IoTAB Environmental Monitoring Sub-WG Notes

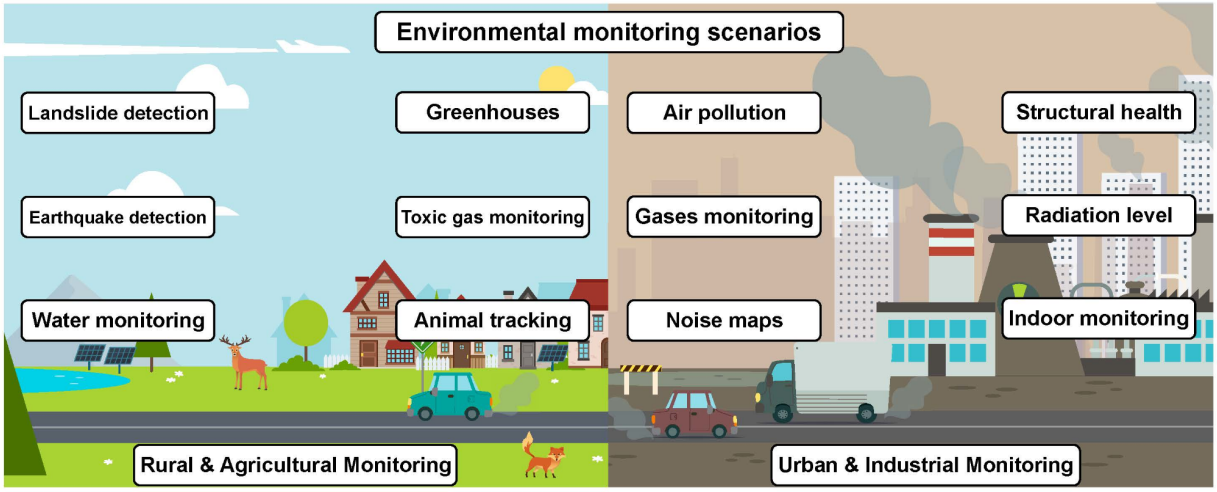
Opportunities, Barriers, and Recommendations

Background on the vertical, or horizontal topic area

Definition of the vertical or horizontal topic

Environmental monitoring includes various measurements to understand the past, present, and future state of the environment. The data collected from environmental monitoring is often used to assess different human health and environmental concerns at different timescales.

Immediate concerns include toxic pollutant detection rare extreme natural occurrences (e.g., earthquakes and tsunamis). Long term concerns include climate change monitoring of carbon dioxide concentrations and ocean acidification). Mid-term concerns include monitoring exposure to air, water, and soil pollutants, such as air pollution criteria pollutants, and monitoring the structural health of infrastructure. .



Ometov et al., 2019. https://www.mdpi.com/596678

What is the significance of this vertical or horizontal to the United States? (i.e. why are we investigating this area, why do we care?)

Environmental monitoring has been an essential component of understanding and addressing environmental pollution and improving the health of populations and the productivity of economic systems. Environmental monitoring is the first step in enacting beneficial strategies in a variety of areas, as only that which is measured can be improved, and overlaps with some of the objectives in Sustainable Infrastructure, Public Health, Precision Agriculture and . Historic examples in the U.S. include drastic improvement in U.S. urban air quality in the 20th century,

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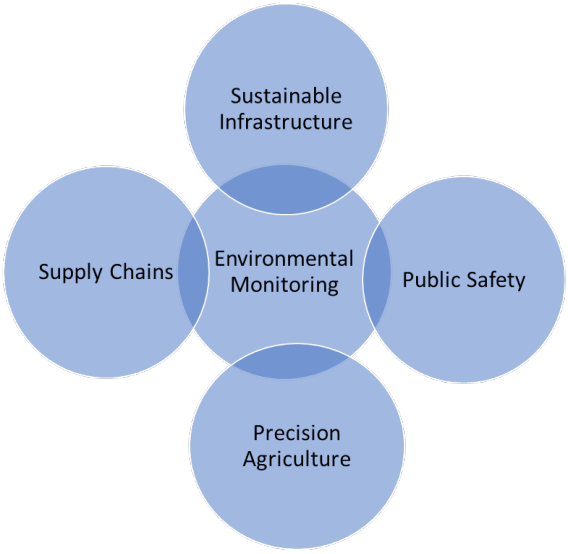
increased understanding of climate change, awareness of indoor air quality concerns. As monitoring devices become smaller, cheaper, and wireless, the potential for expanding environmental monitoring into new areas can be expected and will likely result in a vast increase in environmental data being collected. This expansion and increase of data collection creates new opportunities to address additional health and environmental concerns, but strategic development and deployment is needed to overcome barriers and avoid any unintended consequences.



Opportunity for IoT

- Centralized/consortium collection of environmental data from remote sensing
    - Real time air quality monitoring, Purple Air
- Significant expansion of environmental monitoring through consumer products
    - Example: motion sensors in phones, Waze
- Integration on monitoring within projects/infrastructure for complex environmental metrics
    - Example: Scope 3 CO2 tracking through supply chains

Barriers

- Cost
- Security
- Privacy
- Interoperability
- Data ownership

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Notes/feedback from 4/19 board meeting:

- Consider food and water security, water/energy/food nexus (WEF) for the environmental monitoring
- Consider public/private partnerships, NOAA, EPA,
- Check on EU/Europe progress on Environmental Monitoring (Dan could help here),
- Consider other “hard to measure” environmental metrics (e.g., water consumption/replenishing at source basin, biodiversity), consider integration with ESG requirements
- Monitoring within supply chains can expose proprietary information, companies may be reluctant to share this data, consider some form of indexing of data, partnerships with Lab and trade groups. Tom and Ranveer have ideas/examples of this, Ann suggested a pilot project through the national labs

For the barriers listed:

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- *Description of the barrier*
    - *What is the barrier? (Broad description of the barrier).*
    - *How or why is this a barrier?*
    - *What is the cause of this barrier?*
    - *What does this barrier look like? (illustrative examples)*
- *Impact*
    - *What opportunities does this barrier block?*
    - *Broad quantification or qualification of the impact (e.g. barrier prevents $X in market opportunities, costs $X and Y lives, etc.) if known*
    - *Who is impacted by this barrier? (personas)*
    - *Describe the Impact of this barrier for the affected personas*
- *Is there a "X" component to this barrier*
    - *Does this barrier have an impact on sustainable infrastructure, cybersecurity, data and privacy, etc. (horizontals, verticals). If so, what is it?*
    - *Or, Is this barrier caused in whole or party, by sustainable infrastructure, cybersecurity, data and privacy, etc. (horizontals). If so, what is it?*

Recommendations for the federal government

Notes:

- Draft your initial recommendations as-is. We will consolidate during the integration phase.
- Recommendations can fall into such categories as legislation; regulation; funding/grants for research, study, execution; standards; procurement; etc. (not a comprehensive list)
- Recommendations can fall into something like this (just a list for illustrative purposes, but not intended to be comprehensive)

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- The government should do (begin doing, continue doing, expand doing) … because …
- The government should stop (cease doing, reduce doing) … because …
- The government should conduct additional study/research into … to address …
- The government should incentivize industry to … because …
- The government should encourage industry (call for action but not necessarily funding / enabling) to … because …
- The government should call on the international community to … to address …

For each recommendation, please include (as appropriate or available):

- Short description of the recommendation (one or two sentences)
- Long description of the recommendation (details)
  - Recommendation description (with any details)
  - Justification for the recommendation, including any supporting data, information, references, personas impacted
  - Implementation considerations
    - How should this be implemented? (recommendation implementations, if known)
    - What are possible barriers to implementing this recommendation (if known?)
    - What agencies are impacted by this recommendation? (if known)
    - What should the federal government consider in implementing this? (issues, dependencies, pre-requisites, etc.)

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