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)

January 23 & 24, 2024

Virtual Meeting Platform: Webex

MEETING MINUTES

Board Members	Board Chairs and NIST Staff
Michael J. Bergman, Consumer Technology Association **Dr. Ranveer Chandra**, Microsoft **Nicholas Emanuel**, CropX **Steven E. Griffith**, National Electrical Manufacturers Association **Tom Katsioulas**, Global Semiconductor Alliance **Debra Lam**, Georgia Institute of Technology **Ann Mehra** **Robby Moss**, Moviynt **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:** **Prof. Kevin T. Kornegay**, Morgan State University **Nicole Coughlin**, Town of Cary North Carolina	**Benson M. Chan**, Strategy of Things Inc. (Chair) **Daniel W. Caprio Jr**., The Providence Group (Vice Chair) **Barbara Cuthill**, NIST (Designated Federal Officer) **Jeffrey Brewer**, NIST (Alternate 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) **Wendy Szwerc,** NIST Contractor (Scribe)

Action Items Over Both Days
*Note: Names and roles are **bolded** to show ownership.*

Action items (all due on or before February 7)

For Spreadsheet Ranking Recommendations (Outside Report) --
- All board members (all) to categorize the recommendations and to accept/reject/accept with revisions. All results are anonymous and tentative. **Return spreadsheet to Greg/Barbara by February 7.**

For Findings section
- Need volunteer(s) to pare down equity writeup section in findings (too long). **Need Volunteer.**
- Create a finding speaking to the lack of funding/need for funding as a barrier/challenge for IoT. **Benson.**
   - This is a broad finding that discusses the need for overall funding, from initial projects to sustaining operations once IoT is deployed. This finding is a broad finding covering across industries and markets.
- Revise and pare down the language on supply chain as integrated with findings and recommendations. Can supply chain findings be combined into one or two? **TomKat**
- Update AI findings and consolidate all AI content (i.e., generative AI, existing writeups, Debbie privacy for AI content, Mr. Katsioulas' AI content). **Steve, Debbie, Ranveer.**
- Combine the two business write-ups in findings. **Greg.**
   - Note: Discuss with Benson before doing so. May want to keep separate based on some discussions during meetings.
- Create a template for findings with space to reference corresponding recommendations. **Greg.**
- Pare findings to 1 to 2 pages (including pictures). **Need volunteers.**
- Rephrase findings to include more "positive" outcomes/benefits. **Need volunteers.**
- Pair down content for the finding on lack of trust as a barrier. Mr. Witte at the time indicated it needed to be broken up and is potentially a major barrier to appear earlier in the report. **TomKat (with support from Mike and Debbie)**

For Recommendations section
- Review recommendations and add implementation considerations/information so that each recommendation has content. **Original recommenders.**
- Review supply chain recommendations, findings, and content in the introduction to IoT section and provide feedback to TomKat and Robby. **All board members.**
- Review and contribute content to the lack of coordination at national level finding is a placeholder to support the national strategy recommendation. Specifically, also change national coordination to international coordination. **Dan.**
- Adjust enabling recommendation 1.1.2 (Congress should further improve and elevate inter-agency coordination). Make more specific. **Dan (with support from Mike)**
- Add language acknowledging IoT products from "adversarial" nations and that there is an existing process that should be worked through. This may be in the form of a footnote but need to find a place in the draft report for it. **Mike and Dan.**
- Update recommendation for public safety IoT stockpile based on discussion. **Ann. Board members to provide comments to Ann to incorporate.**
   - Some considerations: Possibly a feasibility and implementation study with an understanding of federal vs local community needs. Also considerations around the governance oversight, types of high priority target applications (e.g., emergency response areas for IoT devices), and trust for the public.

- Review and edit as necessary IoMT content in healthcare finding section. **Ann and Maria**.
- **Ann (with Benson and volunteers)** to review and edit healthcare (HC) recommendations
  - (Notes from meeting to help with healthcare edits : support if identified or indication of other area where could be absorbed with review)
    - HC 1 – Remove this recommendation and add it as an example under the broader standards and interoperability recommendation. **Greg.**
    - HC 2 - Edit recommendation avoid pitfalls and use appropriate terms. **Benson, Mike. Ann.**
    - HC 3 – Remove this recommendation and add as an example under Government Leadership. **Greg.**
    - HC 4 – could be integrated with PET recommendation (needs Debbie's input on this). **Benson, Debbie.**
    - HC 5 – support marked for improvement, needs more action on what is meant by facilitate/support. **Benson. Ann.**
    - HC 6 – Remove recommendation
    - HC 7 – Remove this recommendation and include under Workforce recommendation (med tech) as example
    - HC 8 – support, refine with Ann's inputs. Incorporate Ann comments about replacing workforce improvement with equitable healthcare in title of recommendation. **Greg. Ann.**
- Revise the key recommendation 4.2 so that the 'digital thread' is more concise and clearer. **TomKat, Robbie (with Mike support).**
- Update supply chain writeup. **TomKat and Robby.**
- Review and update 5.4.8 (right to repair recommendation) to make it more about the IoT, as opposed to a broader "right to repair" which is more than IoT. **Nick and Ranveer.**
- Review and revisit 5.4.1 (Agricultural strategy). **Ranveer.**
  - During meeting, there was a question of why Ag IoT strategy is needed (what is so unique for Ag as compared to why don't we need a strategy for each market segment like manufacturing, and why isn't this part of the overall national strategy).
- Review and revise KR 3.3 on Policy and Data Framework. **Debbie**
- Revise 3.3.9 on Sanitization. **Debbie (and Greg).**
  - Debbie to revise the paragraph starting with "the government should leverage…" as text is redundant as result of merging. Greg to revise the NIST references.
- Update recommendation 2.1.1. **Greg.**
- Locate the recommendation related to supply chain and domestic manufacturing. **Steve and Greg**

For Other Items
- Send email to confirm March/April meeting date availability. **Barbara.**
- Advise Greg and team regarding recommended graphic or infographic needs and other report suggestions. **All board members.**

Completed Action Items List
- Nick to rephrase Ag finding to include positive outcomes/benefits. **Done.**
- Debbie to send workflow content to Greg. **Done.**
- Greg and Brad to send out excel sheet with recommendations, vote, and categorization (1, 2, 3). **Done.**

IoTAB Meeting on Tuesday, Jan 23, 2024

Chair Opening Remarks Action Item Review

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

- Mr. Chan went over the agenda and goals for the tenth meeting of the Internet of Things Advisory Board (IoTAB).

Outcomes

- Mr. Chan reviewed the expected outcomes for the meeting:


IoT Advisory Board Meeting # 10 Outcomes

- Baseline understanding of the current state of the latest overall report draft

- Understanding of report structure and format

- Approach to pare down/trim down content to a consumable 150 pages (target)

- Understanding of all recommendations

- Approval/rejection of recommendations for final report

- Identify gaps in content, findings and recommendations

- March/April last meeting date confirmation

- Mr. Bergman asked about the instances where it's indicated that "the government should …" and whether recommendations should be more targeted to individual agencies.

  - Ms. Cuthill indicated that if an agency is clearly known to have a role for a recommendation it can be named but added that there's no expectation the board are experts on the boundaries of agencies. She indicated the Federal IoT Working Group (IoTFWG) can address that.

Schedule/Timeline

- Mr. Witte presented a timeline for the activities planned January through April publication.
- The following milestones were called out:

  - This meeting's focus is on reviewing and refining recommendations and findings.
  - The February meeting will review feedback and confirm consensus.
  - The March meeting review will focus on final review and polish of the report.
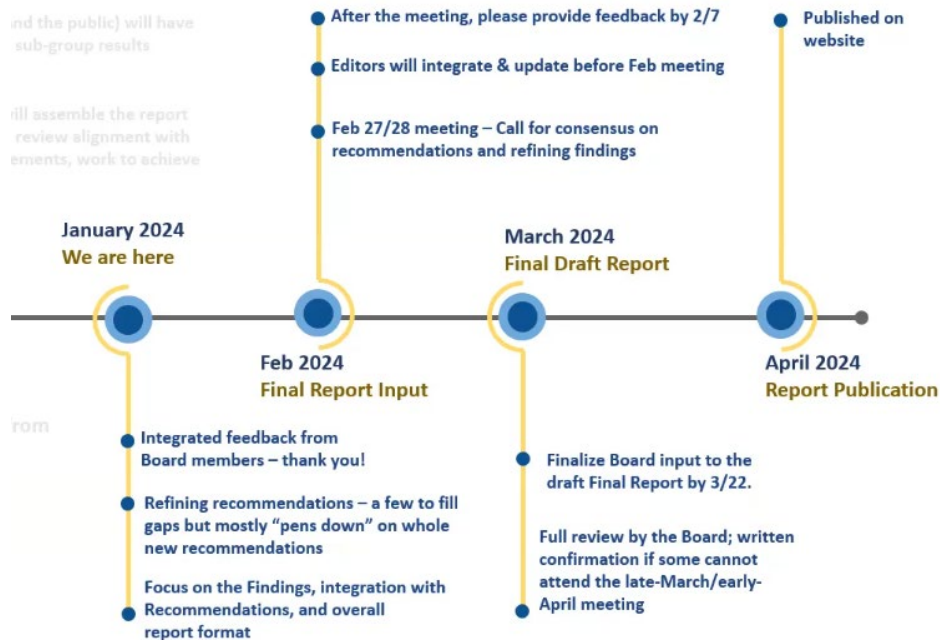
- Mr. Chan asked members to confirm acceptable dates for the March (or April) meeting.

  - Ms. Cuthill indicated that the board is looking for basic consensus on the report in February and would appreciate any indications coming out of the February meeting about accepting the final version of the report.
  - Mr. Witte indicated that the 'final' version of the report would then be revised based on board input by the end of March.

Overview Discussion of the Report

- Mr. Chan presented an overview of the report's structure and status:

  - The Executive Summary hasn't been written yet.
  - The Findings (General and Industry-specific) are a bridge between the Introduction and the Recommendations.

    - Mr. Witte indicated that the findings provide the rationale for the recommendations. He indicated there is still a bit of back-and-forth flow between the findings and recommendations that should be reduced (maybe via hyperlinks or grouping findings and recommendations under themes).
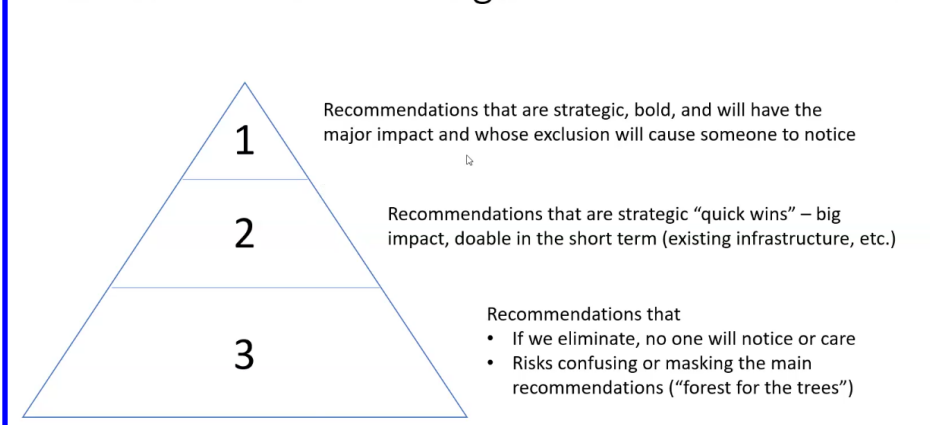
- Mr. Witte indicated other links could be in the glossary and commented that the glossary shouldn't be "another source of formal terms" and things should be layered into the context of the report for readability. A table of items could be another way to identify content directed by Congress.
- Mr. Witte suggested the goal for the report should be no more than 150 pages excluding appendices and much text could be converted to graphics.
- Mr. Chan pointed out that 150 pages is a target. Mr. Witte added that 250+ is too much but 100 is probably not enough.

- Mr. Chan pointed out that from the board's perspective, there are 16 subject matter experts which require a unified board voice. So, there is a process shift from developing recommendations to refining for approval and seeking to speak with a single voice with a broad perspective.
- Mr. Chan described three areas for paring down the report, emphasizing consolidating content, simplifying parts, and determining what to retain in particular for recommendations.
  - Mr. Witte agreed there are areas to combine and there should be agreement on the priorities.

Paring down content (Target 150 pages)

- Consolidate
  - Redundant sections and content
  - Similar recommendations across industries
- Simplify
  - Cut anything that doesn't directly support the main recommendations, or is important, insightful or relevant
  - Cut anything that will "clutter" up the main messages, findings and recommendations
  - Cut anything that doesn't have any industry or data to support it
  - Cut anything that is "out of scope"
  - If you or the FWG can't understand it, simplify it or cut it
  - Identify content where it can be replaced by a graphic or infographic
- Retain
  - Identify the most important, impactful and "move the needle" recommendations
  - Cut or move to appendix "supplementary" recommendations

- Mr. Chan presented three considerations for recommendation categorization to think about during the board's review.

Recommendations categorization considerations

1 — Recommendations that are strategic, bold, and will have the major impact and whose exclusion will cause someone to notice

2 — Recommendations that are strategic "quick wins" – big impact, doable in the short term (existing infrastructure, etc.)

3 — Recommendations that
- If we eliminate, no one will notice or care
- Risks confusing or masking the main recommendations ("forest for the trees")

- Mr. Chan pointed out that the key point is not creating new findings and recommendations but awareness of compliance with existing recommendations in closing gaps.

Gaps in content approach

Gap	Closure approach	Where
Missing recommendations	Create new recommendations	• Public Safety • Healthcare • Supply chain (logistics)
Missing findings	Create new findings	• TBD
Industry verticals	Create finding and add commentary or infographic to it	• Healthcare (see IoMT writeup in findings)
NDAA topics	Create finding and add commentary or infographic to it	• Small business
Other	tbd	• tbd

- Mr. Witte pointed out that the IoTFWG meeting is a week from this meeting and feedback will be collected there to be presented at the February board meeting on the FWG's observations and opportunities for the board's clarification.
- Mr. Chan indicated that board members should identify things they don't fully understand during the report review.
- Mr. Witte indicated that reduction of text can be helpful and the usefulness of cross-references.
- Mr. Witte invited input regarding stronger or additional findings by February 7.

Introduction

Mr. Chan and Mr. Witte

Document: IoTAB Report

- Mr. Witte gave a summary of the current status of the report:

  - Table of content is revised.
  - Executive Summary will be drafted last.
  - Introduction is being revised and will give an overview of the legislation / charter.

- Mr. Bergman requested the formatting be used to set off the legislation especially if there's a direct quote. He submitted text that was explanatory, but the reader needs to recognize where the tasking is being discussed.
- Mr. Witte provided that in the introduction to IoT is the area from the board's perspective and there is an opportunity to improve the flow of material. He noted that Mr. Katsioulas indicated IoT is a business opportunity as well as a technical problem. There are different types of IoT to consider and this sets the stage for the reader with understanding barriers in a broader sense and a view towards the future.

Findings and Recommendations

Mr. Chan and Mr. Witte

Document: IoTAB Report

Findings

- Mr. Witte described the need to identify the right balance between general and industry-specific findings, explaining that there aren't many industry-specific findings but he considered it important to include them, especially any that correspond to the tasking from the NDAA. Mr. Bergman liked the structure.
- Mr. Chan invited the board to discuss more and indicated Mr. Katsioulas had a different approach which was more forward-looking. Mr. Witte indicated the recommendation should lead to the path of solving the problem. Mr. Bergman added that each of the findings should be something compelling to the board as whole.
- Mr. Witte then moved to discuss recommendations at a high level and the audience that each one would address as an important point whether that is bolding words up front or just making it more clear for the Federal IoT Working Group (IoTFWG). Mr. Witte finished with a review of the themes as part of that recommendation structure from findings.

Recommendations

- Mr. Caprio indicated that the board is still struggling on whether to say Congress or White House in some recommendations. He pointed out that the board has many recommendations that 'should' do something that don't directly tie to Congress or the Executive branch and maybe that's a split in the recommendations. He suggested possibly a generic section, 'The Government should XYZ' and for others that the board can't agree on can go in that separate section.

    - Ms. Cuthill pointed out that the 'should' phrasing is okay to designate to an agency / Congress / White house and that the less specific phrasing reflects the limits of the Board's expertise on Agency boundaries and is not necessarily indicative of more general recommendations.

- Ms. Mehra asked about a cluster analysis to which Mr. Witte responded that the editors tried several analysis approaches with multiple analytic tools but concluded the results were not helpful.
- Mr. Witte shared a slide from a previous meeting where there was a lot of discussion about which agency would implement which recommendation and that perhaps the board is not in a position to direct (i.e., may be interpreted as stepping over a line to call out agencies). He did acknowledge that in some cases, the board might have some insight to suggest in some other less direct way.

    - Mr. Katsioulas suggested parenthetical of possible agencies and Mr. Witte indicated that is the case in some places.
    - Ms. Cuthill indicated that if the board wants a particular agency named, that's up to the board and that the government doesn't expect the board to be experts on where the boundaries may be.

- Mr. Witte indicated that each of the recommendations in the report is also in a spreadsheet used to discuss at a higher level. This shows that there are 102 enabling recommendations.

- Mr. Witte discussed 'recommendation 4a' as an example from the spreadsheet. He asks the board how it would be implemented and what are the barriers to implementation?

  - Mr. Katsioulas agreed that things can be overcome by implementation.
  - Mr. Chan pointed out that the original intent of barriers was implementation challenges, and the justification was identifying the problem to be addressed.
  - Mr. Witte pointed to the benefit of linking both ways and that there are lots of good comments for the board to review.

- Mr. Witte pointed out the next iteration of the report would be a clean version without the already resolved comments with a February 7 turnaround date by the board. He also indicated at the February meeting there would be feedback from the IoTFWG.

  - Ms. Cuthill reiterated that ideas need to be debated in this open meeting and that this meeting is a great place to offer feedback and raise concerns.
  - Mr. Chan indicated that some of the content is outside of areas of expertise, but to speak up if something didn't resonate.

- Mr. Witte turned to discussion under theme 3: connectivity and supply chain for Key Recommendation 5 – Enabling Recommendation 5.1.1: The government should consider upgrading legacy federal owned or operated buildings that have inadequate security in their connected systems.

  - Here he indicated that some of the government capabilities recommendations could be moved up with the strategy.
  - Mr. Chan pointed out that GSA is the biggest landlord in the US and as such fostering industry adoption should be a separate thing. He pointed out that government leadership could be through a strategic plan with their own facilities, international concerns, regulation and legislation, and research and development.
  - Mr. Katsioulas indicated that maybe the recommendations should be spread among sections 1-4 rather than be an assortment of recommendations in this one section.
  - Mr. Witte indicated that most have been consolidated and that perhaps a few could move. He pointed out that when looking at the findings, they are split between general and specific and that could be a way to divide them.
  - Mr. Tseronis mentioned the 16 critical infrastructure sectors and that the sector risk management agencies have not changed. Mr. Bergman followed on that those agency designations come from critical infrastructure but that doesn't cover everything. Mr. Tseronis added that the term critical infrastructure invokes those 16 sectors as an ecosystem.

- Mr. Witte returned to pointing out that section 5 has a total of 62 recommendations while others have 10-20.

  - Mr. Tseronis suggested creating a 1 pager to show alignment between NDAA 'domains' and critical infrastructure sectors.
  - Ms. Reynolds asked if there are subgroupings under the larger 'buckets'?

    - Mr. Witte indicated that the headings can be specifically called out just as domains are called out in legislation.
    - Ms. Reynolds pointed out that he was not discussing a re-order but that from a high-level perspective, it may be better for the reader to see the more high-level things before drilling

down. And those recommendations that span across multiple industries and sectors should be at the front of the report.

- Mr. Chan indicated that visual navigation could show how to go directly into specific sections.
- Mr. Caprio pointed out that for most policymakers/people in government, the findings are important and indicated that a mapping between the findings and recommendations is a good way to give people a way to consume both.
- Ms. Mehra liked the report's organization and drew attention to who would be the audience for the report. She pointed out that some comments speak to Congress / White House while others address the federal agencies.
- She also liked the idea of visual navigation and indicated a dashboard would be helpful to show where all categories fall such as a 'click on graphic' to access findings and recommendations for Congress / White House / Agencies.

- Mr. Witte showed the Solarium report[1] and how they started each theme with a strategic objective for what the US should do, followed by key recommendations and enabling recommendations. They just say do it, e.g., "Establish the relationship..."; followed by a summary roll-up of Pillars / Keys / Enablers. Using the recommendation spreadsheet, Mr. Witte showed that the board's report's Theme / Key Recommendation / Enabling Recommendation structure is similar. He agreed that a more visual representation would make it easier to follow.
- Mr. Chan pointed out that the Executive Summary can take some of Mr. Caprio's feedback and address Ms. Mehra's and Ms. Reynolds's points. It could be a non-traditional Executive summary, if needed, that explains how to navigate the report.
- Mr. Witte called attention to the report's conclusion as well, saying the report needs a hard-hitting conclusion with additional references.
- Ms. Reynolds thinks the horizontal elements need to be higher up in the report and can maybe trim them downstream.

  - Mr. Witte started with cross-cutting first but can point out both horizontal and vertical early on. He pointed out that industry findings could lead to the horizontals.
  - Ms. Reynolds followed on that each recommendation was presented using Mr. Chan's template and that restating barriers and categories is redundant.

- Ms. Mehra pointed back to adding a clickable visual that introduces the report adding an element of digitalization.
- Mr. Witte called attention to listing of stakeholders as a section in the appendix. He still finds it important but didn't want it in the way of findings and recommendations.

  - Ms. Mehra indicated this could be added to the visual graphic.

Supply Chain

- Mr. Witte turned to discussion on the supply chain transparency work as being an extensive write-up and is now included in the appendix as it was not tightly integrated with findings and recommendations. He indicated the volume of text is probably too much at present, but the board is open to discuss how to better include this material.

  - Mr. Katsioulas offered to reduce and follow up with Mr. Chan and Mr. Witte.

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[1] https://cybersolarium.org/wp-content/uploads/2022/05/CSC-Final-Report.pdf

- Mr. Chan indicated it's better to discuss input in this meeting and agree collectively. Indicated that the board needs to decide if it's a recommendation and if so, reduce text.
- Mr. Katsioulas expressed interest in tying the implementation strategy into the international leadership theme in some way.
- Mr. Bergman could see it broken out as a separate whitepaper or revised in the appendix.
- Mr. Caprio agreed that there is a lot of content and most seems to be out of scope for the report. He also liked the idea of a stand-alone white paper.
- Mr. Katsioulas indicated the material is an outcome of the subgroup process incorporating feedback and the write-up matches the speaker's notes. He asked what specifics are seen as out of scope.

    - Mr. Caprio pointed to a heavy focus on CHIPS, and this raises potentially two scope concerns (1) many speakers spoke to the board but no one talked about CHIPS and (2) emphasis on CHIPS Act seems out of scope in itself.
    - Mr. Katsioulas indicated he would be open to redline feedback on text and considers CHIPS included because it's foundational for IoT. He welcomes specific feedback to resolve the issues.

- Ms. Reynolds pointed out that last meeting "supply chain" was agreed to in place of "value chain", but still sees many instances of "value chain".

    - Mr. Katsioulas acknowledges and can do a simple replacement. This is about asset supply chains and was open to scope discussions but doesn't see CHIPS as out of scope.

- Mr. Bergman pointed out that the material isn't as much about IoT as it is about the electronics ecosystem and thinks that the focus should be on things specific to IoT. The content here applies to several non-IoT products and technologies.

    - Mr. Katsioulas pointed out that supply chain is about devices that contain chips and the trust involved.

- Ms. Reynolds indicated a need to target the right audience and that some of the material in this section is too down in the weeds for the reader. There was concurrence on this point among other board members.
- Mr. Bergman indicated that a lot of the text reads as business jargon that may not be familiar to a certain audience, leading to needing more definitions to understand the content.
- Mr. Witte asked the board for feedback on example findings with slower than expected adoption.

    - Mr. Bergman noted the need for critical review of some findings. Suggested merging small businesses and emphasized critical scrutiny of the disconnected supply chain group. Appreciated the overall level of detail.

Graphics and Audience

- Mr. Witte indicated a preference for graphics over heavy statistics that distract from the overall story. Emphasizes linking recommendations back to findings (and the lack of one may indicate a problem to be addressed).

    - Mr. Katsioulas asked about the link between findings and recommendations.

- Mr. Witte pointed out that there could be separate sections for findings and recommendations with hyperlinks and numbering for easy reference. Editors can add hyperlinks based on board input and this would help illustrate how recommendations could be presented.
- Ms. Mehra proposed a "vignette" like a callout box to enhance navigation without adding pages.
- Mr. Chan thought that could be a good idea but asked about space constraints and page limits for findings/recommendations. Mr. Katsioulas would also like to page limit per finding/recommendation.
- Ms. Mehra indicated it could help visualize recommendation coverage and noted consensus on findings and recommendations. She then questioned visual navigation for different audiences. Mr. Witte also agreed on multiple access points.

- Ms. Reynolds emphasized audience needs and early impact in the report.
- Mr. Witte noted that the Solarium report had a roll up at the end but for this report, he would prefer it to be up front. Mr. Witte also noted that the audience for Solarium was Congress.

  - Ms. Mehra pointed to hitting all of government, business, and consumer.
  - Ms. Reynolds indicated that the Biden Administration EO on AI was well written and a good example for similar challenges as it addresses all of the same audiences.

Barriers to IoT Adoption

- Mr. Witte emphasized shooting for one or two pages for each finding and trying to focus on barriers to address the problem to be solved. He emphasized framing findings as needs/questions and recommendations as solutions.

  - Ms. Reynolds agreed on barriers but not a detailed list, so people lose focus. He preferred summarizing into concise points linked to recommendations for better readability.
  - Ms. Reynolds pointed to rolling barriers into one paragraph for each overarching recommendation but don't repeat them individually. Mr. Witte agreed.

- Mr. Katsioulas asked should all barriers be in a section upfront?

  - Ms. Reynolds indicated no and that the report currently mentions each barrier with its related recommendation. Instead, for an overarching recommendation with sub-recommendations, write a single paragraph summarizing all its barriers, then list the sub-recommendations.

- Mr. Katsioulas liked the idea of barriers with recommendations but was unsure where to place them.

  - Ms. Reynolds pointed out the discussion centers on barriers.
  - Mr. Witte indicated there is a lot of redundancy in barriers and that bundling them is good. He also is considering moving enabling recommendations back into the main recommendations section.

Findings/Challenges

- Mr. Katsioulas summarized, describing that the board would list findings and challenges, then discuss strategies/solutions and follow with recommendations. He indicated 1-2 pages per finding as a good target length, potentially less with graphics. He also described removing barriers from enabling recommendations to above them and focusing on solutions in the enabling section.

  - Ms. Reynolds agreed.

- Mr. Bergman added that not all findings have barriers so the board would need to remain flexible.

- Mr. Witte highlighted the goal was consistency of presentation but not an absolutely rigid structure, given not all findings include barriers. He pointed to the example that 'small business can benefit, but barriers block adoption' as an example where rewording might be appropriate.

  - Mr. Katsioulas indicated a focus on problems with potential benefits, not solutions. Maybe have it be a little more forward looking.
  - Mr. Witte indicated that at minimum how we solve the problem would be in the recommendation. He then asked about bolding the wording of the finding to emphasize it and whether the bolding would be limited to the finding for emphasis.
  - Mr. Katsioulas indicated yes what's the value added if it doesn't hint at the solution. Mr. Griffith concurred and indicated it could be short.

- Mr. Chan said there could be multiple approaches to address a finding, but the report should keep it short and punchy.

  - Mr. Witte pointed out he is interested in general guidance and indicated there could be outliers.

- Mr. Caprio wanted to know where this left the key recommendations.

  - Mr. Witte indicated they are still there as the main destination from findings and would go first. Enablers are supplemental.
  - Ms. Mehra thought it seemed like a reasonable approach. But indicated the scorecard for IoT adoption is not very green. Maybe there's more about budgets and funding as a barrier rather than being a component of many findings and recommendations.

Funding

- Mr. Bergman asked if there is a recommendation that programs should be fully funded?

  - Ms. Mehra pointed out that financial challenges are scattered throughout the report but may be more emphasized as a single finding.

- Mr. Bergman indicated he has compared the recommendations to the findings.

  - He offered that maybe there should be a recommendation about investing in current and future IoT tied into research recommendations. And then the board can link to that when discussing the full findings (for example an issue of start-up funding not being followed with operating/maintenance funding).
  - Ms. Mehra concurred. She stated that the lack of on-going (or any funding) needs to be addressed. She also pointed that IoT should be similar to CHIPS in this area.

    - Mr. Katsioulas pointed out that the government can't fund everything and that's why there's an emphasis on low-cost pilots that illustrate economic value. He thinks these are more likely to be funded than huge (e.g., $500B) CHIPS-like funding. He noted that CHIPS is requiring businesses to put in some of their own money.
    - Ms. Mehra also added that 'lack of [ongoing] funding' is a barrier and should be a finding that calls that out. There are many recommendations that can point back to that finding including recommendations for PPPs.

- Mr. Chan pointed out the placeholder finding regarding the lack of coordination regarding IoT at the national level finding, saying it would support the national strategy recommendation and indicating that Mr. Caprio and Mr. Tseronis were anticipated to provide supporting text.

    - Mr. Bergman requested the text for this finding be made available soon enough to permit iteration to improve it before the next meeting.
    - Mr. Witte pointed out that names associated with findings were suggestions and any board member can contribute content. He also pointed out that board members should push back on findings where they believe more substantiation is needed.

- Mr. Witte suggested the finding regarding equity of access should be cut down or split up due to its current volume of content.

    - Mr. Bergman noted that the report only has a small number of equity recommendations, so the findings and their associated explanatory text could be pared down. He also noted that there are two findings related to small businesses that are very similar and could be combined. Mr. Griffith concurred.

- Mr. Witte noted the finding regarding innovative business models could be supported with some of Mr. Katsioulas' existing material. He noted that an increased focus on business considerations had materially improved the report.

    - Mr. Bergman suggested that this finding could take the place of the six preceding findings, which he said were detailed exposition about core concepts to a depth greater than appropriate for the audience.

- Mr. Witte noted that the interoperability finding has many associated recommendations, and some of the content from there could be moved to the findings.

    - Mr. Bergman cautioned about expanding this finding significantly, suggesting that the 1–2-page target for recommendations should also apply to the findings. He noted that the Solarium report's findings were very concise.

- Mr. Witte noted the finding on connectivity challenges may have too many specifics and needs more solution-oriented content to avoid a negative tone.
- Mr. Witte stated the finding on lack of trust as a barrier probably would be longer and may need to be broken up. He also noted that he hears about this topic frequently and suggested that it is a major barrier that should appear earlier in the report.

    - Mr. Chan stated this finding includes content came from himself and Mr. Katsioulas, and requested assistance from Mr. Bergman, Ms. Reynolds, and Mr. Katsioulas in paring it down.

- Mr. Witte discussed the finding on the importance of AI noting that trustworthiness is also an important aspect. He noted this finding was currently about 5 pages and probably needed to be shortened. He suggested some material could move to an appendix and asked for the board's guidance.

    - Ms. Reynolds concurred about the importance of addressing AI in the report and suggested the finding should focus on the impacts of AI rather than the generative aspects. She further suggested the finding should be general and types of AI would be better discussed in an appendix.

- Mr. Chan noted this is another finding with multiple contributors and suggested that some form of graphical presentation could help condense it. He concurred with moving the details to an appendix.
- Mr. Griffith took an action to help address the size of the AI finding, and Ms. Reynolds: offered to assist.

- Mr. Witte discussed the finding of legacy infrastructure as barrier to IoT adoption, suggested that it can support numerous recommendations but might be overly broad.

  - Mr. Bergman supported the findings regarding legacy infrastructure and associated security and interoperability challenges, but requested clarification how the finding leads to the need for a "multi-stakeholder platform-based business infrastructure".
  - Ms. Reynolds stated it is hard to imagine what the IoTFWG or Congress could do to make this actionable.
  - Mr. Katsioulas stated that the finding links to recommendations for "orchestrated PPPs", emphasizing the value of orchestration.

- The discussion then moved to discussing the transition from legacy technology supporting supply chains to the technology needed to support digital threads for IoT products.
  - Mr. Bergman responded that he believes the digitization / digital thread / future of business material is the least understandable part of the report and he is concerned that material is going forward without a clear understanding by the board members. He expressed concerns that the terminology was unfamiliar and difficult to reference. He added he believed the material could be compressed significantly.
  - Mr. Katsioulas stated the key terms are "digitalization" and "digital transformation" and that both are needed for a manufacturer to become a "connected supplier" of digital devices to their customers.
  - Mr. Bergman stated he was not seeing the connection of these concepts to IoT, rather than simply to enterprises in general.
  - Mr. Caprio concurred with Mr. Bergman.
  - Mr. Chan asked the board members if they understand Mr. Katsioulas' material.

    - Mr. Griffith stated he was having a hard time and expressed concern that readers will "just gloss over" this stuff.
    - Ms. Reynolds stated that these sections need to be better aligned with the rest of report and supported Mr. Griffith's concern about the material being ignored.
    - Mr. Katsioulas offered he could reduce the material but requested broader input from more board members and specifics.
    - Ms. Reynolds stated she didn't feel able to provide specific feedback.
    - Mr. Chan described the material as "forward looking" and addressing more than just IoT matters.
    - Mr. Katsioulas described the concept as an orchestrated approach to problems that have been solved in siloes, where the network effects can benefit both producers and consumers. He described "siloes and fragmentation" as a key problem that needs to be solved.
    - Mr. Chan offered that he saw potential to describe these new concepts in a way that gets the message through.

- Mr. Witte discussed the finding that slow adoption of digital transformation is a barrier to IoT adoption and asked how it connected to the previous discussion.

- Mr. Katsioulas reported that McKinsey has said slow adoption was due to slow digitalization, and that new trends indicate digitalization is happening now and should accelerate, but that businesses go through a 3-step evolution taking several years.
- Ms. Rerecich addressed the sequence of findings regarding digital transformation. She suggested a clearer definition is needed. She concurred with the first finding but expressed concern about promoting the "everything as a service" business model as it may not be good for consumers. She expressed support for ecosystems working with each other.
- Mr. Katsioulas responded that the material being discussed is for the enterprise only.
- Ms. Rerecich suggested that distinction should be made clearer.

- Mr. Witte suggested the finding regarding convergence of AI, IoT and adjacent technologies could be combined with previous AI components.

  - Mr. Katsioulas described this finding as "more of a vision" rather than a specific finding.
  - Mr. Griffith suggested combining it into an AI appendix.

- Mr. Witte pointed to the industry-oriented findings, using as an example the finding that "IoT brings significant value to agriculture but adoption is slow" and asked whether these finding statements should be left general or include specifics.

  - Mr. Chan recommended providing details in the prose or via a graphic.
  - Mr. Emmanual took an action to rewrite the finding description to clarify the value provided.

- Mr. Witte pointed to subsequent similar findings.

  - Mr. Griffith recalled a desire to have the bold findings statements include positive content.
  - Mr. Witte noted that negativity is a common characteristic of many of the industry findings.

- Mr. Witte asked for guidance on the length of these findings, asking if 1-2 pages per domain-specific finding was appropriate.

  - Mr. Griffith suggested the traffic finding could be condensed to 1-2 pages.
  - Mr. Katsioulas concurred that 1-2 pages was appropriate. He noted that he'd found AI tools can condense a summary to a specified length while retaining the key points.

Report Introduction

Mr. Chan and Mr. Witte

Mr. Witte led an overview of the introduction.

- Mr. Witte described the latest text as "a bit more visionary". He noted the Solarium Report had begun with hard-hitting visionary content and stated the desire to provide a brief introduction that would set the stage for the future.
- Mr. Chan noted that some visionary material had been moved into the introduction.
- Mr. Witte walked through the background and technical architecture.

  - Mr. Katsioulas expressed concern the material isn't understandable for a non-technical reader and gets into the definition of what IoT is which the board had avoided. He suggested keeping the diagram but having material that focused on what IoT is and why it's valuable in non-technical terms.

- Mr. Witte the introduction incorporates material about how IoT can transform business models and discusses business ecosystems. Mr. Katsioulas said he could offer improvements based on suggestions from Mr. Bergman.
- Mr. Witte noted that material regarding consumer and smart home IoT could be integrated. He noted that this topic wasn't a focal point of the NDAA but is important in the IoT market. He stated the material needed to be condensed.

  - Mr. Katsioulas suggested emphasizing that consumer adoption is on the leading edge and other markets need to accelerate as well.

- Mr. Witte noted the section on the current state of IoT would be updated with board member feedback, especially from Mr. Bergman. He noted this section offered many statistics that could be repackaged as graphics.

  - Mr. Chan noted a 2017 "green paper" about IoT[2] and one intent of this material is to show what has changed.
  - Mr. Katsioulas suggested using more global numbers from a source such as McKinsey, saying the U.S. only number are "relatively small".

- Mr. Witte pointed to the section on the Future of IoT which he said should be used to set the vision, noting there is a lot of good research referenced in this section. He identified this as a section that can be condensed or have portions relocated.

  - Mr. Katsioulas suggested developing a budget of pages to help focus the editing process toward meeting a specific target for each section.
  - Mr. Witte offered the need to make decisions regarding whether topics such as Tech Innovation Hubs or Orchestrated Business Ecosystems are necessary to discussing the future of IoT.

- Mr. Witte suggested the background should be no more than 20 pages versus its current 50 page.

  - Ms. Rerecich summarized the board's choices to reduce 272 pages to 150 is to either reduce detail or discuss fewer items.
  - Ms. Cuthill pointed out that the Board must decide on the length and asked if the 150 pages target proposed by Mr. Witte and Mr. Chan includes appendices. Mr. Witte indicated that it did not and described appendices as a tool to share important information not directly related to findings and recommendations. He acknowledged that there is considerable redundancy in the recommendations that can be removed, saving as much as 50 pages. He discussed other condensation mechanics such as moving descriptions of challenges from the recommendations to the findings.
  - Mr. Chan pointed out that the category 1, 2, and 3 designations of the recommendations is another tool that can be used to limit the length, and that only 1s and 2s will be retained.
  - Mr. Witte suggested the category 3 recommendations could be consolidated to a table in an appendix, so they are retained. He noted some recommendations likely will still be cut from the report.
  - Mr. Katsioulas suggested an overall page target of 200 pages, including appendices.

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[2] U.S. Department of Commerce Fact Sheet: Fostering the Advancement of the Internet of Things, https://www.commerce.gov/news/fact-sheets/2017/01/fact-sheet-fostering-advancement-internet-things

Recommendations – Government leadership

Mr. Chan and Mr. Witte

- Mr. Witte: asked Benson to explain what he wants for the reorg of section 5. [shared spreadsheet]
- Mr. Chan reviewed his suggested approach to reorganizing the recommendations section:

  - Some recommendations are strategic, relating to establishing and tracking implementation of a national strategy. This section would include the more impactful things the government can do, such as requiring government use of IoT in its own facilities and adding requirements for organizations to use IoT when receiving government funding.
  - The remaining recommendations relate to the government leading the way through facilitating industry adoption with specifics for various industries.

- Mr. Tseronis expressed support for this approach.
- Mr. Caprio stated the national strategy makes sense. He described is as "seminal" and emphasized not diluting that content.
- Mr. Witte asked whether international recommendations would all under the theme of government leadership.

  - Mr. Caprio responded that the primary international recommendation relates to the U.S. Cyber Trust Mark and conformity assessment, and that political action between the U.S. and the EU is moving forward in that area.
  - Mr. Chan suggested the approach of having a commentary section regarding international matters.
  - Mr. Bergman suggested adding the international dimension to the current finding discussing national coordination.
  - Ms. Mehra suggested recommending further research regarding opportunities for international leadership.
  - Mr. Chan noted that international aspects can include the global nature of the supply chain and trade issues. He stated those could be used in creating commentary.
  - Mr. Katsioulas noted that a national strategy needs to include an international component related to imports and exports.

- Mr. Witte rewrote Key Recommendation (KR) 1.1 to: "Congress and the White House must work together to create and implement a coordinated national IoT strategy."

  - The board members supported this language.

- Mr. Witte- noted the three Enabling Recommendations (ER) 1.1.1-3 have been discussed before.

  - Regarding ER 1.1.2 Mr. Witte asked for any changes to the wording (e.g., adding specific mention of IoT).

    - Mr. Bergman suggested that specificity is needed to separate the recommendation from existing activities of federal agencies and the IoT FWG.
    - Mr. Caprio took an action to work with Mr. Bergman to strengthen ER 1.1.2.

  - Mr. Witte asked if ER 1.1.3 should remain standalone or integrated with other recommendations.

    - The board members agreed that the content of ER 1.1.3 should be integrated into ERs 1.1.1 and 1.1.2, including wording related to creating an "iot.gov" website.

Mr. Witte shifted discussion to the recommendations in Section 5.

- Mr. Witte discussed ER 5.1.1 and asked if it should be broadened from federally owned buildings to all federal facilities, assets, and operations.

  - The board members agreed with this change to ER 5.1.1.

- Mr. Witte discussed ER 5.1.2 and suggested it should be moved to the Smart City section.

  - The board members agree with moving ER 5.1.2.

- Mr. Witte discussed ER 5.1.3 and suggested it should be moved to the National Leadership section. He pointed out related ERs 5.16.x regarding specific funding objectives and suggested the possibility to combine them into a smaller set of ERs for improved research.

  - After concerns from several members the board agreed to drop the word "fully" from ER 5.1.3.
  - Mr. Witte took an action to review suggested funding targets provided by a speaker at an early IoTAB meeting.

- Mr. Witte discussed ER 5.2.1.

  - Mr. Tseronis noted the link between this ER and government sustainability efforts[3], saying this ER shows that the board recognizes the role that IoT can play in sustainable infrastructure.
  - The board agreed to retain this ER.

- Mr. Witte discussed ER 5.2.2, noting that Mr. Chan has suggested combining ERs 5.2.1.and 5.2.2.

  - Mr. Chan clarified that ER 5.2.1 applies to use of IoT in existing assets the government has, whereas ER5.2.2 is focused on including IoT in federal funded projects.
  - The board agreed ERs 5.2.1 and 5.2.2 could be combined but that sustainability considerations need to be clearly identified as part of the combined recommendation.

- Mr. Witte discussed KR 5.3 noting it had been previously revised and is clear.
- Mr. Witte discussed ER 5.3.1 and suggested it could be combined with or replace current KR 5.3.

  - Mr. Chan noted the concern that federal funding often includes "project money" to implement something but no "program money" to keep it running.

- Mr. Witte discussed ER 5.3.2 and suggested it could be moved under Workforce or become an example under a higher-level recommendation. No objections were raised to moving ER 5.3.2.
- Mr. Witte discussed ER 5.3.3 and suggested it could be used as an example under the earlier KR, saying it is an example of applying a key recommendation in a domain-specific way.

  - The board supported using ER 5.3.3 as an example of applying a broader recommendation, including addressing equity issues through examples of how the government could help underserved communities.
  - Mr. Griffith pointed out the need to ensure that domain-specific implementation considerations are accounted for when combining recommendations.

- Mr. Witte discussed ER 5.4.1 and suggested that a strategy for agricultural IoT could be one element of the national strategy. He said this one of many examples where a decision is needed on how many

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[3] See https://www.sustainability.gov/

places to be specific with recommendations versus providing examples supporting more general recommendations.

- Ms. Reynolds raised the concern of overly homogenizing the report by removing too many domain-specific recommendations. She encouraged keeping this recommendation and connecting national and domain-specific strategies using references.
- Mr. Bergman concurred, nothing that a domain-specific strategy such as agriculture should be consistent with the national strategy.
- Mr. Witte requested the board's SMEs to ER 5.4.1 to make sure it is clear why this domain-specific strategy is needed and what it should include.

- Mr. Witte discussed ER 5.4.2, saying it had previously been discussed and received support.
- Mr. Witte discussed ER 5.4.3, and asked whether Generative AI recommendations are needed for other domains. He noted Mr. Chan had suggested moving this ER to a more general area.

- Ms. Reynolds noted there aren't other recommendations specific to Generative AI and suggested the topic could be added to the general AI discussion and linked to the agriculture ER.
- Mr. Bergman suggested that research into generative AI application for IoT should be added to the collection of recommendations for increased research.
- Ms. Reynolds advocated discussing generative AI in the broader AI section as a way to consume data from IoT and make it more interpretable by end users.

- Mr. Witte discussed ER 5.4.4 and suggested that there could be research regarding the use and regulation of drones for a number of different domains.

- Mr. Bergman stated the original issue was drones are under a mixture of local and FAA regulation, which holds back potential drone applications.
- The board supporting moving this recommendation out of agriculture and making it less domain specific.

- Mr. Witte discussed ER 5.4.5 and noted that is has been thoroughly discussed. He points out there is a report section on connectivity, but this ER is focused on AG-specific broadband needs, and he asked if it should remain in its current location.

- Mr. Chan pointed out other domains can benefit from improved broadband including both rural manufacturing and inner cities.
- Mr. Witte suggesting instead adding an agriculture example under the improved connectivity (KR 2.5).
  - The board members agreed with this change.

- Mr. Witte discussed ER 5.4.6, noting this is one instance of interoperability and that there could be examples from other domains.
- Mr. Witte discussed ER 5.4.7, noting that there were specific points to validate this recommendation.
- Mr. Witte discussed ER 5.4.8 and pointed out that the language regarding reviewing "right to repair" legislation is ambiguous regarding both who should be reviewing and what legislation needs to be reviewed.

- Mr. Chan explained the relevance of this ER to agriculture.
- Ms. Reynolds pointed out that there are privacy implications in right to repair, including for automobiles, and both litigation and state-level legislation.

- Mr. Chan assigned an action to Ms. Reynolds and Mr. Emanuel to review this recommendation and ensure it is specific to IoT and not broader right-to-repair issues.

- Mr. Witte: ER discussed 5.4.9 on Data Confidentiality for AG IoT.

  - Mr. Bergman indicated he would like to pick this up tomorrow when Ms. Reynolds is available

Recommendations - Trust in IoT

Mr. Chan and Mr. Witte

Document: IoTAB Report

- Mr. Witte resumed review of the Recommendations on Trust in IoT which consolidates cybersecurity and privacy topics.
- Mr. Witte discussed KR 3.1 and noted that all cybersecurity guidance falls under it.
- Mr. Witte discussed ER 3.1.1 on the strength of cybersecurity measures and noted that this one may have been under supply chain but moved here.
- Mr. Witte discussed ER 3.1.2 on ways to highlight vulnerabilities with the focus of making sure that the government can highlight vulnerabilities. This is related but separate from U.S. Cyber Trust Mark (i.e., about knowing vulnerabilities of the product in hand).

  - Mr. Bergman noted that he has spoken to CISA folks who would implement, and they agree it's reasonable.
  - Mr. Witte indicated that there is no "IoT" checkbox in the National Vulnerability Database and FISMA reporting calls for identifying systems with IoT, but agencies are having difficulty.
  - Mr. Bergman indicated that's part of the motivation. CISA says it can be done relatively easily.

- Mr. Witte discussed ER 3.1.3 on electric grid resilience and noted its focus on the availability part of Confidentiality, Integrity, and Availability.

  - Mr. Witte offered suggestions to change the focus to Congress and Department of Energy
  - Mr. Griffith agrees with changing the focus.

- Mr. Witte discussed ER 3.1.4 on domestic IoT cybersecurity labeling.
- Mr. Witte discussed ER 3.1.4A on funding for U.S. Cyber Trust Mark consumer education.

  - Mr. Caprio pointed out it's straightforward. There's been a lot of progress at the White House in terms of working with Europeans. He pointed out that guest speaker, Steve Kelly, mentioned this in May. It also came up at CES. There is a need to call out specific funding for this awareness campaign for important work on the U.S. Cyber Trust Mark for it to succeed. However, it was silent on where that focus should be.
  - Mr. Caprio had a question for Mr. Bergman: How much is the government spending on EnergyStar? Is that the right baseline?
  - Mr. Bergman pointed out that EnergyStar is used for comparison because people gravitate toward it. He also said that it has >90% recognition rate at approximately $40M / year budget. However, a major brand told Mr. Bergman that $40M in a year isn't going to move the needle at all.
  - Mr. Caprio agreed that it's a multi-year effort and that a PSA campaign like 'Smokey the Bear' requires a massive amount of money.

- Mr. Bergman indicated that he can't recall anyone on the Hill saying this is a bad idea.
- Mr. Witte indicated it would be better to tie the language closer to IoT.

  - Appears to be consensus from board on this.
- Mr. Witte discussed ER 3.1.5 on international harmonization.

- Mr. Bergman suggested removing the first sentence after the recommended text.

  - Agreement from the board to delete.
  - Mr. Chan asked if it should mention the EU Cyber Resilience Act here?
  - Mr. Caprio pointed out that no, this is more specific to US Cyber Trust Mark.
  - Mr. Bergman indicated this is about aligning US Cyber Trust Mark to EU Cyber Resilience Act and that the indented paragraph includes Anne Neuberger's CES announcement.
  - Mr. Caprio indicated wanting to stay on top of it as it's developing quickly.

- Mr. Witte: discussed ER 3.1.6 on standards and conformity schemes. He likes that this calls out Operational Technology (OT).

  - Mr. Griffith was fine with it.
  - Mr. Bergman wanted to explicitly clarify that this is different from the US Cyber Trust Mark and to add introductory words that US Cyber Trust Mark is specific to Consumer IoT.
  - Mr. Bergman and Mr. Chan had a discussion on national security concerns related to legislation and rules (e.g., the Entity List, the FCC Covered Equipment List). The question is what should the board's report say about such concerns? There isn't a recommendation for this. Here's a question in the FCC's NPRM for the US Cyber Trust Mark, and it's unclear what new recommendations should be given. It was pointed out that there are already government lists.

    - Mr. Chan pointed out that maybe it's just an acknowledgement and note that there's a process for it.

  - Mr. Katsioulas noted there are related points regarding root of trust and trust chains. Intent here is to round out recommendations.
  - Mr. Caprio indicated had discussed it with Mr. Chan and that this is a bipartisan issue. It would be good to find a place to add a footnote (e.g., letter to FCC & response).

    - Mr. Witte asked about adding something to ER 3.1.2? And asked about highlighting the covered equipment list.
    - Mr. Caprio indicated that was not the right place and would prefer someplace that's closer to the national security topic.

- Mr. Witte discussed KR 3.2 on comprehensive federal privacy legislation and indicated it has had a lot of discussion.

  - Ms. Reynolds and Mr. Katsioulas discussed where to place it within trust. Ms. Reynolds would address trust at the Executive Summary level.
  - Mr. Bergman added that he doesn't see this as a big concern because the trust theme is well developed, and people can find privacy.
  - Mr. Chan added that a graphic of themes might address this.
  - Ms. Mehra pointed out that this is a different visual than discussed yesterday, which was stakeholder-oriented but that she agrees that Trust in IoT is a resounding theme.

- Mr. Witte discussed KR 3.3 on data and privacy policy framework.

- Ms. Reynolds indicated she had been wordsmithing some content since last meeting.
- Mr. Caprio asked about where the recommendation for the comprehensive federal privacy bill was.
- Mr. Bergman noted that the framework seems to cover both federal policy and guidance for agencies, as well as guidelines for manufacturers, and that it's not clear who the target audience is. He originally thought it was about consistency between what is asked of manufacturers and what is expected of federal agencies, but now it seems like "optional stuff."
- Ms. Reynolds said they thought this recommendation originated with Mr. Bergman and offered to help clarify it.
- Mr. Bergman said it's different from Mr. Bergman's original proposal but is now the basis for other parts of the text. They mentioned there's already a NIST privacy framework that could be used to guide manufacturers, and suggested this recommendation has become obsolete and they're looking for someone to help fix it.
- Ms. Reynolds said she doesn't advocate for removing it without understanding how it impacts the whole section, and they're not trying to replicate or replace NIST's work. She took an action to review the recommendation again.
- Mr. Witte said they interpreted this as being about high-level policy guidelines for handling data.
- Mr. Bergman said this is a leftover from figuring out how to order/group the recommendations, and that privacy regulation might be the top-level recommendation, which would make the function of the policy guidelines unclear.

- Mr. Witte discussed ER 3.3.1 on privacy by design.

  - Ms. Reynolds indicated no controversy here.
  - Mr. Bergman pointed out the implementation language has clarity.

- Mr. Witte discussed ER 3.3.2 on 3rd party data sharing policies.

  - Mr. Bergman thinks recommendation is redundant with ER 2.1.1 and suggests removing one.
  - Ms. Reynolds pointed out that 3rd party sharing is crucial and not covered by ER 2.1.1, which focuses on interoperability and connectivity.
  - Mr. Bergman questioned the value of ER 2.1.1 and sees room for improvement in clarity.
  - Mr. Witte clarified that recommendation ER 2.1.1 addresses broader data sharing concepts including transparency and data selling policies.
  - Ms. Reynolds reiterates that the privacy section already handles 3rd party data and suggests removing it from ER 2.1.1.
  - Mr. Bergman worries about government interference in private sector business transactions.
  - Ms. Reynolds proposes removing data protection from ER 2.1.1.
  - Mr. Katsioulas pointed out the relation to enterprise data sharing and protecting intellectual property.

- Mr. Witte discussed ER 3.3.3 on plain language.

  - Ms. Reynolds pointed out that she took this out of the FAR material.

- Mr. Witte discussed ER 3.3.4 on transparency mechanisms.

  - Ms. Reynolds indicated she covered this one last meeting.

- Mr. Witte discussed ER 3.3.5 on universal opt-out signals.

- Mr. Bergman indicated there is a need to reference how to implement this signal, like a specification, and that he would like it to be stronger with more specifics. Mr. Bergman thought that as-is it was dangling without some kind of reference.

  - Ms. Reynolds pointed out this isn't a specification and that this is the law in many states without technical specifications. She indicated that it could reference some of those state laws. But currently have to opt out for every single thing and want to make it easier for the user to opt out of everything for a company.

- Mr. Bergman indicated that the World Wide Web Consortium (W3C) has material on opt-in, opt-out, and global controls.

- Mr. Witte discussed ER 3.3.6 on Monroney Stickers and whether the government should "*require* the inclusions"?

  - Ms. Reynold indicated the government controls requirements for Monroney Sticker content.

    - Mr. Witte updated the recommendation wording.

- Mr. Witte discussed ER 3.3.7 on tracking notices on e-labeled devices.

  - Mr. Katsioulas supports the recommendation due to its implementation-level detail, contrasting with more general ones.
  - Ms. Reynolds and Mr. Caprio approve of the recommendation.
  - Mr. Witte acknowledges the varying levels of specificity among recommendations and calls for alignment.
  - Mr. Caprio advocates for making broader recommendations more specific, receiving Mr. Witte's agreement.
  - Mr. Chan refers to the 1/2/3 categorization system (not yet implemented) to organize recommendations and determine their positioning.
  - Mr. Katsioulas raises questions about actionability and desired level of specificity.

- Mr. Witte discusses ER 3.3.8 on promoting PETs.

  - Ms. Reynolds indicated that it's aligned with guidance coming from agencies.

- Mr. Witte discussed ER 3.3.9 on sanitization indicating that it's combined two separate recommendations from the previous report.
- Ms. Reynolds noted the document looked good.

  - Mr. Caprio thanked Ms. Reynolds for her leadership, saying it hadn't been easy. He indicated some wordsmithing regarding NIST references in the recommendation text and Mr. Witte agreed to fix it as an action item.
  - Mr. Bergman suggested removing the national cybersecurity strategy reference.
  - Ms. Reynolds and Mr. Caprio agreed to remove that reference.
  - Mr. Bergman noted the paragraph starting "the government should leverage..." was redundant and the whole recommendation needed tightening up and shortening.
  - Ms. Reynolds said she could fix that, explaining it resulted from merging two recommendations.

- The board went back to discussion on ER 2.1.1.

  - Mr. Bergman moved to remove ER 2.1.1 on business transactions and licensing as it doesn't fit in the privacy section.

- Mr. Witte pointed out that it originated in supply chain discussions and evolved to templates and policies for secure data sharing in digital marketplaces.
- Mr. Katsioulas pointed out that it originated from the need for data control in IoT adoption and challenges include confidentiality and cybersecurity.
- Ms. Reynolds questioned the government's role in licensing.
- Mr. Katsioulas emphasized government enabling data sharing in marketplaces and not setting policy.
- Mr. Caprio questioned if a problem existed and asked if the licensing model worked.
- Mr. Bergman compared data marketplace to platforms like Amazon and eBay and questioned the government's role.
- Mr. Katsioulas clarified discussion on enterprise collaboration ecosystems and not marketplaces.
- Ms. Reynolds mentioned European data strategy with regulations and marketplaces for anonymized data access.
- Mr. Katsioulas focused on trusted data exchange for digital goods including IoT data.
- Ms. Reynolds questioned further government involvement.
- Mr. Katsioulas argued the government should facilitate IoT data exchange for competitiveness.
- Mr. Bergman reiterated opposition to a new proposal and sees this as a private sector task.
- Ms. Cuthill noted the recommendation's changes through discussions.
- Mr. Caprio philosophically opposed the European model mentioned.

  - Mr. Griffith agreed with Mr. Caprio.

Candidates for Removal:

- Mr. Witte noted several board members didn't support ER 5.10.1.

  - Mr. Bergman questioned feasibility and cost, preferring specific FEMA recommendations.
  - Ms. Mehra countered that diverse public safety needs require a broader federal approach. The board discussed scope and federal involvement.
  - Ms. Cuthill sought clarification on stockpile details. Mr. Chan voiced concerns about national-level involvement, favoring community-level solutions. Ms. Mehra emphasized federal leadership and standardization. The board again sought a clearer scope and potential for community involvement to determine details was acknowledged.
  - Mr. Bergman raised concerns about missing details on implementation, wanting clarity on selection criteria and objectives. Ms. Mehra agreed to add context later based on potential IoTFWG questions. Ms. Mehra will add details, but specifics are not yet addressed.
  - Mr. Chan expressed interoperability concerns and advocated for community-level solutions. Ms. Rerecich highlighted product variety. Ms. Mehra referenced the Office of the National Coordinator for the IoMT (ONC) creating two programs in healthcare, including the Health Info Exchange (HIE), and argued federal involvement is crucial to solving these problems. She also wants to ask the IoTFWG clarifying questions. Interoperability remains a key concern, alternative approaches considered.

- Mr. Witte discussed ER 5.11.3 on remote monitoring and indicated it's slated for removal.

  - Ms. Mehra mentioned a related charter item about FirstNet/FCC adoption, potentially covered elsewhere.
  - Mr. Chan noted existing infrastructure recommendations and lack of connectivity in remote areas.
  - Mr. Bergman questioned FCC involvement and suggested focusing on opening new spectrum.

- Dr. Chandra highlighted the absence of low-cost satellite solutions discussion.
- Action: Remove ER 5.11.3.

- Mr. Witte discussed ER 5.11.4 on Environmental monitoring IoT.

  - Mr. Witte suggested removal due to weak arguments.
  - Ms. Mehra noted its relation to the stockpile recommendation.
  - Mr. Bergman saw this as targeted towards broader catastrophic events with training needs.
  - Ms. Mehra disagreed with stockpile connection and emphasized proactive monitoring.
  - Mr. Chan advocated for linking it to the stockpile recommendation.
  - Action: Consider combining with ER 5.10.1 if it's kept.

- Mr. Witte discussed ER 5.12.2 on Road Safety.

  - Mr. Bergman objected to directing the FCC to revisit a technical proceeding, implying they erred.
  - Mr. Caprio provided context on a complex, multi-agency dispute across two administrations.
  - Mr. Griffith and Mr. Chan agreed to remove the recommendation.
  - Mr. Chan questioned why iPhones haven't been banned if similar concerns existed.
  - Mr. Bergman clarified the focus on outdoor fixed infrastructure power levels.

Closing

Ms. Cuthill adjourned the meeting at 5:05pm.

IoTAB Meeting on Wednesday, Jan 24, 2024

Opening Remarks

Ms. Cuthill opened the day's meeting and turned the meeting over to the chair, Mr. Chan.

Mr. Chan welcomed attendees.

- Mr. Witte requested that board members return their updated inputs and feedback by February 7th to give the NIST team time to refine the report and provide an updated version early enough to allow members to perform a thorough review prior to the February board meeting.

Recommendations – Healthcare

Document: IoTAB Report

Mr. Witte picked up discussion of healthcare recommendations.

- Mr. Witte discussed KR 5.10, for government to promote adoption of IoT for the medical world.
- Mr. Witte discussed ER HC1, regarding interoperability of medical and healthcare devices and systems.

  - Ms. Mehra pointed out that this is the function of the Office of National Coordinator in HHS, and stated she considered the recommendation vague and unnecessary.
  - Mr. Chan pointed out the potential for government to require the use of open standards to encourage interoperability and the development of needed standards and described this as part of a broader recommendation across industry.
  - Ms. Mehra suggested striking this recommendation, pointing out that the FDA has a process in place to ensure that medical devices adhere to standards.
  - Mr. Chan responded this recommendation came out of Strategy of Thing's study of technology infrastructure gaps, and could be subsumed into a single broader recommendation, where healthcare, retail, and other industries would be examples.

- Mr. Witte discussed ER HC3 regrading government adoption of healthcare IoT technologies.

  - Ms. Mehra pointed out that IoT devices are already extensively used in healthcare facilities, citing an average of 10 devices per bed in medical wards and 18 in intensive care. She said the issue was that healthcare institution IT organizations don't give priority to IoMT and it isn't the role of healthcare payers to fund IoMT devices.
  - Ms. Rerecich asserted a need for clarity regarding the goals of the recommendation. She suggested that supporting the availability of IoMT to individual consumers might be more relevant that encouraging adoption in medical facilities.
  - Mr. Witte reminded the board of the NDAA language about "economic and societal benefits" which includes healthcare as a topic.
  - Ms. Mehra stated that HHS personnel would find the recommendation confusing given that IoMT is in extensive use today.

- Mr. Witte discussed ER HC2 to facilitate cybersecurity in IoMT.

  - Mr. Bergman made two points regarding this recommendation. First, that expanding the Cyber Trust Mark program to medical devices would be impractical and a better recommendation would be to develop a comparable program. He also noted that labeling is not the norm in business-to-

business transactions. Second, it is unclear if the recommendation is accounting for FDA's implementation of its new powers to regulate cybersecurity of IoT, adding that the FDA sees these powers as "a call to action".

- Ms. Rerecich asked if the board should make a distinction between business-to-business medical IoT and consumer facing medical IoT. She noted that consumers may make inappropriate assumptions about the effectiveness, security, and safety of available IoMT devices.

  - Mr. Bergman stated this is the area where the FDA is now regulating.

- Mr. Witte asked if removing the first supporting bullet would improve the recommendation.
- Ms. Mehra suggested scoping the recommendation to consumer IoMT that is not regulated by the FDA.
- Mr. Bergman suggested wording to "consider a cybersecurity trust Mark program for any non-regulated devices and modules used in consumer facing healthcare applications", positioned as the last supporting bullet for ER HC2.
- Ms. Mehra endorsed Mr. Bergman's suggestion and provided several others:

  - The second bullet could be redundant with workforce development recommendations regarding IoT cybersecurity.
  - The fourth bullet should be reworded to address the entire healthcare sector.
  - In the basic recommendation "community IoMT systems" isn't a meaningful term, and "in-clinic systems" should be reworded to address "a continuum of care".
  - Mr. Chan noted the term "community IoMT systems" also appears in a finding and was based on research for the Strategy of Things report.

- Mr. Witte asked for NIST guidance regarding recommendations that addressed actions the government was already undertaking as long as the recommendation doesn't contradict existing activities.

  - Ms. Kahn suggested a better approach would be recommendations to evolve or expand upon existing government activities.

- Mr. Witte discussed ER HC4 regarding privacy concerns in healthcare and medical IoT.

  - Mr. Bergman noted that there are many Privacy Enhancing Technologies, and asked if there are any specifics associated with this recommendation. He suggested it would be useful to have Ms. Reynolds input.

- Mr. Witte discussed ER HC5 regarding support for adoption of healthcare IoT in rural communities.

  - Ms. Rerecich asked if there was data regarding whether rural communities are actually more disadvantaged than inner cities.
  - Mr. Chan pointed to CDC data indicating that many rural areas are "medical deserts" with factors like a shortage of doctors and the lack of broadband to enable telehealth. He acknowledged there may be different issues with inner cities that produce similar results (e.g., inability to access available broadband). He suggested an action to evaluate if this recommendation should be broadened.

- Mr. Witte discussed ER HC6 regarding adoption of IoT among small physician practices.

  - Mr. Chan clarified that this recommendation is based on research that small practices tend to be less connected than larger ones, leading to an assumption is that they are also not using IoT.

- Ms. Rerecich noted this might also apply to lower income practices.
- Mr. Chan pointed to other recommendations related to the challenges of IoT adoption by small businesses.
- Mr. Witte suggested this could be added as an example under ER 5.15.2 or a reference added. He characterized this as an example of finding the balance between redundancy and homogenization, and concluded he believed it should be retained.
- Ms. Mehra pointed out that all medical practices are now required to use electronic health records, which has triggered an industry trend toward consolidation of small practices. She advocated removing the language related to electronic health records. Ms. Mehra also expressed concern that the recommendation lacked clarity on what actions were being suggested for small business in adopting IoT.
- Mr. Chan welcomed input from Ms. Mehra and Ms. Rerecich to rewrite this recommendation.

- Mr. Witte discussed ER HC7, regarding education for the healthcare workforce. He offered the possibility of integrating this into the workforce recommendations.

  - Ms. Mehra suggested revising this to focus on better integration between medical people and technologists and said that there's a need for people who can operate at the intersection of medicine and technology.
  - Ms. Rerecich supported emphasizing that cross-functional knowledge at the intersection of medicine and technology is important.
  - Mr. Witte concluded this ER can be updated and included under workforce.

- Mr. Witte discussed ER HC8 regarding AI in IoT for healthcare.

  - Ms. Mehra and Ms. Rerecich suggested changes to focus on equitable care and the ability of small businesses to compete in the marketplace. They raised the concern of the impact of poor AI training on equity of care.
  - Ms. Mehra pointed out the growing ability of personal devices such as smart watches to provide capabilities similar to IoMT devices.
  - Ms. Rerecich noted that affordability is a concern, where medical insurance might pay for IoMT but not for personal devices.
  - Ms. Mehra emphasized a goal of availability for all through encouraging existence and growth of medical device ecosystem that includes both large and small device manufacturers, including the potential for PPPs to aid smaller manufacturers. Proposed wording changes:

    - "Facilitate *and fund* the adoption …", and
    - "… development and *equitable care to ensure small business innovations and efforts co-exist with large investments in place today*."

- Mr. Witte requested feedback on ERs 5.10.1 (promoting IoMT as an enterprise priority) and 5.10.2 (HIPAA-like protection for user data in IoT devices). No changes were proposed to either ER.
- Mr. Witte re-opened the discussion of ER HC1.

  - Mr. Bergman asked about the path to success, suggesting the recommendation lacked an actionable element.
  - Mr. Katsioulas stated that the intended benefit or value should be included in the recommendation or its discussion.

- ▪ Mr. Witte agreed but noted that referring back to the findings would partially address this concern.
- Ms. Mehra stated that the "ask" is lacking in the proposed HC recommendations.
- Mr. Chan noted that the report contains many recommendations that have very general wording like "promote".
  - ▪ Mr. Witte suggested it could be an action for the board members to suggest more specifics regarding how each recommendation could be implemented. He noted that the IoTFWG was likely to ask for more specifics.
- Ms. Mehra suggested that ER HC1 could propose the creation of a healthcare interoperability council, with government funding and public and private organizations involved. She noted there are already organizations focused on this challenge whose efforts could be consolidated.
- Ms. Cuthill asked Mr. Chan about the process to reach closure on disputed recommendations. She cited important issues that had been raised regarding some draft recommendations, but no call had been made to confirm the board's concurrence with changes or removals. She reminded the members of the requirement for board consensus and suggested members be given action items to provide specific material to Mr. Witte.
  - Mr. Katsioulas suggested an approach for board members to review the recommendations offline and respond specifically with approval, suggested changes, or disapproval for each recommendation.
  - Mr. Mehra suggested Mr. Chan provide an implementation plan for the new recommendations discussed today.
    - ▪ Mr. Chan responded that he would need assistance from the healthcare SMEs to accomplish that.
- Mr. Witte reviewed the eight HC recommendations to confirm his notes.
  - HC1: could be removed due to a lack of support and healthcare considerations added to other interoperability recommendations in the report.
    - ▪ No objections were raised to this approach.
  - HC2: has support with the recommended amendments. He suggested Mr. Chan and Mr. Bergman take an action to address the feedback and ensure use of appropriate terms.
    - ▪ Mr. Chan agreed to this action.
  - HC3: lacked support due to being very general and difficult to make actionable.
    - ▪ Mr. Chan agreed with removing the recommendation and noted that some of its content could be used as examples for cross-cutting recommendations on government use of IoT.
  - HC4: this content could be integrated with other discussion of Privacy Enhancing Technologies.
  - HC5: can be improved by providing more specific understanding of how government could facilitate and support use of IoT in rural medical facilities.
  - HC6: lacked support and could be removed, and some of its content included in other small business considerations.
    - ▪ Mr. Chan concurred with making this content an example regarding small businesses.

- HC7: merge into existing workforce discussions as an example.

  - Ms. Rerecich concurred but emphasized the need to discuss the intersection of medical and technical expertise in support of IoMT.
  - Ms. Mehra stated a need to address the implementation of this recommendation.
  - Mr. Chan responded that there is already more detail in the workforce recommendations.

- HC8: retain this recommendation with refinement regarding equitable care and investments as described by Ms. Mehra.

  - Ms. Mehra confirmed that Mr. Witte had captured the need to ensure that a diverse ecosystem of medical device technologies prevails.
  - Mr. Witte confirmed he would incorporate that concern.

- Ms. Cuthill asked for any concerns or objections from the board regarding Mr. Witte's planned disposition of the new HC recommendations.

  - No objections or additional changes were raised.
  - Mr. Katsioulas noted that the lack of feedback could imply that members haven't read the material and urged having a response mechanism to accompany the next review.
  - Mr. Witte stated that the secretariat could circulate a table of all recommendations and request individual members provide specific feedback per recommendation, potentially along with input on prioritization. He noted that the feedback would have to be part of the February meeting materials.
  - Mr. Chan agreed, noting the need for more active indication of board member concurrence, especially for members unable to attend the future meetings.

Recommendations - Workforce

Mr. Chan and Mr. Witte

Document: IoTAB Report

- Mr. Witte started with a discussion with objective 6 on Workforce which states the US should invest and promote knowledge, skills, and abilities of those in positions of all lifecycles of IoT.
- Mr. Witte articulated Key Recommendation 6.1 as the need for the government to invest and promote IoT-related aspects of education and workforce.

  - Mr. Chan emphasized the need for a new approach to workforce development in Recommendation 3, highlighting the challenge of attracting workers to these areas. He outlined four key layers: sourcing, recruiting, developing, and worker base.
  - Ms. Reynolds inquired about the inclusion of specific area commentary requests made in November/December, confirming her own submission of recommendations based on them. However, she noted their absence in the current draft.
  - Mr. Witte clarified that Ms. Reynold's recommendations would be included in the overview and suggested a broader focus on workforce needs aligned with Ms. Cuthill's outline, potentially incorporating loan forgiveness.
  - Ms. Cuthill sought agreement on the proposed reorganization of the section.

Recommendations - Supply Chain

Mr. Chan and Mr. Witte

Document: IoTAB Report

- Mr. Witte requests defining key terms like "digital thread."
  - Mr. Katsioulas confirmed existing definitions and indicated the need for placement decisions.
  - Mr. Bergman emphasized recommendations should target IoT - "IoT-adjacent" requires significant value and advocated for a single, focused recommendation.
  - Ms. Mehra pointed out that the charter mentions 'supply chain logistics.'
  - Mr. Katsioulas clarified logistics as core with added abilities reflecting discussions.
  - Mr. Moss discouraged leading with 4.1 due to its previous low position. Suggests promoting actions from further down for progress monitoring and aligning with initial intent.

- Mr. Witte discussed Key recommendation 4.2 which focuses on establishing and fostering public-private partnerships (PPPs) focused on IoT adoption.
- A discussion ensued regarding terminology clarity used within the recommendations in Supply Chain.

  - Mr. Bergman emphasized defining crucial terms like "digital thread" on first use and found existing definitions confusing. Mr. Katsioulas echoed this sentiment citing the Boston Consulting Group example while Mr. Witte agreed on the need for clear definitions.

    - Ms. Rerecich advocated for avoiding unnecessary jargon and questioned the presence of undefined terms prompting Mr. Katsioulas to acknowledge the need for reviewing recommendations and adjusting term placement.
    - Ms. Mehra shifted the focus to the charter's objective inquiring about the primary barrier she saw as disconnected chains or creation velocity.

  - Mr. Katsioulas indicated the need for collaboration on complex solutions.

    - Ms. Mehra pointed to the multitude of players involved in supply chains and the need to expedite connection creation.
    - Mr. Katsioulas acknowledged the varying specifics across different chains (SBOM, HBOM), emphasizing that one recommendation cannot encompass all nuances.

  - Mr. Bergman underscored the importance of IoT for the effectiveness of digital information.

    - Mr. Katsioulas further linked IoT application to delivering results for the supply chain through leveraging digital data.
    - Mr. Ross clarified the distinction between claimed data sharing and the actual need for sharing transactional data across companies aligning with Mr. Katsioulas' vision of interconnected supply chains.
    - Ms. Mehra summarized this as addressing the need for connection, not just the existence, of these chains.

- There was a discussion on the relationship of Bill of Materials within Supply Chain recommendations.

  - Mr. Bergman raised concerns about the recommendation's clarity, highlighting the need for broader data considerations beyond "country of origin" and differentiating it from HBOM.

- Ms. Mehra identified the fundamental problem as transitioning from paper-based transactions to electronic systems.
- Mr. Katsioulas emphasized the importance of adding information at critical stages for improved efficiency.
- Mr. Ross pointed out the recommendation's focus on Bill of Materials (BOM) versus the broader challenge of paper usage in warehouses.

- Mr. Bergman questioned the initiative's novelty compared to Walmart's D program, leading Mr. Ross to confirm it is similar concept but with a wider scope. Mr. Katsioulas further clarified the need for harmonization across diverse suppliers and locations.
- Concerns emerged regarding next steps and understanding.

  - Mr. Witte sought clarity on actions needed for decision-making, while Mr. Katsioulas expressed potential time constraints and the risk of a lack of understanding. Mr. Bergman proposed adding clarifying text, and Mr. Chan recognized the potential need for education due to the complexity of the topic.

- As an action item, Mr. Katsioulas and Mr. Ross agreed to collaborate on improving the recommendations.

- There was a continuation discussion on supply chain recommendations and terminology.

  - Mr. Witte emphasized the need for clear recommendations tied to IoT with February's meeting being the final opportunity for revisions.
  - Mr. Witte asked Mr. Katsioulas and Mr. Ross if other relevant supply chain activities have been overlooked.

    - Mr. Katsioulas mentioned a need for a visual graphic consolidating different supply chains and partnerships and aiming to refine it with adoption rates / implementation levels.
    - Ms. Mehra highlighted the potential of IoT in supply chains and suggested prioritizing integration across all sectors.
    - Mr. Katsioulas emphasized the acceleration effect from connecting various chains.
    - Mr. Griffith clarified a recommendation on domestic manufacturing in supply chains.
    - Ms. Mehra raised the absence of aviation in the discussion. She suggested a "scorecard" approach for comparing supply chain characteristics.

  - Ms. Mehra recommended moving away from "digital thread" terminology and focuses on key characteristics and partnerships for each supply chain.
  - Mr. Katsioulas agreed to remove the "digital thread" and refine the descriptions.

- The above discussion included some next steps and actions from the following board members:

  - Mr. Witte will integrate Mr. Griffith's recommendation and investigate aviation inclusion.
  - Mr. Katsioulas and Mr. Ross will further refine the supply chain content.
  - Ms. Mehra suggested adding an association to an agricultural supply chain partnership.

Graphics and Other Support

Mr. Chan and Mr. Witte

Document: IoTAB Report

- Mr. Chan pointed out that when reviewing the report, to be mindful of where graphics can be placed and how to condense the story.
- Mr. Witte indicated there is graphics support and would like to have board feedback by the 7th of Feb to incorporate it into the next draft. More will be discussed at the February meeting.

Open Action Item Review

Mr. Chan and Ms. Cuthill

- Mr. Chan indicated he would work with Mr. Witte and Mr. Hoehn to collect action items and circulate to the board.
- Ms. Cuthill thanked members for their effort and is looking forward to getting the report distilled down to one voice.
- Mr. Chan indicated members should send comments on the report to Mr. Witte ASAP, but NLT 7 Feb.
- Mr. Chan reiterated to the board to look at ways to consolidate and pare text down into graphics.
- Ms. Cuthill indicated she would send out a poll to see who can meet on Feb 12th. Also, that April 2-3 is looking like the most likely dates for the April meeting.

Closing

Barbara Cuthill adjourned the meeting at 4:49 pm.