaking fuel tank issues in Hawaii, ships catching on fire regularly, a lack of leadership at the top, etc.). I hope ICS can break their trend on previous projects.

There is lots of other stuff going on in the military markets, but I do not have the space to put it all down here. I will try to sort it out and put it in future articles. Just understand that there is a plethora of programs and projects underway at the Pentagon and across the services that we know about. But we have no idea about all the secret classified programs being conducted. As for the MIL market research reports referenced, I think many of them may overstate the growth rates and dollar amounts. This market depends on the defense allocations by the country governments. And as you saw in the Economic Conditions segment, world GDP is falling, and inflation is still high (especially in Europe). That will be a drag on worldwide military spending unless Russia and Belarus invade Poland, Latvia, Estonia, Lithuania, Moldova or Romania, or if China gets froggy with Japan, the Philippines, Taiwan, or Vietnam. If things blow up between the Serbs and the Albanians in Kosovo (which is starting again now), the demand for cheap microwave ovens and expensive HARM missiles will go up substantially. And then, there is the Israel-Hamas war....

Mergers and Acquisitions

High interest rates put a damper on mergers and acquisitions, other than the ones that were previously being negotiated. We did see ARM go public in September, at a valuation of \$68 billion. And we are starting to see the military prime contractors buying smaller autonomous platform manufacturers. As an example, BAE Systems bought Riptide, a maker of unmanned underwater vehicles. The next area for acquisitions in the defense industry is probably the smaller artificial intelligence companies. We are starting to see money flowing back into tech IPO's and acquisitions now.⁶⁹

In our corner of the universe we saw the following acquisitions in the past months.

- ❑ *Concurrent Technologies bought Phillips Aerospace in September to gain a U.S. footprint.*⁷⁰
- ❑ *Emerson finalized their purchase of National Instruments (NI), a test and measurement company.*⁷¹
- ❑ *Kontron announced the acquisition of Hartmann and W-IE-NE-R, a group of rugged computing systems manufacturers based in Germany and the United States.*⁷²
- ❑ *AMETEK, announced the acquisition of United Electronic Industries (UEI), a provider of data acquisition and control solutions for the aerospace, defense, energy and semiconductor industries.*⁷³

68 Megan Eckstein, "Lockheed wins \$1.1B contract to design Navy's Integrated Combat System", Defense News, September 29, 2023, <https://www.defensenews.com/battlefield-tech/it-networks/2023/09/29/lockheed-wins-11b-contract-to-design-navys-integrated-combat-system/>

69 Jeremy C. Owens, "Tech money is finally flowing again, and it may be just the beginning", MarketWatch, September 22, 2023, <https://www.marketwatch.com/story/tech-money-is-finally-flowing-again-and-it-may-be-just-the-beginning-24d1a61c?mod=home-page>

70 Lisa Daigle, "Concurrent Technologies acquires Phillips Aerospace", Military Embedded Systems, September 6, 2023, <https://militaryembedded.com/radar-ew/rugged-computing/concurrent-technologies-acquires-phillips-aerospace>

71 John McHale, "Emerson completes acquisition of NI", Military Embedded Systems, October 11, 2023, <https://militaryembedded.com/radar-ew/test/emerson-completes-acquisition-of-ni>

72 Kontron, "Kontron acquires Hartmann and W-IE-NE-R", August 28, 2023, <https://www.kontron.com/en/news/m-a---kontron-acquires-hartmann-and-w-ie-ne-r/n181508>

73 AMETEK, "AMETEK Acquires United Electronic Industries", September 6, 2023, <https://www.ametek.com/newsroom/news/investor/2023/september/ametech-acquires-united-electronic-industries>

Summary

Economic conditions look more uncertain going forward.⁷⁴ Europe and China are the countries with the biggest problems. The U.S. is muddling along. As Warren Buffet once said, "Only when the tide goes out do you learn who has been swimming naked." High interest rates, to slow economic activity and fight inflation, are definitely making the tide go out.

Economist Joseph Schumpeter (in his book, "Capitalism, Socialism, and Democracy") said that inflation is a powerful factor in social unrest that accelerates political and societal change. He outlined the three mechanisms that governments can use to get inflation under control:

1. *Raise interest rates, to reduce economic activity. The U.S. has raised rates to about 5.5%. The EU has raised rates to 4%. China has reduced rates to 3.45%, to increase their economic activity (China has a distinct set of problems).*
2. *Raise taxes on consumption, to reduce consumer and business spending (a large sales tax). In the US, sales taxes are mostly below 10%. In the EU, the VAT (value-added tax) ranges from 27% in Hungary to 16% in Luxembourg (an average of 21% across the EU countries).⁷⁵ Schumpeter says that raising income taxes on the wealthy and corporations is ineffective in reducing inflation. You must increase taxes on the largest group, the working class. Europe already does that, with income tax rates ranging from over 55% (in Denmark, France, and Austria) to 15% (in Hungary).⁷⁶*
3. *Institute government negotiated or mandated price controls on specific goods and services. Germany did that to gas and electricity prices in 2022.⁷⁷ France did it to food prices earlier this year.⁷⁸ The UK did it to energy prices in 2022.⁷⁹*

Now, let me add a fourth mechanism from my reading in economics:

4. *Nationalize companies in specific market and product segments. Germany and Poland took over natural gas companies in their country in 2022.⁸⁰ There is a proposal in the UK to nationalize their energy industry and railroads.⁸¹ France is nationalizing a nuclear power company (EDF, or Electricite de France).⁸²*

As you can see, some EU countries have pulled all four levers to get inflation under control. The U.S. is only pulling one lever (interest rates), and the Fed may move that lever another notch (to about 5.75%) in the future. As the EV disaster continues, we may see certain countries nationalize their auto industry (especially in Germany).

Artificial Intelligence has much more influence over our future than anything else being hyped-up these days. Even Vladimir Putin said (in 2017) that the country that leads in AI will be the ruler of the world. So far, AI has been directly attacking the entertainment industry (artists, musicians, writers, and actors). But that is just the beginning of the markets that AI will disrupt.

⁷⁴ Desmond Lachman, "The U.S. Economy Is Headed for a 'Hard Landing'", The National Interest, October 6, 2023, <https://nationalinterest.org/feature/us-economy-headed-hard-landing-206889>

⁷⁵ Cristina Enache, "2023 VAT Rates in Europe", Tax Foundation, January 31, 2023, <https://taxfoundation.org/data/all/eu/value-added-tax-2023-vat-rates-europe/>

⁷⁶ Cristina Enache, "Top Personal Income Tax Rates in Europe", Tax Foundation, February 28, 2023, <https://taxfoundation.org/data/all/eu/top-personal-income-tax-rates-europe-2023/>

⁷⁷ Jack McGovan, "Germany's energy price caps prove too cumbersome to effectively reduce costs for companies", Clean Energy Wire, August 22, 2023, <https://www.cleanenergywire.org/news/germanys-energy-price-caps-prove-too-cumbersome-effectively-reduce-costs-companies-report>

⁷⁸ Ellen O'Dwyer, "How France's supermarket price controls work, and whether the UK could copy them", I News, July 3, 2023, <https://inews.co.uk/news/how-france-supermarket-price-controls-work-uk-copy-2450041>

⁷⁹ Paul Sandle, "UK eases pressure on business by halving energy bills this winter", Reuters, September 21, 2023, <https://www.reuters.com/business/energy/britain-caps-electricity-gas-prices-businesses-2022-09-21/>

⁸⁰ "Germany, Poland take over natural gas firms tied to Russia", AP News, November 14, 2022, [https://apnews.com/article/europe-business-germany-economy-energy-industry-9b46b2333c10a074bddf652cc1a7a38a#:~:text=BERLIN%20\(AP\)%20-%20Germany%20and,to%20the%20war%20in%20Ukraine](https://apnews.com/article/europe-business-germany-economy-energy-industry-9b46b2333c10a074bddf652cc1a7a38a#:~:text=BERLIN%20(AP)%20-%20Germany%20and,to%20the%20war%20in%20Ukraine)

⁸¹ Sam Francis and Iain Watson, "Labour conference votes to nationalise energy", BBC News, <https://www.bbc.com/news/uk-politics-67056005>

⁸² Benjamin Mallet and Leigh Thomas, "France starts process to fully nationalise power group EDF", Reuters, October 4, 2022, <https://www.reuters.com/business/energy/france-keeps-edf-buyout-offer-12-euros-per-share-filing-2022-10-04/>

However, the Russia-Ukraine war, the Israel-Hamas war, the China-Taiwan tensions, the Serb-Albanian tensions, the North Korea-South Korea tensions, the Pakistan-India tensions, and the Iran-vs-everybody tensions could make things worse, depending on what happens. One thing seems to be certain: world military spending on combat platforms and weapons will grow. As Thomas Jefferson once said, "Peace is that brief glorious moment in history when everybody stands around reloading."

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