Response to AI Action Plan, US Leadership

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About Permion

Permion Inc. has developed technology that supports a novel neurosymbolic AI processor enabling competitive foundational AI models, integrating parallel, distributed, Agentic, neural, and logical capabilities. The company offers a full-stack approach to AI, coding analyzers, coding tools, and industry-standard compliance to popular developer environments as well as ISO Standards (ISO 24707) Common Logic. Our flagship product, the XVM™ (X-Machines Virtual Machine), also offers lower size, weight and power, higher efficiency options for advanced AI application development. We have built an application to illustrate the use of XVM™ as the Digital Subject Matter Expert (DSME™) tool for business intelligence analysis. The company plans to create AI chips in the future, based on the design of its neurosymbolic AI Instructure Set Architecture (ISA). More about Permion is at https://permion.ai/

Dr John F., Sowa and Arun K. Majumdar have collaborated for over two decades, developed technologies and standards for the AI community, and published in multiple peer-reviewed journals. Our view for AI at human level cognitive processing is a statement that there is a need *"for an internal virtual reality as the foundation for the perception, action, and cognition of an embodied mind"* quoted from the paper by Sowa "The Virtual Reality of the Mind"[1].

Response

Permion Inc. appreciates the opportunity to contribute to the public discourse for the Office of Science and Technology Policy to provide input to the AI Action Plan and to empower the supremacy of US Leadership in

[1] https://www.jfsowa.com/pubs/vrmind.pdf

AI technological superiority. **We recommend that the AI frontier address these key foundations: Knowledge Representation, the use of Quantum approaches, and formalized engineering methods adapted for use in guaranteeing trustworthy, verifiable, certifiable, AI processing and AI models**. For a view on the quantum perspective, the paper by Majumdar and Sowa[2] combines general probabilistic model (of Quantum Theory) with formal logical knowledge representation (Conceptual Graphs, ISO 24707) embedding formal methods within error bounds of confidence within cognitive models. ChatGPT and Large Language Models (LLM) are auto-regressive probabilistic models and require policies to support the use and reference of ontology and knowledge representation to codify the informational physics, causality capabilities, provability in inference, of AI models and processes to address the ability to solve constraints and problems of planning and logistics. The point is emphasized by Sowa in a popular YouTube video[3].

We recommend the AI Action Plan expand on leveraging not only an AI talent network but also related multidisciplinary communities in advanced mathematics, logic, expertise in ISO standards, NIST, and encourage practitioners in physics, both the hard and soft engineering disciplines, to work with AI. In our viewpoint, we recommend that our contributions towards policies be further carefully calibrated and targeted, effectively aligning multiple communities, and assure the protections of the various communities and their interests as they advance the proposition for America to serve as a frontier leader in AI.

Based on the topics identified in the RFI, we provide responses below in Table-1 to address the elements. Following this response, we offer seven recommendations that we see as cross-cutting to the big picture of American leadership in AI technological superiority, following and appended as Table-2 and Table-3.

Table-1: Permion Inc. Response Categories	
Hardware and chips	AI workloads require radical re-design by policies that incentivize technological superiority over business scaling drivers.
Data centers	Policies to empower AI supply innovation for AI task-specific data centers that drive optimized value-chains to contribute to an AI ecosystems policy over commoditized limited centralized capabilities
Energy consumption and efficiency	AI requires size, weight and power (SWaP) policies. We recommend a metric of AI model size and power relative to information theoretic, e.g.,, such as entropy coupling metrics (between answers and reference data).
Model development	Models require policies that enforce proof-of-integrity, compliance to measures of security, resilience, and capabilities to incentivize adoption. Generative AI like all probabilistic models must have criteria for evaluating the precision of outputs and results within designated error bounds for task specific problem solving.
Open-source development,	AI in the open-source community requires policies to define and

[2] https://ieeexplore.ieee.org/document/6927518 **Quantum Cognition**
[3] https://www.youtube.com/watch?v=t7wZbbISdyA - **Without Ontology, LLMs are clueless**

application, and use (either in the private sector or by government)	create support frameworks that can curate, validate and authenticate provenance of data sources while mitigating the risk of disinformation or fake data.
Explainability and assurance of AI model outputs	**We recommend standard publication methods for producing measurable, repeatable, reproducible, results on** the confidence of both explanations as well as measurable assurance of AI through community developed standards and peer-reviews.
Cybersecurity	Counter-AI is a significant new domain of cybersecurity concerns as AI operations on human-AI interactions, AI on AI interactions, and AI on data or machine processes as well as AI in the loop of conventional offensive/defensive cyber are largely absent in all current policy, regulatory or compliance strategies.
Data privacy and security throughout the lifecycle of AI system development and deployment (to include security against AI model attacks)	A national level effort to utilize emerging tools and consensus based approaches with metrics and measurements, with confidence, confidentiality, and integrity is needed – for example, leveraging Blockchain technology to support AI, leveraging behavior profiling to support AI model integrity, leveraging the concepts, techniques, tactics and procedures of companies like Rapidfort (Ironbank) or Chainguard or others in providing model and data risk reduction sources versus honor-system based approaches (such as "model cards" used by an unpoliced community for model descriptors).
Risks, regulation, and governance	**We recommend the NIST recommendations for Zero-Trust Frameworks applied to AI** and approaches especially relevant to AI systems. The nexus of AI tools and techniques occurs in the embodiments such as advanced Robotics, UAS or Counter-UAS, intelligence and defense. This has been largely driven by reliance on vendor-defined bespoke metrics that have no attachment or derivations from reference methodology or best-practices – other than trust in an honorable vendor. The issues of risks, regulation and governance requires a policy to support the creation as well as the enforcement of use of, for example, ISO Standards, such ISO 24707 (Common Logic) for interchange compliance and many more standards development efforts by the expert communities. AI systems are largely unbounded by any hard real-time or responsiveness standards and this mitigates their use, trustworthiness, and reliability in, for example, combat systems.
Technical and safety standards	**We recommend a new US AI government organization be created** in concert with DoD and the Intelligence Community, FFRDCs, National Labs, NIST and DHS to bring the AI best-practices into consensus on where safety and technical standards are truly meaningful: weapons, health, banking, smart-cities, vehicles, IoT and other mission-critical industries.
National security and defense	**We recommend a National Security and Defense caution to addres the role of AI in Counter-AI,** with respect to Great Power Competition, with respect to force-multiplication and irregular warfare. We shall not commit our understanding into the public record at this time but

	can do so within appropriate secure environments of discourse.
Research and development	There is prevailing tendency to craft or engineer requirements to stimulate research and development based on certain commercial events. However, there is a large gap in stimulating moonshot innovation in the research itself, as well as adoption of agility enhancing tools that may be outside of the mainstream. The key impediment is the nature of policies that influence investor decision making. Timelines of investment for serious advancements require policies that incentivize domestic industrial base and infrastructure efforts in technology over the abundance of investment in business scaling which is driven by commodity markets, cost-minimizing pursuits which leads to outsourcing and other behaviors that shift the value chain of deep investment to adversarial and foreign competitors. Research and development requires the long-game policy support that extends beyond any one presidency.
Education and workforce	**We recommend AI enabled workforce development, AI supported education practices** with teachers for AI itself to which policies of compliance around measurably secure, measurable truth (versus deception) will become factors in both training and distinguishing the use of AI as appropriate in education. AI may need to be treated as an "adult" tool and not necessarily one that is used as crutch by students to cheat their way through home-work. AI as a support to teachers should clearly be supported by policy to force-multiply teacher-student effectiveness and personalization of educational throughput
Innovation and competition	**We recommend adding policies and measures to protect American companies from predation and espionage** or exposure of critical AI technologies while recognizing that innovation in new AI software or infrastructure or chips is very high-risk and competition that originates from within the country is an inherently healthy activity, but critical also is to recognize theft from outside the country as a predatory and as an unhealthy activity that can compromise much more than just the survivability of any one specific company. Therefore, measures of "creativeness" and "innovativeness" and measures of "originality" as well as measures of "Technology Readiness Level" (TRL as defined by NASA) must be used to identify the hidden gems of American innovations that need to be protected or supported. It is far too easy for an adversary to circumvent CIFIUS or FOCI issues and any company that has a critical AI technology can be targeted by "disinformation" agents of foreign regimes to "poison" the well of investor pools. There are several examples of companies that have been removed from the American market and that are now part of, for example, Chinese technology assets.
Intellectual property	**We recommend policy to support the protection of American sourced Intellectual Property** which is currently wholly absent in the Patent system. AI is the key differentiating technology in the

	projection of national power and the individual as well as corporate innovators need to file patents within the American legal apparatus that recognizes the need to avoid publications of sources and methods to the open world community. By endorsing policies and regulations to transform the current climate of Intellectual Property (IP) rights and management of AI specific technologies, to support a national registry of trade-secrecy as an America only protected IP base, the apparatus of the USPTO may be extended to recognize the role of AI both from commercial actors developing within the country as well as the DoD/IC focused actors.
Procurement, international collaboration, and export controls	**We recommend A systematic and focused effort on the production of business intelligence to serve as an American national treasure** needs at the very least supporting policies for supply chain creation and management, perhaps with the Small Business Administration. The supply chain becomes the root cause in the matter for any procurement effort, or international collaboration as well as to understand the need for where and what kind of export controls are needed. An AI and related-technologies capability based supply chain, unification of connected supply chains with the domestic base as well as the indirect dependence on foreign individuals, or foreign control or foreign assets could be supported by policies to incentivize company procedures for reporting into a structured process. We can think of this as analogous to a national library of assets that could be leveraged for value chains based on the supply chain.

Permion Recommendations for the AI Action Plan

Permion envisions the result of the AI Action Plan as **AI Technological superiority of America as the frontier leader.** We define AI Technological superiority as the quality of operations generated by the human and AI tools and techniques used to conduct them, to deliver **extreme mission agility**. This is about an organization's capacity to anticipate critical outcomes in a complex competitive environment and take action to maintain advantage. Operating with mission agility means that any competitor is enduringly overmatched, and the organizations core culture, values, and stakeholder benefits are maintained. In a military context this means continuously outwitting, out-thinking, out-maneuvering, and out-pacing any adversary in all domains. We provide 7 key strategic elements that have several aspects.

Recommendation #1 – AI Action Plan Requirements Matrix

We recommend several key AI focused areas for an AI Action Plan to deliver American technological superiority to enable **mission agility** and to achieve **overmatch**. Table 2 below presents requirements for such an AI Action Plan.

Table-2: AI Action Plan Requirements Matrix		
What Do We Need?	**What Does It Do for the AI Action Plan?**	**Technology Solution Ideas**
1. Communications	• Offers limitless possibility for creating	• Post-quantum resilient

Integrity and Dominance Dynamically composable trusted information connections between certifiably friendly entities, robust to adversarial action.	AI power, effects webs at the tactical, operational, and campaign. • Implies inherent backwards compatibility and just-in-time custom creation of any needed connections that AI or human actors need. • Enables rapid, intelligent, strategic composition of diverse AI systems under adversity.	cryptology. • Zero-trust blockchain, enabled by AI, for secure data transfer within and between theaters. • AI Smart contracts for chain of custody of data, users, and endpoints. • AI-powered cyber networks to mitigate risk *at the edge* and offer offensive use.
2. Information & Decision Dominance Mastery of all available data, information, and knowledge to optimize available courses of action for mission impact and superiority.	• Clarity in the AI powered operational environment through advanced sensor processing – reduction in the "fog of war." • Eliminate AI hallucination, gain trust, explainability and sustainment. • Insight through real-time AI processing all incoming data streams with advanced AI methods and AI toolkits to generate new approaches.	• Capabilities based on modular open systems AI architectures and inherent capacity for rapidly composable applications. • Modern *cybernetic system-of-systems approach to AI* with *feedback* to drive sensing and decision making in human-AI teams. • Network and edge-centric embedded AI for hardware/software infrastructure.
3.Human Machine AR/VR Insight Preservation of mission-intent through timely, high-fidelity analysis in the chain of command, effects, and outcomes.	• Reduction in operator analytic load and enhancement of results by AI powering visual and cognitive relief. • Instantaneous integration of task specific AI Knowledge, Skills, Abilities (KSAs) and AI improvement in after-action reports/lessons learned into the operational AI refinement process.	• Augmented and Virtual reality technologies (AR/VR) integrate the AI with human-on-the-loop. • AI-enabled Brain sensing to enhance C4I. • Machine Learning from human expertise, powers the human with profound insight and foresight.
4. Asymmetric Computing Superior algorithms through quantum design thinking,	• The ability to assess past and present data and project through all plausible futures; achieved through systems that utilize quantum features: superposition, entanglement, and interference.	• Non-Von Neumann Computing, including Quantum computing, algorithm design, and emulation with AI/ML augmentation.

solving problems in complex, high-dimensional spaces with unmatched speed.	• Detecting weak signals hidden in noise and obscured by complexity, allowing for a new level of insight into the operational space. • Cross-domain insight at any scale and across differing types of effects networks offers new COAs for adversary competition, deterrence, or defeat.	• QIS-based representations for data / information / knowledge. • Programmer-friendly *QIS-Based Languages and Tools* for efficient, fast, capability development. • Graph computation and representation with integrated QIS-based techniques. • Algorithms to identify weak signals in data and lead to identification of novel COAs.
5. Anticipatory Operations Integrate past, present, and plausible future scenarios for optimal power projection.	• Anticipatory CONOPS: continuous AI scanning and inference, integration of lessons learned, draw out signal from noise and identify patterns of data in motion. Synthesize cohesive situational picture using AI across domains and as a sequence in time to project plausible futures for COA development.	• AI based Digital Twins • Quantum & Quantum Network/Graph Computing • Automatic ontology construction that integrates all the elements in the previous sections of this matrix.

Recommendation #2 – Reference the National Strategic Interests

We recommend using the key national strategic interests in the AI Action Plan that provides the key reference needs. We have consolidated these into table-2 below.

Table-3: References for National Strategic Interests		
TOP NEEDS	**SELECTED STATEMENTS**	**REFERENCES**
Mission Agility & **Anticipatory Operations** Only through hindsight (past), insight (present), foresight (future), topsight (past, present, future) that we can seek to understand and anticipate.	2018 National Security and Defense Security Strategies address the new character of warfare. The 2018 NSS states "...Majority of adversary efforts in Competition phase (short of armed conflict) ... (are) challenging our ability to deter aggression." It is in the cognitive realm we are losing the ideological war on multiple fronts, we are losing our intellectual property, our adversaries are outmaneuvering us, and we are failing to achieve overmatch because we focus solely on kinetic options.	https://nsiteam.com/future-military-intelligence-conops-and-st-investment-roadmap-2035-2050-the-cognitive-war/ https://nsiteam.com/social/wp-content/uploads/2019/04/Future-MI-CONOPS-and-ST-Roadmap-2035-

	Moving from Perpetually Reactive Posture to one of Proactive Influence and Predictive Analysis. **Anticipatory intelligence** involves collecting and analyzing information to identify new, emerging trends, changing conditions, and undervalued developments, which challenge long-standing assumptions and encourage new perspectives, as well as identify new opportunities and warn of threats to U.S. interests. Anticipatory intelligence usually leverages a cross-disciplinary approach, and often utilizes specialized tradecraft to identify emerging issues from "weak signals," cope with high degrees of uncertainty, and consider alternative futures.	2050_2-20-2019_FINAL.pdf https://www.dni.gov/files/ODNI/documents/National_Intelligence_Strategy_2019.pdf
Machine Learning/ **Artificial Intelligence;** **Graph Signal & Cyber Edge Processing**	*"We can send a UAS to look down alleys, around buildings, in backyards, or on a roof to see what's up there, dramatically increasing Soldier protection and preserving the force - a vital force multiplier in this era of persistent conflict "* - Major General James O. Barclay, III, Commanding General of the United States Army Aviation Center of Excellence (USAACE) and Fort Rucker, AL	https://fas.org/irp/program/collect/uas-army.pdf
Non-Von Neumann & **Quantum Computing;** **Blockchain, Smart-Contracts & Cryptography**	DoD CIO Priorities: • Cybersecurity • Artificial Intelligence (AI) • Cloud *(NB: Combat systems can be standalone)* • Command, Control and Communications (C3) Digital Modernization Goals: • Innovate for Competitive Advantage • Optimize for Efficiencies and Improved Capability • Evolve Cybersecurity for an Agile and Resilient Defense Posture *Protect the combined commercial, civil, and military command, control, communications, computer, intelligence, surveillance, and reconnaissance (C4ISR) infrastructure to monitor and control space operations and provide information services in, through, and from the cislunar environment during peace and conflict.*	https://media.defense.gov/2019/Jul/12/2002156622/-1/-1/1/DOD-DIGITAL-MODERNIZATION-STRATEGY-2019.PDF https://www.afspc.af.mil/Portals/3/Future of Space 2060 (5 Sep).pdf

Recommendation #2 – Compound AI as a Path to Artificial General Intelligence (AGI)

The rise of Large Language Models (LLMs) in 2023 has transformed AI application development. We recommend AI models and their computational algorithms or agents be treated as *Compound AI systems*, which aim to integrate many components to achieve beyond state-of-the-art results. We recommend the AI Action Plan use the DoD DODAF and engineering best-practices based on analogs in combat systems mission engineering doctrine. Retrieval-Augmented Generation and complex multi-step inference strategies using chain-of-though prompt engineering are ad-hoc solutions to the deeper problem of sound and verifiable inference. Therefore, the AI Action Plan should include incentives to enhance performance beyond what any monolithic models can achieve, combine LLMs with other components like symbolic solvers, constraint solvers, logic, and a variety of code execution modules and favor a path to **Artificial General Intelligence (AGI)**. Even a task-specific activity (e.g., drug-design) may require several AI models, humans and a variety of expertise to achieve impactful results, all of which can contribute to AGI development.

Compound AI systems address challenges that single models cannot. **We recommend the AI Action Plan include not only the policies to guardrail auto-regressive or statistical AI models, to endorse and incentivize the use of symbolic methods, first-order or modal logical models, neural and hybrid systems**. This approach favors and emphasizes data, information and knowledge representation including adoption and adherence to standards or community endorsed best-practices. The approach disincentives black-box approaches and incentivizes the use of measurably secure rationally bounded approaches to mitigate risks.

Compound AI integrates neural and symbolic, both static and dynamic data, improving control and trust, and optimizing performance for varied application requirements, offering substantial benefits, including reliable, trustworthy, and efficient AI. **We recommend Neurosymbolic AI to support compound AI technologies**, Agents and systems. Developing AGI using compound AI systems involves navigating a vast design space, optimizing the interplay of different components, and managing intricate operations and this will require extensive benchmarks.

Recommendation #3 – AI Instruction Set Architecture and Formal Methods

We recommend national focus on the design of the Instruction Set Architecture (ISA) and the models of AI computing because the ISA is at the heart of the problem for AI superiority, software and hardware. There is little work available in AI ISA design and there is a need for both task-specific and cross-task AI processing acceleration. To get more scale or speed, at the high cost of power and memory, systems are tiled, cascaded or layered in pursuit of the performance to run large AI models, to perform the vast numerical calculations and to manage data processing. Conventional computing relies on a Von-Neumann design paradigm and an ossified reliance silicon materials science for manufacturing. New computing approaches intrinsically need new materials science not based on silicon. But this needs policy to halt the stifling effect of silicon.

We recommend considering new and emerging AI processor designs for Non-Von-Neumann deeply parallel, data-driven, or data-oriented computing that uses new materials and alternative materials properties or physics. However, the issue of the ISA, and the subsequent issues of how AI is defined within such a system will require a joint approach to rapidly evolve, iterate and co-design new data structure representations that may include new representations of the concept of a "number" as well as encouraging and supporting new or nascent processes with its alternatives, such as analog array processing, photonics, or quantum. **We recommend policies that support formal methods and verifications.** The ultimate version of AI empowerment: **the ability of software to define**

hardware in which AI co-evolves within human intentions for creating the capabilities required for delivery at any time, any place, with proof of correctness, integrity, trust and verifiability.

Recommendation #4 – Quantum Information Science as Key Enabler to AGI

Power in the modern conflict/competition environment is accumulated to those with mastery of information and technology. While conventional information science is well-established, we can see the future in an AI Action Plan transformed by leveraging policies that support the use of *Quantum* Information Science (QIS). **We recommend leveraging the Quantum Information Science (QIS) for artificial general intelligence** (AGI) in a co-optimal, co-design strategy, that only then can both hardware and software, materials-science and manufacturing be approached holistically and in concert together. We recommend the AI Action Plan favor QIS and thus a path to AGI.

With the emerging exponential capacity of Quantum Computing, we see QIS able to unlock powerful new capabilities. Therefore, QIS should be favored by policy in any AI Action Plan for Quantum AI, Quantum Inspired AI or other approaches leveraging QIS and should be considered one of the key bedrock theories underlying every choice, design motivation, asset, and technology in this endeavor.

We recommend emphasis on quantum approaches, and QIS that will define the coming AI era in much the same way as Einstein's energy-mass equation defined the Nuclear Age.

Recommendation #5 – Public Private Partnerships

We recommend a rapid and iterative Private-Public partnership for not only the big businesses, but most importantly as a deliberate act of policy for the small emerging AI business. We recognized the need for a new corporate strategy that we outline here to underpin the organizational approach:

1. **We recommend a "Skunk Works" mindset**: A talented, well-led, and well-funded team can achieve more than a large bureaucracy. Small companies can achieve more agility in innovation than large corporates.
2. This effort and all involved should be inclusive of an ongoing creation of American society, its development, and maturation of the *practice* of the representative government, the use of AI in daily life and the support of capitalism within that structure, against adversarial philosophies from peer-competitors.
3. **We recommend defining an AI Entity that uniquely represents American national interests** by design and societal ideals, in essence acting as a Constitutional Citizen (a "virtual" synthetic entity with thinking skills) – that means we need policies integrated into the engineering of AI so that AI is built by design to be resilient to adverse effects much like a war fighter is trained for survival, evasion, resistance and escape.

Recommendation #6 – Human Centered AI and Specific Measures of Impact

We recommend that AI needs to be governed with the center of action as the "human-on-the-loop-of-AI". In this viewpoint, convergent technologies augment the human, not replacing the human and the primary agent in the operational "space" of commercial competition, battle, intelligence, or other is centered on the human or the human-AI team. Any desired operational quality becomes the achievement of desired and chosen outcomes by an AI system supporting the human, while maintaining freedom of action and minimizing adversarial knowledge and response. The key foundation for this systems design approach is through *technological convergence* of communications, AI/ML, high-performance computing, and an entirely new concept of AI centric processing. Today's processing has been

graphics centric (GPU) but applied to AI or specific to various number-crunching tasks – none of which are tailored as AI centric.

Technological convergence generally refers to the combination of individual technologies to create new capabilities and modalities previously unseen. While this has been the case with the convergence of graphics technologies into AI technologies, it needs to move to native AI focus. For example, the convergence of compact microelectronics for cameras, telecommunications, and processors yielded the smart phone. Convergence in the AI Action Plan in our viewpoints means the phenomenon of AI and design thinking within engineering best-practices. Our vision of convergence means that mission capabilities can be constituted with *reconfiguration* instead of *redesign*, and functionality develops synergistically. As a result we promote the following five specific impact measures:

1. **AI SWaP to Performance ratio**: Total product size decreases while total performance increases.
2. **AI Cyber Readiness Level**: Total fragility decreases while resilience increases.
3. **Public AI Economic Scalability**: Total cost of ownership decreases while adoption rate increases.
4. **Public AI ROI Scaling**: Total cost of new products decreases while returns on investments increases.
5. **AI Total impact Metric**: a composite measure of items 1 through 4 preceding is maximized.

Implementing this vision in service of US defense and commerce will provide the nation with overwhelming advantage over any competitor. We envision an augmented human-on-the-loop of AI, conducting *anticipatory operations*, enabled by quantum information science (QIS), will provide overwhelming force regardless of domain and compose asymmetric advantages produced by the key set of strategic measures.

Recommendation #7 – Design Thinking Approach to Knowledge Intensive Competition

> *"Knowledge itself is Power"*, Francis Bacon, *Meditationes Sacrae* (ca. 1597)

We recommend a holistic approach to AI using Design Thinking principles to elevate the *knowledge intensive competition* in America's favor over that of peer-competitors and adversaries. Policies and regulations that reduce the need for rules and dogma but empowers and trusts people at the center of the activities in AI are required: in effect, a policy to foster teaming for AI outcomes between large and small players so that the infrastructure benefits of large players can be leveraged by the innovative small actors.

"Design thinking is a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success." – Tim Brown, Chairman, IDEO[4]

We recommend using Design Thinking[4] as a key aspect in the AI Action Plan to provide a framework to transform the very basic processes of human and AI technology research to business outcomes in synergistic way. Design Thinking principles used as a concept of strategy to build the AI Action Plan could result (for example) in the addition of salient policies that accelerate academia, industry, and government value of innovations, by **unlocking access to government IP (patents, prototypes, methods) that are siloed and otherwise hidden in various agencies or lying dormant in university laboratories.** The Design Thinking approach, as we see it, deserves organizational review in

4 https://designthinking.ideo.com/

the AI Action Plan around the nature of commercial off the shelf (COTS) open-source tools and technologies. We draw attention to the potential and latent critical dangers to signify critical cautions for any future AI Action Plan:

- COTS and Open-Source is not focused on interoperability. Interoperability is critical to AI systems.
- COTS and Open-Source does not have Security-by-design. AI requires security in its foundations.
- Today's AI Models have a mix of sources, inherent inconsistencies, and maintainability issues.
- Malicious contributions pose significant and often undetected risk. Counter-AI is not understood.
- Human-AI Performance metrics are not generally aligned or developed with task-specific, sector specific, DoD or IC mission requirements. Rather, these are derived from COTS or Open-Source foundational AI models as rote truth rather than through curated, configured, verified, sources and best-practices to any community of interest.

We recommend the AI Action Plan prioritize these concerns in the assessment of assets from COTS and open source while supporting the innovation process, empowering collective knowledge intensive competition (against peers) while crafting open-source derived but trusted solutions. This implies also and especially favoring the unique and proprietary values that bring expertise from America's innovative thinkers and providing policies that attract asymmetrical advantages in developers toward a whole of nation AI-benefits driven approach.

While open-source is surely to always be some component of AI, we suggest the true value is locked in people within the companies and establishments that if resources are freed up to support collaboration and cooperation, for example, punishing agencies that avoid CRADA's (Collaborative Research And Development Agreements) and rewarding agencies that attract CRADA's will contribute to rapidly advancing an AI Action Plan into tangible AI outcomes that cannot be predicted by extrapolative thinking.

It is easy to forget that beneficial strategic surprises reside within America. We are suggesting unlocking these benefits by addressing the AI Action Plan to include design-thinking, cooperation, collaboration incentives for AI and the resultant empowerment to build AI focused intellectual property will become exponential. This process can start in the classroom or the boardroom, with the tinkerers and enabling a broader support through introspective intelligence via supply chain inventory and analytics within the United States. **We recommend, this process should proceed in the AI Action Plan** irrespective of mainstream or commodity availability of conventional AI mindsets, tools, software libraries and open-source data resources or ossified agency or group cultures in various sectors, markets or domains that inhibit outreach and opportunity.

END OF RESPONSE