Internet of Things Advisory Board (IoTAB) Committee

Established by 9204(b)(5) of the William M. (Mac) Thornberry
National Defense Authorization Act for Fiscal Year 2021 (Pub. L. 116-283)

August 22 & 23, 2023

Virtual Meeting Platform: Webex

MEETING MINUTES

Board Members Present	**Board Chairs and NIST Staff**
• **Michael J. Bergman**, Consumer Technology Association • **Dr. Ranveer Chandra**, Microsoft • **Steven E. Griffith**, National Electrical Manufacturers Association • **Tom Katsioulas**, Global Semiconductor Alliance • **Debra Lam**, Georgia Institute of Technology • **Robby Moss**, Moviynt • **Nicole Coughlin**, Town of Cary North Carolina • **Maria Rerecich**, Consumer Reports • **Debbie A. Reynolds**, Debbie Reynolds Consulting • **Dr. Arman Shehabi**, Lawrence Berkeley National Laboratory • **Peter Tseronis**, Dots and Bridges LLC **Board Members Absent** • **Ann Mehra** • **Nicholas Emanuel**, CropX • **Prof. Kevin T. Kornegay**, Morgan State University	• **Benson M. Chan**, Strategy of Things Inc. (Chair) • **Daniel W. Caprio Jr**., The Providence Group (Vice Chair) • **Barbara Cuthill**, NIST (Designated Federal Officer) • **Katerina Megas**, NIST (Federal Working Group Co-Convener) • **Alison Kahn**, NIST (Federal Working Group Co-Convener) • **Greg Witte**, NIST Contractor, (Report Editor) • **Brad Hoehn**, NIST Contractor (Report Editor) • **David Lemire**, NIST Contractor (Scribe)
Speaker(s): • **Manu Fontaine,** Hushmesh	

Action Items Over Both Days

*Note: Names and roles are **bolded** to show ownership.*

Report

In General

- Send Mr. Witte redline updates to the draft**: All Board members**
- Review the national standards strategy: **All Board members**
- Integrate themes into draft report: **Mr. Witte**
- A cross-reference will be established to enable tracking the relocation of specific recommendations: **Mr. Witte**
- Consider content approach for commentary sections, including adjacent technologies: **Mr. Griffith, Ms. Rerecich, Mr. Katsioulas, Mr. Chan**
- Reach out to person updating PPD-21 based on the Solarium Commission recommendations from the June meeting of the National infrastructure Advisory Council: **Mr. Witte/NIST**

Previous Speaker Recommendations:

- Collate speaker recommendations from previous speakers for Board review: **Mr. Chan**
- Board members to review the speaker's recommendations from July:
    - Chris Moore's recommendations: **Ms. Rerecich, Ms. Coughlin**
    - Ms. Fung's recommendations: **Ms. Mehra**
    - Chris Autrey's recommendations: **Mr. Chan**
    - Paul Eisler's recommendations: **Mr. Caprio, Mr. Bergman, Mr. Griffith**

Specific Recommendations:

- An action to **all subgroups** to review and make recommendations as actionable as possible.
    - Mr. Witte suggested board members while reviewing should consider how they would act on a recommendation, or what their definition of "done" would be and suggested more "this is what you should do" is needed.
- An action to **public safety** and **healthcare subgroups** to provide more clarity on what should be recommended (suggestions discussed were to suggest an alternative on what to investigate next or to start with the identification of barriers to identify clearer recommendations should be examined).
- By 8/31, Update intelligent traffic recommendations (including for small business): **Mr. Griffith, Ms. Lam**
- By 8/31, Create overarching carbon measurement recommendations and agricultural supply chain, sustainable infrastructure: **Mr. Katsioulas, Mr. Griffith, Dr. Chandra** (**Dr. Chandra** to send out initial recommendations copy)
- By 8/31, Update international recommendation 14.1: **Mr. Bergman, Mr. Caprio**
- By 8/31, Continue discussion on National Emerging Technology Office: **Mr. Caprio, Mr. Bergman, Mr. Tseronis**
- By 8/31, Update wording and split healthcare recommendation (2.7) into two recommendations: **Ms. Rerecich, Ms. Reynolds**
- By 8/31, Cybersecurity recommendation 6 – continue research and update: **Mr. Katsioulas, Mr. Griffith**
- By 8/31, Cybersecurity recommendation 7 – research VEX and update: **Mr. Bergman**
- By 8/31, Confirm with Dr. Chandra on generative AI recommendation: **Mr. Chan**

Personas / Use Cases / Examples

- By 9/20, all **board members** consider personas addressed by recommendation to make sure various personas are covered.
    - Material related to industrial infrastructure: **Mr. Griffith**
    - Input on consumer topics**: Mr. Bergman** and **Ms. Rerecich**

Report Graphics

- **All board members** to indicate or contribute graphics or statistics for the report where appropriate.

Schedule

- Review the draft IoTAB timeline.
- Upcoming meeting dates:
    - September (26th-27th)
    - October (24th-25th)
    - Consensus needed on November and beyond with 60 days lead time to publish the FRN for the meeting.
- The IoTAB is looking at a one-year timeline with the following milestones:
    - **September**: Board should target having all recommendations complete by end of this meeting.
    - **October**: Board will review summaries and prioritizations.
    - **November**: Board should target having a final draft report by the end of the meeting with some final adjustments being made in December.

IoTAB Meeting on Tuesday, August 22, 2023

Welcome and Chair's Opening Remarks

Ms. Cuthill welcomed the attendees, opened the meeting, and introduced the chair, Mr. Benson Chan.

Mr. Chan went over the agenda and goals for the meeting.

Slide deck: Chair Agenda Discussion Slides

- The discussion reviewed the expected outcomes for the day, the agenda, the draft report, and the logistics.

Invited Speaker – Manu Fontaine, Hushmesh

Mr. Manu Fontaine, Hushmesh

Slide: Hushmesh IoTAB Slides

- Mr. Fontaine explained that his company was a "public benefit" cybersecurity startup. He stated that they have developed an approach to solve zero trust in a universal way, applying what he described as an "ambitious" concept. He described the concept as automating cryptographic security between any two points on the Internet, using what he called a Universal Naming System (UNS), which he was recommending the federal government should support. He said the UNS aligned with the concept of the domain name system but is for any kind of connected entity.
- Mr. Fontaine explained the operating approach as never trusting, always verifying, and doing that in a global and automated way. This approach enables any two entities, be they people or non-person entities, to establish a pair-wise cryptographic relationship as needed.
- Mr. Fontaine stated that the Internet's domain-centric architecture creates privileged insiders and precludes zero trust. He explained that the insiders manage keys, data, and security from a domain-centric viewpoint, with humans managing things at every level.
- Mr. Fontaine identified "confidential computing" as the enabling technology for the solution he is proposing. The use of confidential computing enables two critical features: attestation of hardware and software integrity and confidentiality of data in use even from system administrators. He said this technology is now virtually available in every cloud environment and in hardware implementations.
- Mr. Fontaine explained the approach as employing two types of enclaves (or actors). The first is an agent associated with an end entity, which may be a person, organization, device; anything that can be a communicating endpoint. The end entity is registered uniquely with its agent. The second actor type is a verifier that carries out the verification of attestation of the agent. End entities are connected with their agent.
- Mr. Fontaine described the process that occurs when two end entities want to communicate. A verifier can run code and carry out a remote attestation that the agent is not leaking secrets and is behaving as expected. Verifiers can connect hierarchically in a recursive manner, so that a parent verifier higher in the hierarchy can confirm the attestation of both entities' agents. Higher level verifiers perform verification of those lower in the hierarchy. The parent verifier attesting to the individual verifiers creates a secure channel through which public keys from the end entities can be exchanged in a trusted manner, providing a basis for a pair-wise connection between the end entities' agents.
- Mr. Fontaine then described how this concept can be generalize by connecting to Universal Name System servers as verifiers. He said that UNS servers would be positioned similarly to how DNS

servers are positioned today. He explained the important difference is that with UNS there are no humans with access to the key materials or the names exchanged between the actors, enabling the creation of artificially complex chains of custody. He explained that this was a naming system because it can handle publishing random names generated by the agents associated with end entities. He said such names can be shared offline and looked up through the UNS.

- Mr. Fontaine stated that a proof-of-concept system currently exists and will be demonstrated soon to the NIST identity team. He acknowledged that the scalability has not been demonstrated but the other properties have.
- Mr. Fontaine said that because UNS is hierarchical and recursive like DNS, it is globally decentralized, and some companies may just want to deploy a limited number of servers while others may to do more. Countries may want to deploy entire subnets by chaining many different servers.
- Mr. Fontaine describe that with this approach, code is a digital asset that can be assigned a universal name and be wrapped and encrypted. Those pieces of codes can be moved around under the authority of specific humans or organizations and pushed to specific machines. He said Hushmesh is leveraging this mechanism to deploy agents virtually anywhere.

Group Discussion

- Mr. Chan asked about the current state of the proof of concept.
    - Mr. Fontaine explained the proof-of-concept is deployed in an Azure cloud, saying it has all the pieces, includes chains of UNS servers and is functional. He described the first product as an identity provider where humans can register themselves and receive identity tokens (digital assets), signed using keys generated from within the infrastructure and completely shielded from humans. These identity tokens can be used to "mesh in" to a web application and get keys to encrypt data. He said the primary application at present was software supply chain security, which he described as at an alpha stage and can be deployed in the cloud with all of the necessary cryptographic primitives and exhibiting the principles he had explained.
    - He said is scaling out across continents has not been proven. He stated they believe it is inherently scalable, because once you establish it you do not have to go back to the root. The commonality between specific agents can keep a copy of the keys to secure the connection between the two entities. He said the UNS behaves like a one-time meeting point, after which key exchanges can be direct once established. He also noted that while the universe of devices is "gigantic", the number of connections between any two devices is limited, so there is a universe of sparse connections that don't rely on continued connections to the UNS.
- Mr. Chan asked what aspects of this are proprietary?
    - Mr. Fontaine repeated that Hushmesh is a public benefit company and wants the UNS to be operated as a public benefit. He said he wants to find a coalition of government or institutions to run the root UNS. He said the technology can be transformative, enabling a range of related businesses such a data security and identity. He said they are looking for a governance solution for the UNS, such as the UN or W3C, and described the situation as akin to the early days of DNS: Who is operating the DNS/UNS and should it be the government or a corporation? He stated Hushmesh is putting it out there for everyone to use it and governance needs to be determined.
- Mr. Chan asked if there are other companies working on a similar concept?
    - Mr. Fontaine replied none that he was aware of. He described his company as a small startup implementing ideas that have been building for about 20 years. He said the key technology of

confidential computing only became available commercially a few years ago and enabled the ability to manage keys without exposing them. He noted there are other companies employing confidential computing for secure messaging and data vaults but that those are still domain oriented.
    - Mr. Fontaine emphasized that the absence of domain authority is the key to the UNS concept. He noted there can still be domains of authorities, such as automakers over their cars, or law enforcement organizations, but their operating model would leverage the concepts of the UNS.
- Mr. Chan asked when Hushmesh would have something for the board to consider?
    - Mr. Fontaine replied that the timeline is challenging due to the public nature of the board's operations, meaning decisions must be made regarding how much information to expose.

Chair/Vice Chair Comments

Mr. Benson Chan, Chair & Mr. Dan Caprio, Vice Chair

Slide deck: Chair Agenda Discussion Slides

- Mr. Chan opened a session to discuss the progress of the board. He stated there has been a lot of progress since April while noting that some topic areas still needed to provide additional material. He invited board members to identify additional speakers the board should consider.
- Mr. Chan encouraged board members to provide bold recommendations, recognizing that some may not be immediately actionable but would still be worth considering. He pointed to the concept of a national emerging technology office as an example of a bold recommendation.
- Mr. Bergman suggested that the board should consider the draft report and ask whether they were missing the big picture. He suggested that subgroups should focus their efforts around the draft report, with the big picture as a topic to discuss at the next meeting; several board members indicated agreement.
- Ms. Lam suggested that the presentation needs to be more "public facing" and readable by those less familiar with the technology. She suggested board members read the draft for what's missing, and for readability and impact, noting that the executive summary would probably be the main focus for many readers.
- Mr. Chan noted that the charter calls for considering the impact on small businesses and noted Mr. Griffith had recommendation in that area that should be taken into consideration.
- Mr. Katsioulas identified several aspects he felt were missing:
    - A good justification for how the recommendations would lift barriers and enable growth;
    - International aspects, particularly regarding connectivity, cybersecurity, and traceability;
    - Critical infrastructure.
- Mr. Witte concurred with many of the points raised and cited the value of having a template for providing key recommendations for each area. He suggested the report needs to "tell the story" and suggested the potential for more use cases. He noted that for many people IoT has become "routine", even if they don't resonate with that label.
- Ms. Kahn concurred with the points raised, noting there have been similar discussion in the Federal Working Group (FWG). She emphasized the need for the report to be readable and understandable, and the recommendations to be actionable.
- Ms. Megas emphasized the need to address how the Board's recommendations will actually remove barriers and catalyze adoption of IoT. She stated her expectation that the FWG will have questions

about how the Board anticipates the recommendations being applied and the outcomes they will achieve. What problems will be solved, and how?

- Mr. Katsioulas suggested that a focus on use cases and identifying the "killer app" would help provide context to develop guidance on lifting barriers.
- Mr. Witte reviewed the timeline, noting that the Board was on track having an interim report by this meeting, and suggesting that remaining recommendations needed to be solidified by the end of September to leave time to work on messaging, tone, themes, and key takeaways.
- Mr. Katsioulas asked whether the recommendation should include specific agencies.
    - Mr. Witte replied there was considerable inconsistency across recommendations and suggested the Board should come to some agreement regarding level of detail.
    - Mr. Chan concurred, saying he thought the original idea for the details was to provide context.

Potential Themes

- Mr. Chan displayed a proposed organization for the report content around selected themes.
- Mr. Bergman discussed an ongoing process dating back to March to collect themes to aggregate report content. Referring to the slide he pointed to themes on the left and potential content on the right.
- Mr. Bergman described an example, where the theme is creating trust in IoT and the activities are making things more transparent, more secure, enhance privacy protections, explain data use and management. He walked through a number of other examples:

Organizing Themes	Description/examples
Enhance and modernize infrastructure supporting IoT	Connectivity, standards and interoperability, compute, etc.
Create trust in IoT	Cybersecurity, privacy, confidentiality, provenance, integrity, transparency, data usage and management
Ensure IoT supply chain integrity and resilience	Augmented Logistics & Supply Chain
Develop, grow, and maintain a workforce to support the IoT economy	Workforce Development *(all subgroups)*
Address challenges of IoT in a global ecosystem and economy	International subgroup (standards, trade, etc.)
Develop government capability to support and sustain a IoT economy	*(All subgroups)*
Facilitate industry adoption (including govt, small business adoption) and value realization of IoT.	Consumer awareness, government procurement, policies (tax credits, etc.)
Facilitate US IoT technology and innovation leadership	Research and development, technology transfer, etc.

Organizing Themes	Description
Align federal actions in IoT to advance policy goals	
Climate change	
Sustainability	
Healthcare	
Environmental Monitoring	
Traffic and transit technologies	
Critical infrastructure	
Precision agriculture	
Technology transfer/lab to market	
Augmented supply chains	

- Mr. Bergman noted that the FWG preliminary update on their web page included an additional theme that the Board hasn't considered of "adjacent technologies". These are technologies that could help deployment and adoption of IoT if the overlaps are handled properly. He suggested that the board should be on the lookout for adjacent technologies that could be flagged for the FWG's attention.

Group Discussion

- Mr. Katsioulas discussed the theme of facilitating technology leadership. He suggested leadership was not just about technologies but also about platforms of aggregation and modernization that benefit all stakeholders.
- Ms. Rerecich stated she likes the idea of organizing by themes but doesn't want to lose detailed recommendations in the process. She described the themes as high level and needing to be connected to specifics.
- Mr. Chan suggested the Board members consider potential additional themes.
- Mr. Witte asked if the themes would take the place of the umbrella recommendations currently in Section 9? Be the basis of a new set of subsections? And if so, would the report continue to have topical recommendations.
    - Mr. Chan agreed with that approach, but Mr. Caprio requested this decision be deferred until the current draft report was discussed. Mr. Chan agreed.
- Ms. Reynolds stated the report needed to include data provenance for lineage and suggested it could be woven into existing recommendations.
- Mr. Chan asked if there was general consensus for applying the themes in the report and received no objections. There was agreement to use the themes in place of the existing section 9 umbrella recommendations and reorganize supporting recommendations as necessary.

Discussion of the Draft Report

Mr. Witte shared the draft report for discussion: 18 August 2023 Draft Report

Comments on Draft Report

- Mr. Witte stated that there had been considerable progress, and reminded the members that the draft report is a point-in-time snapshot. He briefly reviewed the structure of the document:

  - The Executive Summary will be drafted toward the end of the process.
  - The new summary table of recommendations (Section 4) gives readers immediate access to the overall picture.
  - A description of the board's work process will be provided in Section 5.
  - Section 6 will provide a discussion of related emerging technologies that are relevant to the success of IoT. He noted this section would also include the discussion on personas.
  - Section 7 describes umbrella topics derived from reviewing previous recommendations. He explained those recommendations show clear areas of overlap.
  - Section 8 will provide overarching findings.
  - Section 9 will provide the details of all of the board's recommendations.

- Mr. Witte then presented the summary table. He pointed out that it currently indicates supporting recommendations traceability to original recommendations from the May and July meetings, and a legend column to indicate the mechanism(s) associated with a recommendation. He noted that there aren't graphics yet for the legend, and that the subgroup traceability column would eventually be removed. He said the summary table recommendations would be hyperlinked to the details for each recommendation. He also said that information on personas would be added to the table to see if that is beneficial, saying this would help to ensure that various stakeholders have been addressed.
- Section 6 provides discussion of the "adjacent" or "converging" technologies related to IoT: AI, blockchain, etc. He noted that the board would need to decide how to label those technologies.
- Section 7 discusses over-arching topics areas; it currently provides overviews, benefits, barriers, and justifications.
- Section 8 provides similar discussion as Section 7 but focuses on the topic areas called out in the enabling legislation. Mr. Witte noted that the approach to Sections 7 and 8 might be revised as the themes discussed earlier in the meeting are integrated into the report, including the possibility of combining the material into a single section.
- Section 9 is the recommendations section, with the detailed discussion of each recommendation. Mr. Witte noted the potential to put in front material describing how the presentation of recommendations is organized, along with using icons associated with mechanisms that can be associated with the recommendations.
- Mr. Witte encouraged the board members to supply candidate graphics, saying there was support available to convert rough drafts to usable graphics, although he suggested that more camera-ready graphics were preferrable. He also requested statistics that could help support recommendations.

Organizing Themes

- Mr. Witte described how the sections for the themes discussed earlier would be organized. Each section would start with a summary, identifying the key and supporting recommendations, each linked to the detailed specifics. He said that recommendations should be actionable: things an agency should start doing, stop doing, or study. There would be introductory text, and information about the recommendation, including potential barriers to carrying out the recommendation. He noted the possibility that barriers might be grouped and moved earlier in the report.
- Mr. Witte said he had removed material regarding agencies that should be involved for each recommendation due to varying levels of input in the original recommendations, and that he would be restoring that material.

  - Ms. Cuthill noted that recommendations regarding agencies should be from the Board, rather than from subgroups, particularly if choosing a lead agency from a list developed by a subgroup.

- Mr. Witte suggested an alternative was to only identify lead agencies for overarching areas and noted that such identifications could only be suggestions.

- Mr. Witte reviewed the organization of Section 9. He explained that a number of overarching recommendations (e.g., data framework) had been created based on significant overlap of specific recommendations; these make up the first seven subsections of Section 9 in the report. The remaining seven subsections contain recommendations associated with more specific topics. He noted that the draft report included recommendations that would be discussed in this meeting.
- Mr. Witte invited the board to identify references to generate a bibliography. He pointed to a compliance matrix tagging specific recommendations back to the topics identified in the enabling NDAA. He expected to populate that matrix after the next round of revisions to the organization of recommendations and have it available in the next version.
- Mr. Caprio inquired where the recommendation for a White House office dealing with emerging technologies had been placed.
  - Mr. Witte replied it is currently under sustainable infrastructure, along with related recommendations, but could move.
  - Mr. Chan stated he believed that would be moved, noting the recommendation had expanded since its origination in the sustainable infrastructure subgroup. He added that many recommendations may move as the themes are integrated into the report.
  - Mr. Katsioulas described that recommendation as an umbrella for many things.
  - Mr. Witte suggested it could be moved under the topic of the nation taking leadership and pointed out other recommendations might also be moved.
- Mr. Witte turned to questions regarding certain recommendations that he hoped to resolve during this meeting.

Supporting recommendation 1.3	Conformance to any specific set of requirements should be voluntary**.**

- Mr. Witte said, regarding the recommendation that conformance to specific sets of requirements should be voluntary, the draft report offers a revised wording that removes the reference to specific programs.
  - Mr. Bergman stated he believed the proposed words were the correct interpretation.
  - Mr. Caprio noted there is a similar recommendation for public/private partnerships in the international recommendations.

Supporting recommendation 1.4	The government should examine opportunities to use the notional IoT Data Framework to support and document privacy considerations.

- Mr. Witte noted various framework recommendations, and the opportunity to integrate the discussions from cybersecurity and privacy. He asked whether the Board was advocating for the creation of a schema / taxonomy / model for how data should be used and shared.
  - Ms. Reynolds stated she believed Mr. Witte's statement was accurate.
  - Mr. Bergman pointed out that the term framework could be problematic, given the existence of other frameworks such as the NIST Privacy Framework, and recalled the Board discussing moving away from the term. He suggested that the term should be avoided unless the Board is advocating for a "NIST type" framework.

- There was consensus for using "model".
- Mr. Witte suggested a more complete description would be appropriate. He summarized as the Board is identifying a need to understand how data should be used, shared, and stored, and for a taxonomy for the data.
- Mr. Griffith noted that there is both machine data, which could be used for process improvement, and personal data with privacy implications, and suggested a taxonomy that addressed these distinctions was needed.
- Mr. Katsioulas suggested a reference model with a taxonomy underneath it.

Supporting recommendation 1.6	The government can encourage and foster data policies that drive economic growth, such as through this framework.
SSC-R19 (from May minutes)	Establish data policies that drive economic growth via frameworks that facilitates Data Monetization Security, Privacy, Data Sharing, Ownership, Control, Licensing etc.

- Mr. Witte noted the potential for overlap among recommendations. He pointed to recommendation 1.3 as potentially overlapping with SSC-R19. He suggested that Board members reviewing the report should look for opportunities to eliminate redundancy. He pointed to workforce as an area where there are recommendations to improve the workforce for almost every topic area. It is important to find the right level for individual recommendations versus a single recommendation that addresses multiple topics while retaining nuance regarding the needs of individual topic areas, particularly with regard to barriers and mechanisms. He encouraged the board to consider opportunities for combining recommendations.
    - Mr. Chan noted there wasn't a workforce subgroup, so multiple similar recommendations surfaced. He suggested that once the recommendations were substantially complete, they could be re-examined with a "workforce lens". He said he was starting to see some of the gaps.
    - Mr. Witte suggested the potential for a recommendation for the government to establish how we would provide the training and education and write better job descriptions in this field. He suggested that during the September meeting the Board could review the recommendations for opportunities to bundle, separate or converge, and to draft better content for Sections 6, 7, and 8.
    - Mr. Katsioulas pointed out that Board members need to review the entire report draft to prepare for the activity that Mr. Witte had described.
- Mr. Witte called attention to highlights he had placed in the table for board members to review potential overlap across requirements. He noted that some recommendations were connected back to the recommendations discussed in May.

Supporting recommendation 2.4	The federal government can facilitate and support the adoption of smart city and sustainable infrastructure standards.
SUS-R05 (from May minutes)	The federal government should facilitate and support the development and use of smart city and sustainable infrastructure reference models.

Supporting recommendation 2.6	Agencies should advocate for the implementation and adoption of interoperable data standards for public safety IoT.

- Regarding the recommendation for supporting interoperable data standards, Mr. Witte noted there had been discussion about clarifying the scope.
    - Mr. Katsioulas described this recommendation as "too general" and suggested that defining the sub-bullets of the reference model could be a tool to clarify the scope.
    - Mr. Witte concurred.

Supporting recommendation 2.7	Agencies can promote and, if necessary, develop a protocol for data exchange standards for IoMT (Internet of Medical Things) for interoperability, and promote the adoption of these standards. Solutions might include protection for medical data in mobile apps and IoT devices that is similar to the current Health Insurance Portability and Accountability (HIPAA) Act provisions.

- Mr. Witte described recommendation 2.7 as "pending" and needs feedback from the healthcare team.

Supporting recommendation 3.6	The Federal Government should update Presidential Policy Directive 21 (PPD-21): Critical Infrastructure Security and Resilience requiring a sector-specific Internet of Things (IoT) data strategy.

- Mr. Witte asked what the Board's intent was regarding the recommendation to update PPD-21. There was a broad discussion about a range of federal policy documents in need of updating. NIST was requested to ask the participants in the IoT FWG if they are aware of efforts to update PPD-21, and if those efforts included mention of IoT.
- Ms. Megas asked for clarification on what barriers result from IoT not being included.

Supporting recommendation 4.2	The federal government should actively promote and support the adoption of satellite narrowband IoT systems for agricultural IoT, with the aim of improving connectivity, data collection, and decision-making in rural and remote agricultural areas.

- Mr. Witte requested the status of this recommendation, recalling a discussion from July over harmonizing standards.
    - Mr. Bergman advocated changing the language: He suggested appropriate language would focus on adopting communications technologies for IoT more suitable for precision agriculture applications, with narrowband satellite communications as an example.

Key recommendation 10.0	Develop a comprehensive national strategy for agricultural IoT to establish a clear vision and roadmap for the integration of IoT in agriculture, addressing current challenges, fostering innovation, and promoting long-term sustainability and competitiveness of the agricultural sector.

- Mr. Witte noted that this requirement regarding a comprehensive strategy needed refinement and greater specificity, and that additional input is needed.

Supporting recommendation 10.3	The federal government should actively promote and support the adoption of Generative AI applications for agricultural IoT, with the aim of improving decision-making, optimizing resource utilization, and enhancing productivity in the agricultural sector through innovative and data-driven solutions.

- Mr. Witte noted a question from the previous meeting whether it was premature for the government to promote generative AI for agriculture.
    - Mr. Chan stated that generative AI is coming, and the government should plan for it, not just for agriculture but across many sectors. Government leadership would include establishing capabilities and policies.
    - Mr. Katsioulas described the recommendations as "very general", saying more specific guidance is need that itemizes the activities that are needed.
    - Mr. Witte requested status on this recommendation, and Mr. Chan directed him to check the meeting minutes.
- Mr. Witte noted the need for expanding on the recommendations for healthcare and public safety. He said a benefit of having the consolidated table is the ability to see the coverage for various topics.

Supporting recommendation 11.2	The federal government should facilitate and support the research, development and deployment of low cost air quality sensors.

- Mr. Witte suggested that during their review Board members can also look for opportunities to broaden the recommendations. He used the example of the environmental monitoring recommendation regarding air quality sensors, saying that could expand to water quality, noise pollution, earthquake monitoring, etc.
- Mr. Witte acknowledged that he is already aware of additions to the table. He stated he will process redlines, comments, and additional material from Board members.
    - Ms. Cuthill proposed a deadline of 31 August to return comments on the draft report to NIST.
    - Mr. Chan asked Board members to also consider where individual recommendations should go relative to the themes discussed earlier in the session.
    - There was consensus to move the leadership theme to be first in the list.
    - Mr. Witte stated he would include a cross-reference to enable tracking the relocation of specific recommendations.

Report Takeaways

- Mr. Chan called for a discussion of Board members' takeaways from the draft report review.
- Mr. Witte stated there are many good ideas in the recommendations but that a fair number are not actionable or sufficiently specific. He suggested board members while reviewing should consider how they would act on a recommendation, or what their definition of "done" would be. He was positive about the breadth of ideas but suggested more "this is what you should do" is needed. Mr. Witte suggested using the S.M.A.R.T.[1] goals approach but acknowledged that may not apply to every recommendation.

[1] Specific; Measurable; Achievable, Realistic; Time-based.

- Mr. Witte observed that in some areas (e.g., public safety, healthcare) there was apparently lack of clarity about what to recommend. He suggested an alternative for those cases would be to recommend what should be investigated next.
    - Mr. Katsioulas suggested for those cases it would be helpful to start with identification of barriers, which should lead to recommendations.
    - Mr. Chan said there will be different types of recommendations and while some are not easily actionable, the Board should try to get as actionable as possible.

Specific Sections / Topics (Editor's walkthrough)

- Mr. Witte asked for input regarding the legend. Preferences from the discussion were to use icons to create a visual snapshot and place them after each recommendation since there might be multiple icons.

Supporting recommendation 1.6	The government can encourage and foster data policies that drive economic growth, such as through this framework.

- Mr. Witte pointed to a wording change he had made from "establish policies" to "encourage policies" and requested feedback. There was concern the recommending the creation of policies isn't actionable, compared to recommending creating guidance or regulations. A decision was deferred pending further discussion. Mr. Witte noted that there are several recommendations that discuss policies, and he would review those further.

Key recommendation 2.0	The Federal Government should establish methods to foster interoperability for IoT technology, including through the use of consistent models, protocols, and schemas

- Mr. Witte stated that all of the recommendations regarding standards are about promoting existing standards for interoperability, reliability, and security, rather than a call for new standards.

Supporting recommendation 3.5	The Administration should encourage Congressional support to deploy IoT cybersecurity labeling initiatives, including establishing incentives for manufacturers to participate.

- Mr. Witte asked whether the recommendation to encourage congressional support for cybersecurity labeling initiatives has changed now that the Cyber Trust Mark work has been announced.
    - Mr. Bergman noted that he had submitted relevant edits, included in the draft, that generalized the recommendation beyond the consumer IoT in line with government activity in this area.

Key recommendation 6.0	The Federal Government should lead in the adoption and integration of sustainable infrastructure and emerging technologies into the US economy and infrastructure.

- Mr. Witte noted the recommendations pertaining to the use of energy efficient technologies in new construction and government building operations. He suggested that there are opportunities to be more specific about energy efficiency and addressing climate change and encouraged Board members to provide additional clarity and detail in their comments.

Key recommendation 7.0	The federal government should invest in and promote education and workforce. Workforce and education are broad topics. Specialized training programs could start as early as high school and include cybersecurity topics. Inclusion of yearly certifications is encouraged.

- Mr. Witte pointed out that the workforce recommendations could include Mr. Chan's observations about the impact of the overall shortage of labor, and the limits it creates for manufacturing and deploying IoT. He suggested that Board members think about how to provide more clarity on the challenges and benefits associated with workforce especially in increasing efficiencies through IoT deployment.

Supporting recommendation 10.1	The federal government should consider subsidizing the use of IoT in farms.

- Mr. Witte noted that the write-up for this recommendation is fairly brief, whereas other recommendations may have the justification taking an entire page. The question to the board - what is the right level of detail?
    - Mr. Chan replied that it could be different for each recommendation, and as long as someone can identify the context behind the recommendation that is sufficient. He expressed confidence that Mr. Witte is a good judge of the understandability of a recommendation and said that more complex recommendations require more support.
    - Mr. Witte contrasted this to the level of detail in the supply chain traceability recommendations. He expressed the desire for guidance from the board to find the balance between recommendations expressed in a few sentences versus a few pages.
    - Ms. Cuthill stated that disagreement among comments on a section of the report will need to be resolved by the board.

Commentary Section

- Mr. Chan pointed to the Section 6 (Commentary and Discussion Topics), which was created early on for topics that didn't fit into recommendations. He noted that many of the subsections could be considered as "adjacent technologies" and described the section as containing topics that the Board, as industry representatives, want to call to the FWG's attention. Mr. Chan said the section is currently mostly a placeholder and there is a need for individuals to lead each subsection and develop content.
    - Mr. Witte added that additional topics could be added to this section. He described it as an opportunity for the Board to lead the FWG.
- Mr. Katsioulas asked for clarity on the approach for framing content for this section in order to present it in a consistent manner.
    - Mr. Chan said this may differ by topic. He suggested that use cases could go into Sections 7 and 8.
- Mr. Katsioulas described a list of examples he had provided to Mr. Chan and Ms. Cuthill regarding the convergence of IoT with a number of the adjacent technologies. Mr. Witte asked what Mr. Kat Katsioulas meant by a use case?

- Mr. Chan suggested those examples would fit in the opportunity section, and that AI could be discussed both in specific use cases and more broadly in Section 6.
- Mr. Katsioulas indicated he felt it would be helpful to use these examples to discuss adjacent technologies in the context of an application. He expressed the need to consider technology in relation to specific application markets.
- Mr. Griffith stated he could provide material related to industrial infrastructure.

- Mr. Chan called for volunteers.
  - Mr. Griffith took an action to do some research on the topics identified in Section 6.
  - Mr. Bergman and Ms. Rerecich said they could provide input on consumer topics.
  - Mr. Witte suggested the regulations and standards were well-covered elsewhere and could be removed from Section 6. Mr. Bergman concurred.
  - Mr. Griffith suggested adding industrial as a topic in parallel with consumers and smart homes.
- Ms. Rerecich asked for clarification on the desired deliverable.
  - Mr. Chan described it as an opportunity to discuss topics the Board feels the federal government should know about. He said it can present context about these topics or possibly use cases or describe challenges and issues unique to those topic areas. He discouraged adding recommendations in this section.

Graphics

- Mr. Witte discussed the potential for using graphics in the report. He encouraged the contribution of graphics to convey ideas visually and break up the extensive text of the report. He also suggested statistics as another useful way of providing variety and strengthening the justifications. He noted that NIST can produce infographics if the Board has ideas for such.

Recommendations from Speakers at July Meeting

Mr. Chan, Chair

Document: Outside Speaker Recommendations

- Mr. Chan explained that the recommendations from July meeting outside speakers, as well as from previous meetings, had been extracted and sent to Board members as part of the pre-read materials.
  - Ms. Cuthill clarified that recommendations in the table from Ms. Fung's presentation were crafted for an IEEE committee, and that Ms. Fung wanted to bring them to the board's attention. She said the goals was to make the recommendations easily accessible to the board for individual consideration. She pointed out that the presentations from the meeting, available on the Board's website, provide context for better understanding the recommendations.
- Mr. Chan assigned Board members to consider the recommendations:
  - Chris Moore's recommendations: Ms. Rerecich and Ms. Coughlin
  - Ms. Fung's recommendations: Ms. Mehra
  - Chris Autrey's recommendations: Mr. Chan took an action to consult further with Mr. Autrey.
  - Paul Eisler's recommendations: Mr. Bergman noted he was involved in developing these recommendations. He suggested:

- US hosting of standards meetings (#1) and efforts at reforming standards body governance (#2) should be taken up by the International subgroup.
- Reforming standards body governance (#2)
- Incentives for small business participation in standards work (#3) could go into the commentary write-up about small business.

Action Items and Wrap Up

Slide deck: Chair Agenda Discussion Slides

- Mr. Chan shared the Day 2 agenda.
- Mr. Chan asked which subgroups have recommendations.
  - Privacy, International, Cybersecurity, Transportation, possibly Agriculture
- Mr. Chan announced there was consensus to end the Day 1 meeting.

Closing

Ms. Cuthill adjourned the meeting.

IoTAB Meeting on Wednesday, August 23, 2023

Opening Remarks

Ms. Cuthill opened the day's meeting. She thanked people for attending and turned the meeting over to the chair, Mr. Chan.

Mr. Chan reviewed the agenda and introduced the invited speakers.

- Shared slides of the agenda for Day 2.
- Today will go through recommendations that were new that were not in the report as well as ones that needed an update. Some may have been incorporated, but today we will go through them today.
- Noted that some board members were not with us today and would need to shift around recommendations.

Recommendations Requiring Discussion – Not currently included in draft Report

Smart Transportation

Mr. Steve Griffith

Document: Smart Transportation Draft Recommendations

Smart Transportation: Recommendation 6	The federal government should promote the development and adoption of policies, procedures, and funding methods that can accelerate the adoption of smart, connected, and electrified transportation technologies. Many of these technologies incorporate the use of IoT.
Moving Forward	Issues: • Provide more specificity regarding funding sources that might be applied.

- Mr. Griffith described the challenges for small businesses and local governments to afford investments in such technologies, which can improve safety, reduce emissions, assist in finding charging stations for electric vehicles, improve traffic flow, and provide other benefits.

Smart Transportation: Recommendation XX	The federal government should promote the development and adoption of policies, procedures, and funding methods that can accelerate the adoption of IoT technologies manufactured by small business and startup organizations.
Held back for further work	Issues: • Not enough clarity on the recommendation, may apply to a broader recommendation outside of just transportation.

- Mr. Griffith described some of the challenges small business face getting capital funding for projects, and their difficulties competing against larger organizations. He said his discussions were with transportation sector businesses, but the recommendation was broader.

- Ms. Lam noted the potential overlap with the previous recommendation and suggested perhaps one should focus on local government and the other on small businesses, noting that the goals are similar, but the tactics would be different. For example, business have to gain access to government procurement processes to bid as vendors. She agreed both were broader than transportation.
- Dr. Chandra noted that customers often have concerns about the longevity of small businesses and startups to support the technology they provide.
    - Mr. Chan suggested this should be identified as a barrier.

Environmental Monitoring

Dr. Ranveer Chandra

Document: Environmental Monitoring Draft Recommendations

Environmental Monitoring Recommendation 4	Implement a nationwide IoT water monitoring infrastructure.
Approved to move forward	Issues: • Develop supporting recommendations with additional specifics

- Dr. Chandra explained that NOAA has a water model based on satellite images driving simulations. He described this as providing a "macro level" understanding of water use, but that micro level information is unavailable. He described the recommendation as adding transparency to supplement the NOAA data. He noted that many companies have made commitments around water and other environmental concerns, and the type of monitoring recommended could measure progress against those commitments.
- Mr. Bergman suggested recommending a study and pilot programs to determine the most effective approach to micro-level water monitoring, leading to broader deployment.
    - Dr. Chandra said he would develop a corresponding recommendation.

Environmental Monitoring Recommendation 4	Encourage sharing of IoT Technologies to Estimate and Mitigate Carbon Emissions in Farms
Approved to move forward	Issues: • Develop overarching recommendation regarding use of IoT for monitoring various types of systems (e.g., environmental, transportation) • Group this and other similar recommendations as supporting

- Dr. Chandra explained the difficulties in measuring the generation of greenhouse gases from agriculture, saying the recommendation included both the use of IoT for measurement and the sharing of data since the data system today is "closed". He described this as a two-part recommendation, covering both monitoring for data collection and data sharing. He said that data doesn't need to be shared for free but there is a need to be more granular understanding carbon emissions from farms.
- Dr. Chandra acknowledged the need to anonymize data and protect trade secrets. He also related this recommendation to transparency requirements that are becoming common in Europe. He also noted

incentive funding provided by USDA to promote particular agriculture practices, saying right now there is no way to monitor the results.

- The Board concluded this recommendation should be kept, and an overarching recommendation drawn from it.

International Considerations

Mr. Dan Caprio

Slides: International Draft Recommendations

International Recommendation 14.1	The IoTAB strongly supports the voluntary public/private partnership that created the US Cyber Trust Mark.
Held back for further work	Issues: • Mr. Bergman and Mr. Caprio to develop revised language

- Mr. Caprio noted the language from the White House announcement and explained that the international element is a State Department commitment to engage partners and allies and pursuing mutual recognition. He acknowledged this recommendation is not covering new ground but said it is important for the board to agree to this, saying there is both industry and international interest.
- Mr. Bergman noted that many government agencies would have a role related to this recommendation and suggested alternative language:
    - The US Department of State must be committed to supporting the sector relevant agency and NIST for each of the mark programs, and industry, to engage allies and partners ... (Mr. Bergman's proposal was incomplete).
- Mr. Bergman and Mr. Caprio agreed to work offline to refine and complete Mr. Bergman's phrasing.

International Recommendation 14.2	The government should create internationally compatible data minimization guidance related to IoT devices, aligning with the NIST Privacy Framework and NIST Cybersecurity Framework principles.
Approved to move forward	Issues: • None

- Ms. Reynolds explained this recommendation had been revised from the version presented at the July meeting, with recommendation to create a data minimization international standard changed to creating international-compatible data minimization guidance. She said that data minimization is inherently supportive of privacy-by-design, which is addressed in a separate recommendation.

Privacy Recommendations

Ms. Debbie Reynolds

Slides: Privacy Recommendations

Document: Privacy Draft Recommendations

Ms. Reynolds shows the list of privacy recommendations, noting that #4 had been updated since the July meeting and #8 (privacy by design) is new.

Privacy Recommendation 4	Include IoT in US Federal Privacy Regulation Proposal
Approved to move forward	Issues: • None

- Ms. Reynolds explained that there is a push toward getting some type of federal data privacy law or regulation, noting there are at least proposals before Congress. She pointed to increased enforcement of existing laws, for example by the FTC, and increasing friction internationally. She said the proposal in this recommendation is to ensure IoT is included in any proposed federal privacy legislation, and the rewording had removed references to any specific legislation.

Privacy Recommendation 8	Promote "Privacy by Design" in IoT device development, deployment, and implementation
Approved to move forward	Issues: • None

- Ms. Reynolds stated this recommendation aligns with the U.S. national strategy for advancing privacy-preserving data sharing and analytics. She also related it to the national cybersecurity strategy implementation plan call to drive development of secure-by-design and secure-by-default hardware and software. She stated that privacy-by-design will also with international data standards, noting the concept's presence in the EU GDPR and ISO standards.

Sustainable Infrastructure

Mr. Dan Caprio, Mr. Benson Chan

Slides: Recommendations – Sustainable Infrastructure – July 18-19, 2023

Sustainable Infrastructure R11	Establish a National Emerging Technology Office
Held back for further work	Issues: • Mr. Caprio and Mr. Bergman to refine, focusing on the outcome rather than the mechanism. • Consider the potential impacts of S.18.73 and S.1577.

- Mr. Chan explained this had relates to the recommendation for an emerging technology office point of contact in federal agencies (Sustainable Infrastructure R08).
- Mr. Caprio described this proposal as one of the overarching themes, related to the opportunity for the federal government, especially the White House and the OSTP, to lead on emerging technologies. He said that without leadership things don't get appropriate attention. He described the goal as providing for an early warning system for emerging technologies to ensure there is coordination with federal agencies and state and local governments. He said this was a way of applying lessons learned from the IoT to future emerging technologies. Mr. Caprio said the recommendation avoids specific technologies in order to be forward-looking.

- Mr. Caprio clarified this would be a supporting recommendation under the theme of emerging technologies.

Group Discussion

- Mr. Bergman suggested an alternative approach of recommending that OSTP add a critical emerging technology focus to their charter and identifying that IoT should be viewed as a critical emerging technology. He noted that OSTP staffing has been restored under the current administration. He noted that having two offices in the White House with overlapping responsibilities can be problematic.
- Mr. Caprio said he wanted to make sure the proposal was "emphatic". He expressed concern that OSTP has not been performing the coordination function but acknowledged that the creation of a new office could take a very long time.
- Ms. Reynolds emphasized the need to recognize the gap in ownership for emerging technologies, whether or not a new office is created.
- Mr. Bergman suggested focusing on the outcome, rather than the mechanism to achieve it. He described the outcome as the federal government establishing more priority for emerging technologies, including IoT, within the executive office.
- Mr. Chan noted that the proposed legislation listed on slide[2] should be considered. He also suggested considering S.1577.[3] He suggested that how the legislation plays out may impact how the board talks about it.

Cybersecurity Recommendations

Mr. Michael Bergman

Slides: Cybersecurity Slide Deck

Document: Cybersecurity Draft Recommendations

Mr. Bergman shared two new recommendations from the cybersecurity subgroup.

Cybersecurity R.06	The federal government should promote and support the development of an overarching guideline developed in a multi-stakeholder process that more clearly distinguishes the major sectors of the IoT for use when dealing with concerns such as cybersecurity.
Held back for further work	Issues: • Intent and goals of recommendation remain unclear • Concerns about conflict with already-defined statutory authorities of federal agencies

- Mr. Griffith explained the subgroup sees a need for guidance that distinguishes the types of IoT (e.g., consumer, industrial, process sensors) since each sector has distinctive risk criteria. He emphasized the subgroup was not trying to define the sector but rather looking for guidance from a multi-stakeholder process looking across sectors to create guidance. He noted that the standards applied in each sector are distinctive, along with other variations such as attack surfaces, privacy concerns, and degree of physical and life safety implications. He suggested the results could also be helpful for international alignment.

[2] S.1873 - Global Technology Leadership Act
[3] S.1577 - Oversee Emerging Technology Act

He acknowledged the challenges in implementing this recommendation, given the mix of existing regulations, and said the subgroup was looking to the board to help refine it.

- Mr. Katsioulas added that the main goal was to define categories and allow different agencies to set appropriate criteria for their areas of responsibility.
- Mr. Bergman pointed out that agencies already have statutory authorities, which aren't easily changed. He did concur with a goal of keeping regulations regarding consumer IoT from intruding into other areas.
- Mr. Witte suggested that the concepts in this recommendation could be discussed in Section 6 of the report, saying they could be presented as context for the report.

Cybersecurity R.07	The government should consider additional ways to highlight those vulnerabilities most likely to be applicable to IoT product developers.
Held back for further work	Issues: • Concerns about ability to establish and maintain IoT-oriented vulnerability lists or tags from existing vulnerability databases. • Uncertainty about appropriate mechanisms to publish this information.

- Mr. Bergman described the intent as to highlight security vulnerabilities most relevant for IoT product developers. He noted the extensive guidance on vulnerabilities from many sources but explained that presently it is incumbent on developers to identify, and address, known and critical vulnerabilities in their designs and there is no guidance to focus on vulnerabilities relevant to IoT. He stated that more focused guidance or a set of usable filter criteria for the long lists would help an IoT developer address critical and known vulnerabilities. He suggested that either flags on vulnerabilities in existing databases or dedicated lists of IoT-relevant vulnerabilities could be an implementation approach and acknowledged that it would need to be maintained.
- Mr. Katsioulas suggested that the sector risk management agencies should identify the most critical vulnerabilities for their sectors. He also suggested that VEX[4] might be applicable to this need.
    - Mr. Bergman replied that VEX relates to information exchange and probably isn't applicable to this recommendation.

Healthcare Recommendations

Ms. Maria Rerecich

Document: 18 August 2023 Draft Report

Ms. Rerecich requested updates on two recommendations contained in the draft report.

Report Recommendation 2.7	Agencies can promote and, if necessary, develop a protocol for data exchange standards for IoMT (Internet of Medical Things) for interoperability, and promote the adoption of these standards.
Held back for further work	Issues: • Ms. Rerecich and Ms. Reynolds to rework into separate interoperability and privacy recommendations.

[4] Vulnerability Exploitability eXchange; see CISA VEX Use Cases.

- Ms. Rerecich inquired about the status of health recommendations for "HIPAA-like protection of medical data in mobile apps and IoT devices".
    - Mr. Witte stated it is recommendation #2.7 in the draft report, grouped with the data recommendations and tagged as "(Under Review)". He noted the potential for reorganization under the new themes.
    - Ms. Rerecich stated this recommendation was intended to be more about privacy of the data than interoperability, saying that it would be possible to be interoperable without protecting privacy and vice versa.
    - Mr. Bergman noted that the "if necessary, develop" language was counter to the goal of using industry standards wherever possible. He noted that government agencies don't normally develop protocols, rather they are developed by industry consensus.

Draft Report Recommendation 13.1	Raise Priority for IoMT to Healthcare Facilities' Executive Leadership Teams
Moving forward in principle	Issues: • Reword to emphasize the government's role in advising healthcare organization leadership.

- Mr. Witte stated that his notes from the May meeting regarding recommendation 13.1 indicated that what remained to be resolved was to whom it should be directed, specifically what is mean by "healthcare facilities' executive leadership teams". He indicated there was consensus in May on raising the priority.
    - Ms. Rerecich said the intent was to affect how a healthcare facility's or corporation's leadership focuses time, attention, and budget with regard to IoMT versus IT, and to make IoMT equally important. The focus is the people making those decisions.
- Mr. Chan asked what the federal government's role in this would be?
    - Mr. Witte suggested an FDA or HHS advisory to remind healthcare leaders to consider this in their priorities. Ms. Rerecich concurred.
    - Mr. Witte suggested rewording to focus on the government advising healthcare leadership with regard to the priority of IoMT.

Other Business

- Mr. Witte referred to the day 1 discussions regarding updating PPD-21 and pointed to a report from the June meeting of the National Infrastructure Advisory Council that says they are working on an update to PPD-21 based on Solarium Commission recommendations. Mr. Witte stated he had a CISA contact the board could contact. He stated he was confirming a rumor that had been discussed on day 1.
- Mr. Chan opened the floor for other topics the board should discuss.
    - Mr. Witte stated he will reorganize the recommendations using the themes, and said he believes the meeting had addressed most of the concerns highlighted in the current draft. He asked for feedback on the existing report, especially pointers on reducing redundancy or adding cross-references.
    - Mr. Witte asked about the board's resolution regarding the recommendation promoting generative AI. He noted the recommendation was written in support of precision agriculture but could be

applied more broadly. He recalled discussion from the May meeting regarding concerns about the maturity of generative AI.

- Mr. Chan stated he believed it was premature to promote generative AI. He acknowledged that the government would have a role in the application of AI in general.
- Mr. Reynolds noted that the White House has a "blueprint" for an AI bill of rights.
- Mr. Chan created an action to revisit this recommendation with Dr. Chandra.

Action Items and Wrap-up

Mr. Chan, Chair

- Mr. Chan shared the action items below on screen during the meeting:

Action	Who	When
Consider content approach for commentary sections, including adjacent tech.	Steve, Maria, Tom, Benson	8-31-2023
Review the national standards strategy	All	
Send Greg redline updates to the draft	All	8-31-2023
Review July speaker recommendations – Chris Moore	Public Safety subgroup	8-31-2023
Review July speaker recommendations – Mei Lin Fung (where does it fit?)	Ann	8-31-2023
Review July speaker recommendations – Chris Autry	Benson	8-31-2023
Review July speaker recommendations – Paul Eisler	Dan, Mike, Steve	8-31-2023
Collate speaker recommendations from previous speakers for board review	Benson	8-31-2023
Update intelligent traffic recommendation	Steve	8-31-2023
Update intelligent traffic recommendation (small business)	Steve, Debra	8-31-2023
Create overaching carbon measurement recomm, and ag, supply chain, sustainable infrastructure (Ranveer to send out initial recomm copy)	Tom, Steve, Sustainable infrastructure, Ranveer	8-31-2023
Update international recommendation 14.1	Mike, Dan	8-31-2023
Continue discussion on National Emerging Tech Office	Dan, Mike, Pete	8-31-2023
Update wording and split healthcare recommendations (2.7) into 2 recommendations	Maria, Debbie	8-31-2023

Action	Who	When
Cybersecurity recommendation 6 – continue research and update	TomKat, Steve	8-31-2023
Cybersecurity recommendation 7 – research VEX, update	Mike	8-31-2023
NIST/Greg to reach out to person updating PPD21	Greg	8-31-2023
Integrate themes into draft	Greg	8-31-2023
Confirm with Ranveer on generative AI recommendation	Benson	8-31-2023

Meeting Schedule

- The next meetings are set as:
  - September 26th and 27th
  - October 24th and 25th

- No consensus was reached regarding meeting dates for November and beyond. Ms. Cuthill reminded the board that 60 days lead time is needed to publish the FRN for the meeting.
    - Mr. Chan will coordinate additional meeting dates via email.

Ms. Cuthill adjourned the meeting.