UPISC UNIVERSITY OF PITTSBURGH INFRASTRUCTURE SENSING

COLLABORATION WORKSHOP

NATIONAL ENERGY TECHNOLOGY LABORATORY

# Status Update of UPISC 2023 UPISC Annual Workshop


Prof. Paul R. Ohodnicki, Jr.

***University of Pittsburgh***

Dr. Ruishu Wright

***National Energy Technology Lab.***


**Date:** November 7th, 2023

***Cathedral of Learning University of Pittsburgh***


# Agenda for the Meeting Today

| Time | Activity |
|---|---|
| **Innovation Hall** | Steering Committee and Conference Organizers Only |
| **1:00 p.m.** | Welcome Remarks |
| **1:05 p.m.** | Workshop Planning Updates and Discussion |
| **1:30 p.m.** | Status Update of UPISC – Action Items and Progress – Discussion of Path Forward |
| **2:30 p.m.** | Coffee and Networking Break |
| **3:00 p.m.** | Pittsburgh Public Sector Infrastructure Sensing Needs and Roadmapping (Invited) |
| **Covestro Room** | Steering Committee, Conference Organizers, and Invited Speakers / Panelists |
| **4:00 p.m.** | Overview of Workshop and Final Preparation |
| **4:15 p.m.** | Adjourn |
| **Innovation Hall** | |
| **4:15 – 6:00 p.m.** | Networking Social Hour and Light Refreshments |

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## Welcome Remarks

1. Welcome and Thank You to All Steering Committee Members & Guests

2. Round-Robin Introductions of Attendees
   - Name
   - Affiliation
   - Formal Participation Role in UPISC
   - Interest in UPISC and Goals for Engaging in the Effort

3. Workshop Planning : Updates and Discussion (Next Slide)

4. Anything Else Before Proceeding to the UPISC Update?


## 2023 UPISC Annual Workshop : Overall Statistics

1. Agenda and Invited Speakers Organized by UPISC Steering Committee

2. Close Collaboration Between NETL and U. Pitt. for Organization

3. >75 Registered Guests for In-Person Attendance (Also Held Remote, TBA)

4. ~25 Technical Posters from U. Pitt. and NETL Students and Researchers

5. Sponsored by Internal U. Pitt. Funds for 2023
(Swanson School of Engineering, University of Pittsburgh Center for Advanced Manufacturing, Office of the Senior Vice Chancellor for Research)

5. Specific Focus Areas : H2, Civil / Transportation, and Grid Infrastructure

Welcome Remarks: 1:00 – 1:30PM

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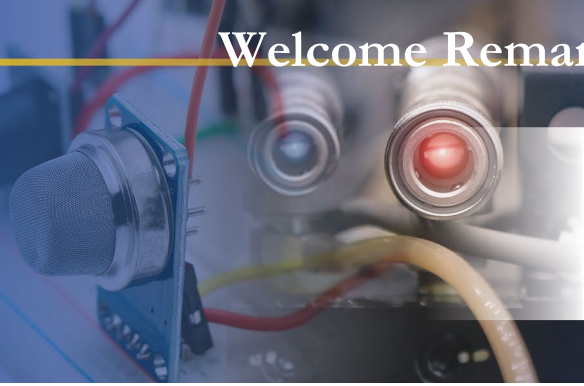

NATIONAL ENERGY TECHNOLOGY LABORATORY

# 2023 UPISC Annual Workshop

## GOALS

The goals of the workshop are to increase awareness of existing on-going research and collaborations with University of Pittsburgh and regional stakeholders in the following areas:

1. Development of novel sensor technologies as solutions to infrastructure sensing needs;
2. Regional collaboration to promote workforce development in the emerging sensor area for near-term R&D capability needs and future deployment and commercial needs;
3. Engagements with industry and stakeholders, regarding sensor technologies and related technology transfer;
4. Team and collaboration partnerships capable of responding to funding agencies' and industry's call for sensor technologies.

| Voice of Industry and Government Stakeholders | Technology Maturation and Technology Transfer | Workforce Development |
|---|---|---|

Welcome Remarks: 1:00 – 1:30PM

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NATIONAL ENERGY TECHNOLOGY LABORATORY

# 2023 UPISC Annual Workshop

## SCOPE

The workshop particularly seeks to focus on the following areas:

1. Multiple sensing platforms with spatially distributed sensing capability (e.g. optical fiber sensing, passive wireless sensors, electrochemical sensors, chip sensors)
2. Spanning sensor technology development areas from fundamental principles of sensor materials to prototypes in field validations, prototypes in field validations,

## IMPACT

The workshop seeks to promote intelligent infrastructure sensing for the following impacts:

1. Predictive monitoring before infrastructure failures occur (structural, electrical, etc.)
2. Mitigation of green-house gas emissions,
3. Enabling large-scale $H_2$ transportation,
4. Supporting needs for a robust and resilient electricity and natural gas transportation and delivery system,
5. Early detection of environmental contamination.


# 2023 UPISC Annual Workshop

## STEERING COMMITTEE MEMBERS

The steering committee is a group of prominent scientists and leaders that were carefully selected to represent key segments and application areas of critical importance to the UPittISC objectives. The advisory group provides the faculty and leadership team with insights about emerging needs and trends within relevant industries and across various agencies.

**Tony Lindsay**, GTI, Managing Director, tlindsay@gti.energy

**Josh Gould**, Duquesne Light Company, Director, Innovation, jgould@duqlight.com

**Susan Maley**, Electric Power Research Institute (EPRI), Program Manager, smaley@epri.com

**C. Ravi**, Aquatech, ravic@aquatech.com

**Saba Almalkie**, Ansys, Engineering Manager, Digital Twins, saba.almalkie@ansys.com

**Robert Lieberman**, Lumoptix, President, lumoptix@aol.com

**Gary Choquette**, Pipeline Research Council International (PRCI), gchoquette@prci.org

**Arvind Tiwari**, GE Research, arvind.tiwari1@ge.com


# 2023 UPISC Annual Workshop : Day 2 Agenda

| Time | Activity |
|---|---|
| 8:00 a.m. | Welcome Remarks and Introduction to the Workshop (Objective, Scope, Steering Committee) |
| 8:10 a.m. | University and NETL Speaker Introduction |
| 8:15 a.m. | UPitt and NETL Speakers – Sensing Collaborations and UPISC<br>• 10-min presentation – Dr. Mike Holland, Science Policy and Research Development, U. of Pittsburgh<br>Dr. David Vorp, Sr. Associate Dean for Research, U. of Pittsburgh<br>• 10-min presentation – Dr. Bryan Morreale, Executive Director, National Energy Technology Laboratory |
| 8:35 a.m. | Update on UPISC and Progress on Prioritized Action Items From Workshop #1<br>• 10-min Presentation – Dr. Paul Ohodnicki, RK Mellon Faculty Fellow in Energy, University of Pittsburgh<br>• 5-min Q&A |
| 8:50 a.m. | Keynote Industry Speaker #1 |
| 8:55 a.m. | Topic One – Keynote – The National Academies Perspective on Infrastructure and Sensing<br>• 20-min Presentation – Dr. Cameron Oskvig, Director Board on Infrastructure and the Constructed Environment, National Academy of Sciences<br>• 10-min Q&A |
| 9:25 a.m. | Workshop Logistics – Day One, Morning |
| 9:25 a.m. | Break |


# 2023 UPISC Annual Workshop : Day 2 Agenda

| Time | Activity |
|---|---|
| **9:40 a.m.** | Topic Two Speaker Introduction |
| **9:45 a.m.** | Topic Two – Invited – Standardization of Sensing, Data, and Analytics Across Infrastructure Segments<br>• 20-min Presentation – Dr. David Krohn, IEEE Fiber Optic Sensor Standards, P2067 **(REMOTE)**<br>• 10-min Q&A |
| **10:15 a.m.** | Topic Three Speaker Introduction |
| **10:20 a.m.** | Topic Three – Sensor Device Technologies Progress Updates (Optical, Passive Wireless, etc.)<br>• 15-min Presentation (NETL) Dr. Ruishu Wright, Technology Portfolio Lead, NETL<br>• 15-min Presentation (Pitt) Dr. Paul Ohodnicki, RK Mellon Faculty Fellow in Energy, U. of Pittsburgh<br>• 10-min Q&A |
| **11:00 a.m.** | Panel on Sensing Opportunities and Needs in H2 Infrastructure (Dr. Wright Moderator)<br>Industry, University and National Lab Perspective<br>• 5 min Panelist 1 (DOE Program) – Evan Frye, Physical Scientist, US DOE Headquarters<br>• 5 min Panelist 2 (National Lab and H2 Hubs) – Dr. William Buttner, Physical Scientist, NREL<br>• 5 min Panelist 3 (NETL Technology) – Dr. Nate Weiland, National Energy Technology Lab<br>• 5 Min Panelist 4 (Industry) – Dr. Chris Moore, Technical Program Manager, GTI Energy<br>• 5-min Panelist 5 (Industry) – Dr. Troy Demmer, CPO, Co-Founder, Gecko Robotics<br>• 30-min Moderated Q&A |
| **12:00 p.m.** | Logistical Announcements / Lunch / Networking Break |

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NATIONAL ENERGY TECHNOLOGY LABORATORY

# 2023 UPISC Annual Workshop : Day 2 Agenda

| Time | Activity |
|---|---|
| 1:15 p.m. | Afternoon Announcements |
| 1:20 p.m. | Keynote Speaker #2 Introduction |
| 1:25 p.m. | Topic Four – Keynote – Digital Twins Applied to Infrastructure Sensing<br>• 20-min Presentation – Dr. Arvind Tiwari, Program Manager, GE Vernova<br>• 10-min Q&A |
| 1:55 p.m. | Topic Five Speaker Introduction |
| 2:00 p.m. | Topic Five – Invited – Electric Power Grid Sensing, Analytics, and Digital Twins<br>• 20-min Presentation – Jeremy Gill, Interim Chief Information Officer, Duquesne Light Company<br>• 10-min Q&A |
| 2:30 p.m. | Topic Six Speaker Introduction |
| 2:35 p.m. | Topic Six – Invited – Wireless Networking and Integration (Sensing, Data and Communication)<br>• 20-min Presentation – Christopher Ziolkowski, R&D Manager, GTI Energy, Wi-SUN Alliance **(REMOTE)**<br>• 10-min Q&A |
| 3:05 p.m. | Break |


# 2023 UPISC Annual Workshop : Day 2 Agenda

| Time | Activity |
|---|---|
| 3:30 p.m. | Panel on Sensing Opportunities and Needs in Transportation / Civil Infrastructure (Dr. Ohodnicki Moderator)<br>Industry, University and National Lab Perspective<br>• 5-min Panelist 1 (DOT Representative) – Chris Atkinson, Deputy Director, ARPA-I / DOT<br>• 5-min Panelist 2 (Technologies – U. Pitt.) – Dr. Piervincenzo Rizzo, Full Professor, U. of Pittsburgh<br>• 5-min Panelist 3 (IRISE Consortium – U. Pitt.) – Joseph Szczur, Executive Director of IRISE, U. of Pittsburgh<br>• 5-min Panelist 4 (City of Pittsburgh) – Chase Klingensmith, Autonomous Vehicles Policy Analyst, Pittsburgh<br>• 5-min Panelist 5 (City of Pittsburgh) – Michael Bethune, Policy Analyst, Pittsburgh<br>• 30-min Moderated Q&A |
| 4:25 p.m. | Summary of Action Items and Preparation for Report Out |
| 4:30 p.m. | Looking to the Future and Next Steps (Ohodnicki, Wright, Steering Committee)<br>• Workshop closeout report discussion<br>• Where we go from here and how to be involved<br>• Etc. |
| 5:00 p.m. | Final Remarks and Poster Session Summary |
| 5:05 p.m. –6:30 p.m. | Poster Session with a Social Hour and Light Refreshments |

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# Any Questions, Comments, or Discussion with Steering Committee and Invited Guests?

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# Status of UPISC – Action Items and Progress

UPISC UNIVERSITY OF PITTSBURGH INFRASTRUCTURE SENSING
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## Natural Gas, Oil, & $H_2$ Transport & Storage

## Civil (Road, Bridges, Water)

## Electricity Grid Transport & Storage

## Conventional & Renewable Generation

**Mission:** UPISC Seeks to Pursue Research and Innovation, Workforce Development, and Technology Transfer in the Area of Critical Infrastructure Sensing and Monitoring

# Status of UPISC – Action Items and Progress

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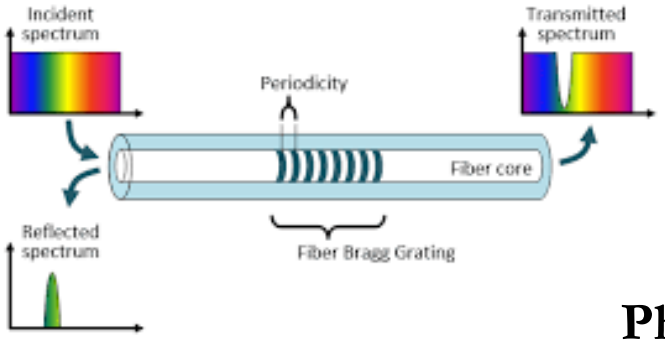
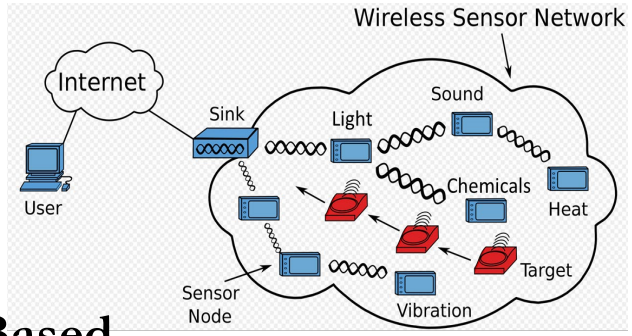
## Optical Fiber Sensing



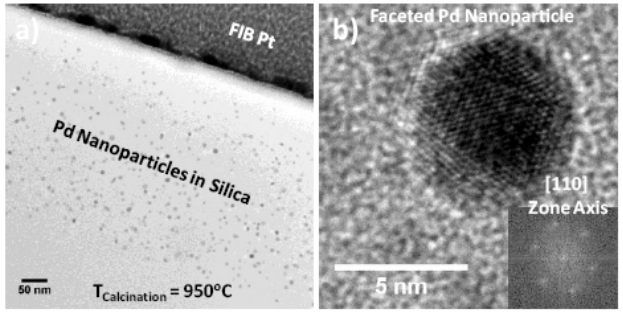

## Passive Wireless Sensing



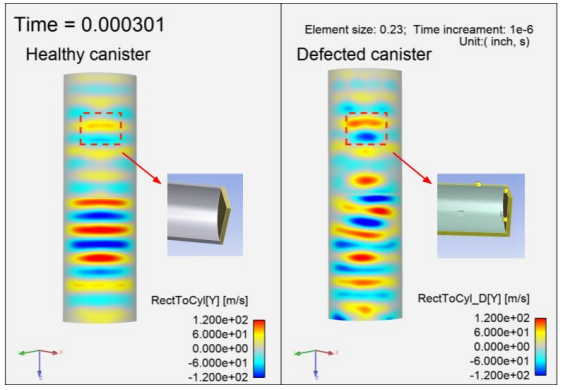

https://en.wikipedia.org

## Physics Based

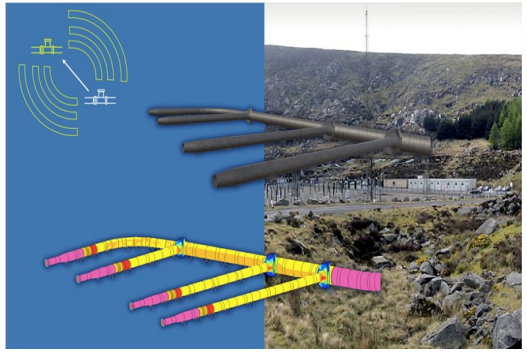
## Novel Sensing Materials




## Machine Learning & AI




## Digital Twin Models



**Enabling Technologies:** UPISC Scope Encompasses all Aspects of Critical Infrastructure Sensing Spanning Enabling Technology, Hardware, Communications, Data, and Analytics.

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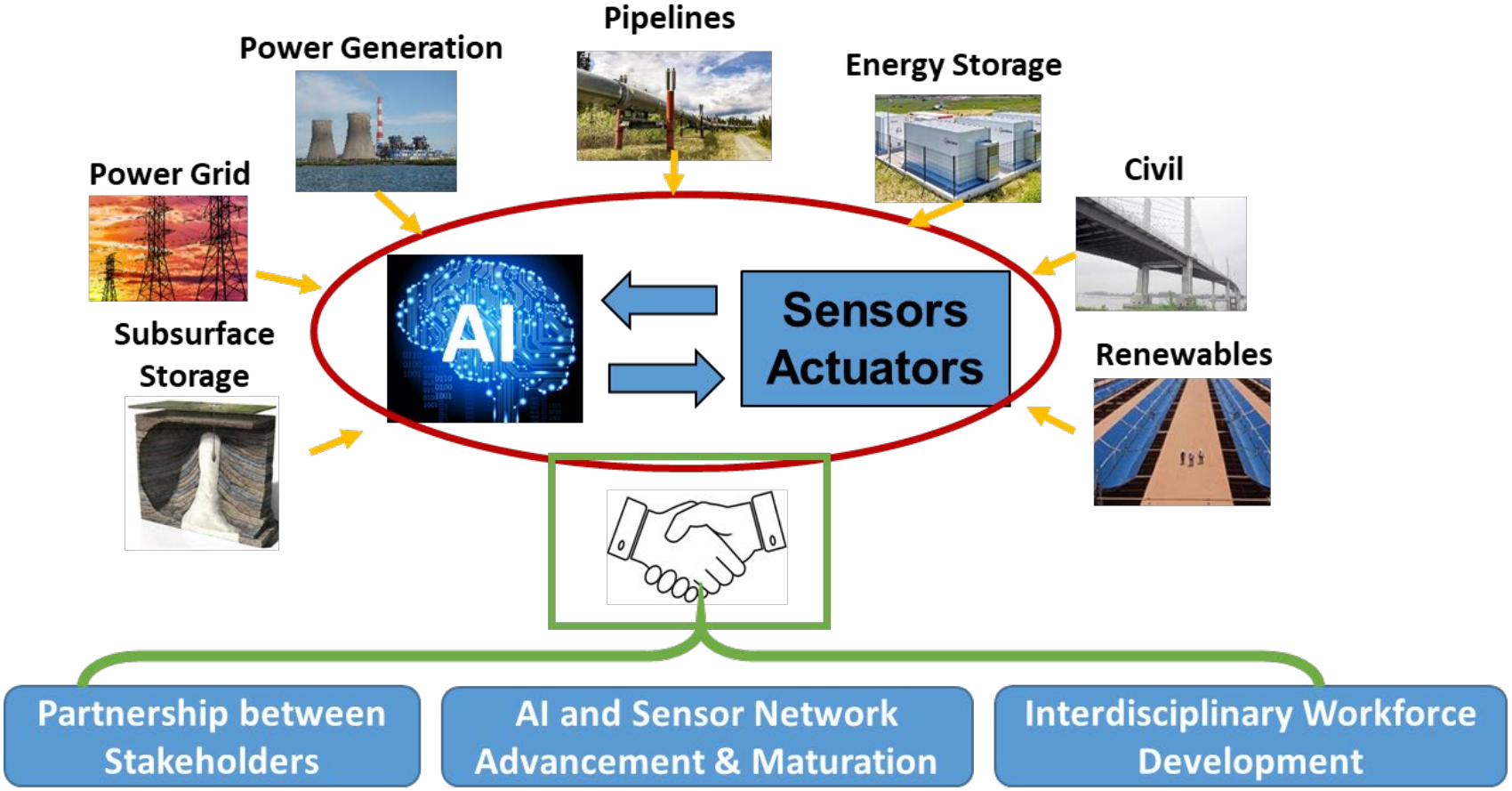
# Objective of UPISC Workshop : Community and Partnership Development




University, Lab, Industry, and Government Partnerships are Necessary to Maximize Impact

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# 2022 UPISC Inaugural Workshop : August 2022


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UPISC Inaugural Workshop

**August 2022**

Energy Innovation Center

www.engineering.pitt.edu/UPISC

75 Registered Attendees

Strong Feedback and Dialogue Encouraged Annual Offering as Well as Action Items Into the Future

Highly Successful Initial Workshop Held in 2022 Confirmed the Need and Opportunity

# UPISC UNIVERSITY OF PITTSBURGH INFRASTRUCTURE SENSING COLLABORATION WORKSHOP

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## How Can We Expand and Build Upon Partnerships Moving Forward?

PITT | SWANSON ENGINEERING

NATIONAL ENERGY TECHNOLOGY LABORATORY

NRECA America's Electric Cooperatives

Pitt SCI School of Computing and Information

DLC DUQUESNE LIGHT CO.

Ansys

AKSELOS

UNIVERSITY OF PITTSBURGH The DIETRICH School of Arts & Sciences

THE SEAL OF THE CITY OF PITTSBURGH 1816 BENIGNO NUMINE

Pacific Northwest NATIONAL LABORATORY

Sandia National Laboratories

EPRI ELECTRIC POWER RESEARCH INSTITUTE

PRCI Pipeline Research Council International LEADING PIPELINE RESEARCH

gti GAS TECHNOLOGY INSTITUTE

Aquatech

Examples of Organizations in Attendance at Previous Meeting or Collaborating

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## Potential Pathways Forward and Action Items From August 2022 Meeting

1. Consider UPISC leading a new study on this topic (National Academy?)
2. New activity focused on field testing digital twins (data normalization, experimental facilities, etc.)
3. Pursue concepts for a more formalized collaboration (center, major proposals, etc.)
4. Increase opportunities and targeting of workforce training in universities.
5. Identify potential stakeholders to engage in the future
6. Improve the path from R&D through commercialization and technology transfer.
7. Compile best practices for technology and knowledge dissemination and adoption.
8. Establish a public access data repository to collect and share information among stakeholders
9. Work toward data integration and synergy standardization across infrastructure segments
10. Establish a comprehensive list of industry needs
11. Work to improve sensor diagnostics and reliability, potentially even self-diagnosing sensors.
12. Develop specific mechanisms to enhance collaboration of industry, academia, government, others.
13. Improve communication between users and developers.

## Discussed "Top Three" in December Steering Committee Meeting

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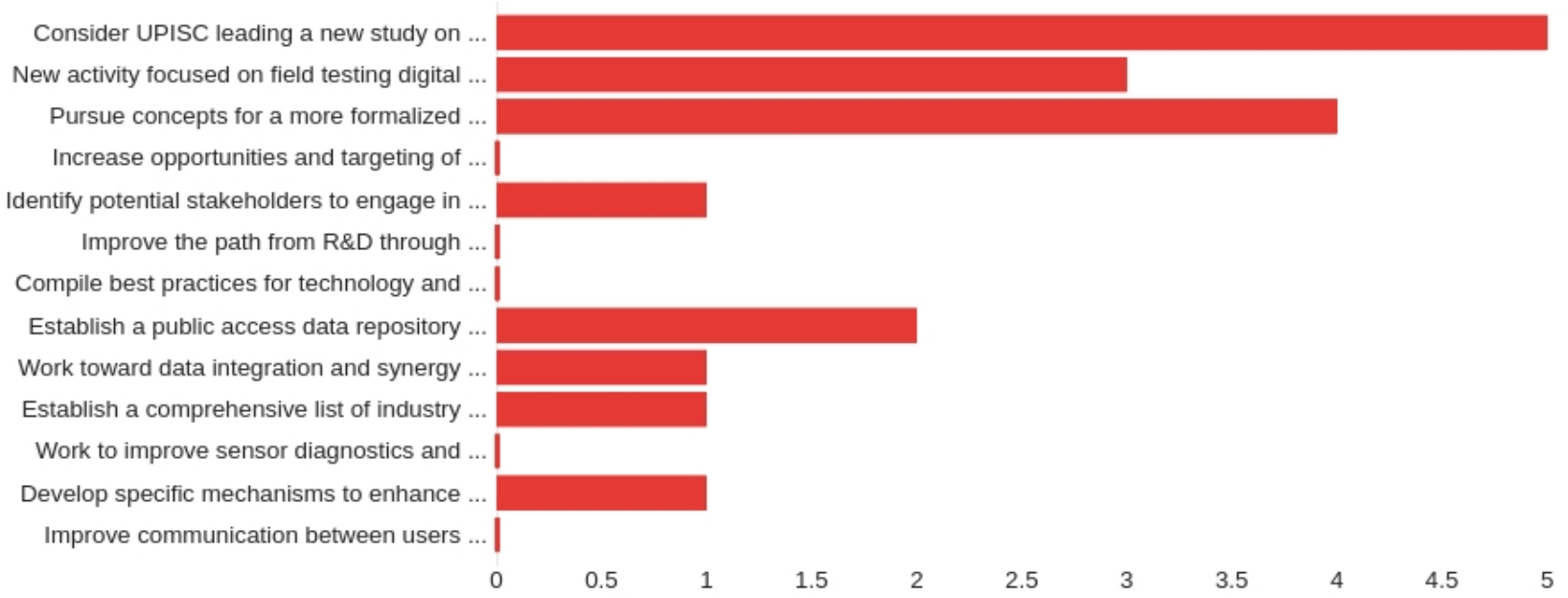
## UPISC Survey Results of Steering Committee Recommendations




1. Consider UPISC leading or initiating a new study on this topic
2. Pursue concepts for a more formalized collaboration
3. New activity focused on field testing digital twins

## Subsequent "Top Three" Vote to Determine Prioritized Next Steps with UPISC

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## Recommended Next Steps and Dates for High Priority Action Items

1. Seek potential funding sources to support a study:
    1. Department of Energy (Earthshot / Large Initiatives / Infrastructure Bill)
    2. National Geospatial Agency
    3. Department of Transportation
2. Identify potential study venues and methods for financial support:
    - National academies
    - Consultants
    - Professional Societies
3. Develop and submit a proposal (Calendar Years 2024 / 2025)
4. Establish study team (2025+)

**Recommendation #1: UPISC Initiates a New Study On This Topic**

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## Discussion Point #1: Potential for Collaborations with the National Academies

1. Initial discussions occurred in 2023 about options:
    1. Member-led workshop (Early 2024 or combine w/ 2024 UPISC workshop)
        – Requires a small financial commitment and a proposal (discussing with Pitt)
        – Targeted for calendar year 2024
    2. Proposal submitted to U. Pitt. Momentum funds for financial support
    3. Full study – requires a major 3rd party proposal for financial support
2. Potential partners and/or funding sources to engage through a proposal:
    - Federal (DOE, DOT, NGA, etc.)
    - State (PA, PennDOT, Turnpike, etc.)
    - Regional (City of Pittsburgh, Allegheny County, etc.)
    - Local (Pittsburgh Gateways, Energy Innovation Center, etc.)
    - University (UPCAM, Pitt IRISE, UPISC, etc.)

**Recommendation #1: UPISC Initiates a New Study On This Topic**

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## Recommended Next Steps and Dates for High Priority Action Items

1. Established an MOU Between NETL and U. Pitt. (Completed 1/2023)
2. Pursue collaborations and proposals regularly (In Progress)
   - EERE H2 Shot, Earthshot, ARPA-E ULTRAFAST, NSF, etc.
   - **Funding Successes!** ARPA-E SEA CO2, DOE GMI
   - **Partnership Successes!** 2 – Joint R&D 100 Awards (2022, 2023)
3. Establish a formal Pitt participation agreement for partners (Draft)
4. Invite potential company and national lab partners (Calendar Year 2024)
5. Revisit NETL MOU in Calendar Year 2024

**Recommendation #2: Pursue Concepts for a More Formalized Collaboration**

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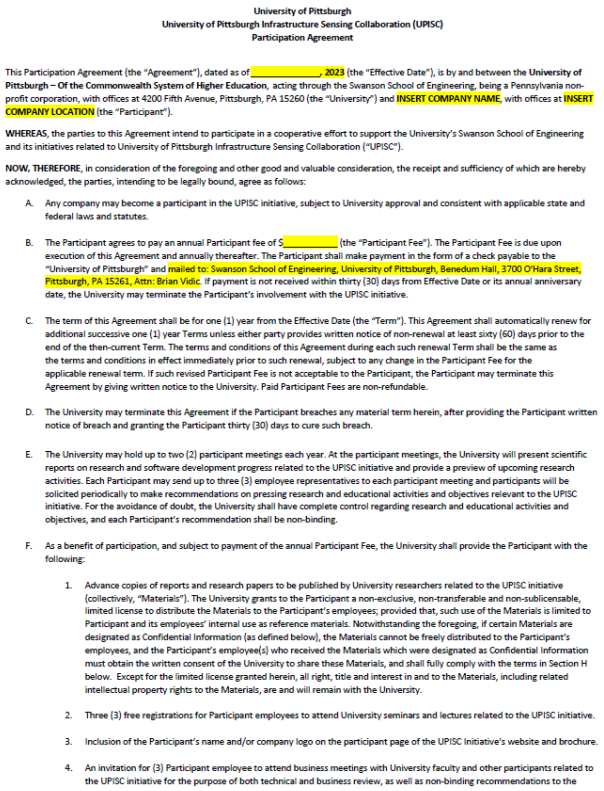
# Discussion Point #2 : Potential for Establishing a Formal Agreement



**University of Pittsburgh**
**University of Pittsburgh Infrastructure Sensing Collaboration (UPISC)**
**Participation Agreement**

This Participation Agreement (the "Agreement"), dated as of _____, 2023 (the "Effective Date"), is by and between the **University of Pittsburgh – Of the Commonwealth System of Higher Education**, acting through the Swanson School of Engineering, being a Pennsylvania non-profit corporation, with offices at 4200 Fifth Avenue, Pittsburgh, PA 15260 (the "University") and **INSERT COMPANY NAME**, with offices at **INSERT COMPANY LOCATION** (the "Participant").

**WHEREAS**, the parties to this Agreement intend to participate in a cooperative effort to support the University's Swanson School of Engineering and its initiatives related to University of Pittsburgh Infrastructure Sensing Collaboration ("UPISC").

**NOW, THEREFORE**, in consideration of the foregoing and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties, intending to be legally bound, agree as follows:

A. Any company may become a participant in the UPISC initiative, subject to University approval and consistent with applicable state and federal laws and statutes.

B. The Participant agrees to pay an annual Participant fee of $_____ (the "Participant Fee"). The Participant Fee is due upon execution of this Agreement and annually thereafter. The Participant shall make payment in the form of a check payable to the "University of Pittsburgh" and mailed to: Swanson School of Engineering, University of Pittsburgh, Benedum Hall, 3700 O'Hara Street, Pittsburgh, PA 15261, Attn: Brian Vidic. If payment is not received within thirty (30) days from Effective Date or its annual anniversary date, the University may terminate the Participant's involvement with the UPISC initiative.

C. The term of this Agreement shall be for one (1) year from the Effective Date (the "Term"). This Agreement shall automatically renew for additional successive one (1) year Terms unless either party provides written notice of non-renewal at least sixty (60) days prior to the end of the then-current Term. The terms and conditions of this Agreement during each such renewal Term shall be the same as the terms and conditions in effect immediately prior to such renewal, subject to any change in the Participant Fee for the applicable renewal term. If such revised Participant Fee is not acceptable to the Participant, the Participant may terminate this Agreement by giving written notice to the University. Paid Participant Fees are non-refundable.

D. The University may terminate this Agreement if the Participant breaches any material term herein, after providing the Participant written notice of breach and granting the Participant thirty (30) days to cure such breach.

E. The University may hold up to two (2) participant meetings each year. At the participant meetings, the University will present scientific reports on research and software development progress related to the UPISC initiative and provide a preview of upcoming research activities. Each Participant may send up to three (3) employee representatives to each participant meeting and participants will be solicited periodically to make recommendations on pressing research and educational activities and objectives relevant to the UPISC initiative. For the avoidance of doubt, the University shall have complete control regarding research and educational activities and objectives, and each Participant's recommendation shall be non-binding.

F. As a benefit of participation, and subject to payment of the annual Participant Fee, the University shall provide the Participant with the following:

1. Advance copies of reports and research papers to be published by University researchers related to the UPISC initiative (collectively, "Materials"). The University grants to the Participant a non-exclusive, non-transferable and non-sublicensable, limited license to distribute the Materials to the Participant's employees; provided that, such use of the Materials is limited to Participant and its employees' internal use as reference materials. Notwithstanding the foregoing, if certain Materials are designated as Confidential Information (as defined below), the Materials cannot be freely distributed to the Participant's employees, and the Participant's employee(s) who received the Materials which were designated as Confidential Information must obtain the written consent of the University to share these Materials, and shall fully comply with the terms in Section H below. Except for the limited license granted herein, all right, title and interest in and to the Materials, including related intellectual property rights to the Materials, are and will remain with the University.
2. Three (3) free registrations for Participant employees to attend University seminars and lectures related to the UPISC initiative.
3. Inclusion of the Participant's name and/or company logo on the participant page of the UPISC Initiative's website and brochure.
4. An invitation for (3) Participant employee to attend business meetings with University faculty and other participants related to the UPISC initiative for the purpose of both technical and business review, as well as non-binding recommendations to the

1. Formalized Participation Agreement Draft was Developed and Distributed
2. Annual "Participation Fee" to Be Used for Student Support on Related Research, Lab, and Workshop Expenses
3. Other Consortia at Pitt Range From $5-50k / Year for Participation (e.g. AMPED = $20k)
4. Monthly Technical Seminars w/ University, Lab, Industry Speakers
5. Annual UPISC Collaboration Workshop Meeting

**Recommendation #2: Pursue Concepts for a More Formalized Collaboration**

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## Discussion Point #2 : Potential for Establishing a Formal Agreement

1. Should Other Potential Business Models be Considered?
   - Current Plan = Participation Funding + In-Kind Donations
2. What Organizations to Engage?
   - Sensor Companies, End Users of Sensors, Utilities, National Labs
3. Managing the Parallel Relationship with NETL / Federal Entitites
   - Questions, Concerns, Strategies…
4. Distinguishing from and Collaborating with Other University Consortia
5. Anything Else?

**Recommendation #2: Pursue Concepts for a More Formalized Collaboration**

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## Recommended Next Steps and Dates for High Priority Action Items

1. Establish formal collaborations with existing partners
    1. Existing laboratory facilities
    2. Expand upon existing modeling activities
    3. Integrate real-time interactions between sensing / analytics

2. Determine initial funding support to seed activity

3. Identify proposal opportunities for new collaborations

4. Successfully secure competitive funding for new projects

**Recommendation #3: New Activity Field Testing of Digital Twins**

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## Discussion Point #3 : Example Project Concept to Consider

1. City of Pittsburgh - Discussions Since Summer Workshop
   - Real-Time Monitoring of Bridges
   - Distributed Optical Fiber + Digital Twin
   - Submitted to 2023 SMART Cities and U. Pitt. Momentum Funds, Pending

2. Regional Roadmapping Exercise
   - Infrastructure Sensing in Pittsburgh
   - Information Can Be Utilized in Future Regional or National Studies

3. UPISC Partners - Interested in Collaboration
   - Digital Twin Development and Integration w/ Real-Time Sensing
   - Field Testing of Digital Twins

**Recommendation #3: New Activity Field Testing of Digital Twins**

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## Discussion Point #4 : 2023 UPISC Workshop Plans

1. Venue : Energy Innovation Center
2. Format : Similar as Last Year
    - Steering Committee / Invited Guest Portion (Day 1 / Today)
    - Invited Speakers and Panelists (Day 2 / Tomorrow)
    - Technical Poster Session / Social Hour (Day 2 / Tomorrow)
3. Goals:
    - Further Promote Identified Action Items
    - Continue to Facilitate Pitt / NETL and other Collaborations
        - Target other partnerships in future facilitated through UPISC
        - Identify new partnership opportunities
    - Showcasing Relevance Across Infrastructure Segments
    - Technology Transfer and Transitions (Standard, Commercialization, etc.)
    - Initiate Dialogue Around a Regional Roadmapping Exercise

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## Topical Areas and Applications to Cover at 2023 UPISC Workshop

1. DOE
   - H2 Infrastructure - Emphasis
   - Electric Power Grid - Emphasis

2. DOT
   - Civil / Transportation Infrastructure - Emphasis

3. Sensor Alignment (Applications and Capabilities)
   - Value Proposition
   - Standards and Requirements
   - Installation Costs and Challenges
   - Networking and Integration
   - Technological Relevance
   - Digital Twin Integration and Analytics

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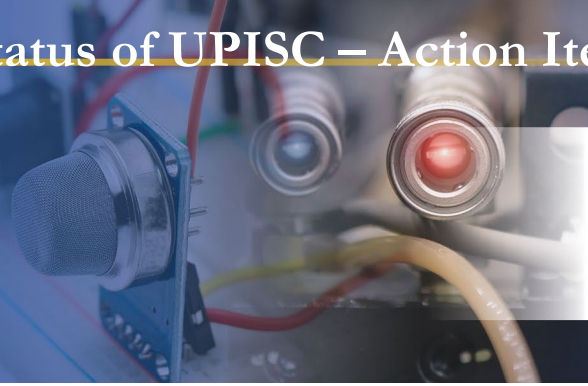

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# Open Discussion: Current Status & Plans for 2024…

Examples of questions to consider…

1) Do we need to set additional / new 2024 goals?

2) How should we plan for meetings in 2024?

3) Establishment of a formal consortium in 2024?

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# Agenda for the Meeting Today

| Time | Activity |
|---|---|
| Innovation Hall | Steering Committee and Conference Organizers Only |
| 1:00 p.m. | Welcome Remarks |
| 1:05 p.m. | Workshop Planning Updates and Discussion |
| 1:30 p.m. | Status Update of UPISC – Action Items and Progress – Discussion of Path Forward |
| 2:30 p.m. | Coffee and Networking Break |
| 3:00 p.m. | Pittsburgh Public Sector Infrastructure Sensing Needs and Roadmapping (Invited) |
| Covestro Room | Steering Committee, Conference Organizers, and Invited Speakers / Panelists |
| 4:00 p.m. | Overview of Workshop and Final Preparation |
| 4:15 p.m. | Adjourn |
| Innovation Hall | |
| 4:15 – 6:00 p.m. | Networking Social Hour and Light Refreshments |

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**DOMI Mission**

Provide the physical mobility necessary to support the social and economic mobility of the people of Pittsburgh through the management, design, improvement, and operation of the public right of way.

**What we do.**

The Department is responsible for the transportation of people and goods throughout the City of Pittsburgh, and for managing the operation of and access to the public right-of-way (the sidewalks, curbs, streets, and bridges that make up our network).

**City's Mobility Principles:**

1. No one dies or is seriously injured traveling on city streets.
2. Every household in Pittsburgh can access fresh fruits and vegetables within 20 minutes travel of home, without the requirement of a private vehicle.
3. All trips less than 1 mile are easily and enjoyably achieved by non-vehicle travel.
4. No household must spend more than 45% of household income to satisfy basic housing, transportation and energy needs.
5. The design, maintenance and operation of city streets reflects the values of our community.

**DOMI maintains:**

- 1,000+ linear miles of streets
- 2,400+ lane miles of streets.
- Tens of thousands of crosswalks and pavement markings.
- 800 sets of steps covering 23.3 linear miles.
- ~44,000 street lighting fixtures.
- 613 signalized intersections + ~10,000 traffic control fixtures.
- 850,000 street signs.
- ~33 miles of guiderail.
- 150 bridges

**PGH 2070 Mobility Vision Plan** link

**Plan Summary**

The 2070 Mobility Vision Plan dares to dream. It reaches both forward and back, integrating numerous separate community-led plans, existing assets, and past wisdom into one cohesive vision for infrastructure and mobility.

# Pittsburgh Public Sector Infrastructure Sensing Needs

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1. Make meaningful changes to promote equity in infrastructure and mobility.
2. Support, pursue, and adopt fair and sustainable funding structures.
3. Dramatically reduce transportation-related carbon emissions and prepare for climate change.
4. Recognize and organize the mobility system of systems, including the movement of people, goods, and information.
5. Actively and effectively manage streets for public benefit.
6. Proactively guide and manage mobility innovation and technology to solve real problems and serve community values.

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## Relevant projects the City is undertaking

**SmartSpines**
Broad deployment of advanced transportation technology along eight highly utilized corridors in the City of Pittsburgh.

**PGH Lab**
Pittsburgh's regional incubator geared  innovating local government through new technologies and services to be more efficient, transparent, sustainable, and inclusive.

**NetPGH**
The comprehensive, unified fiber connectivity network for city facilities with the goal of improving efficiency in the delivery of public services.

**Smart Loading Zones Pilot**
A new way to manage our curb space to increase delivery efficiency and decrease congestion and emissions.

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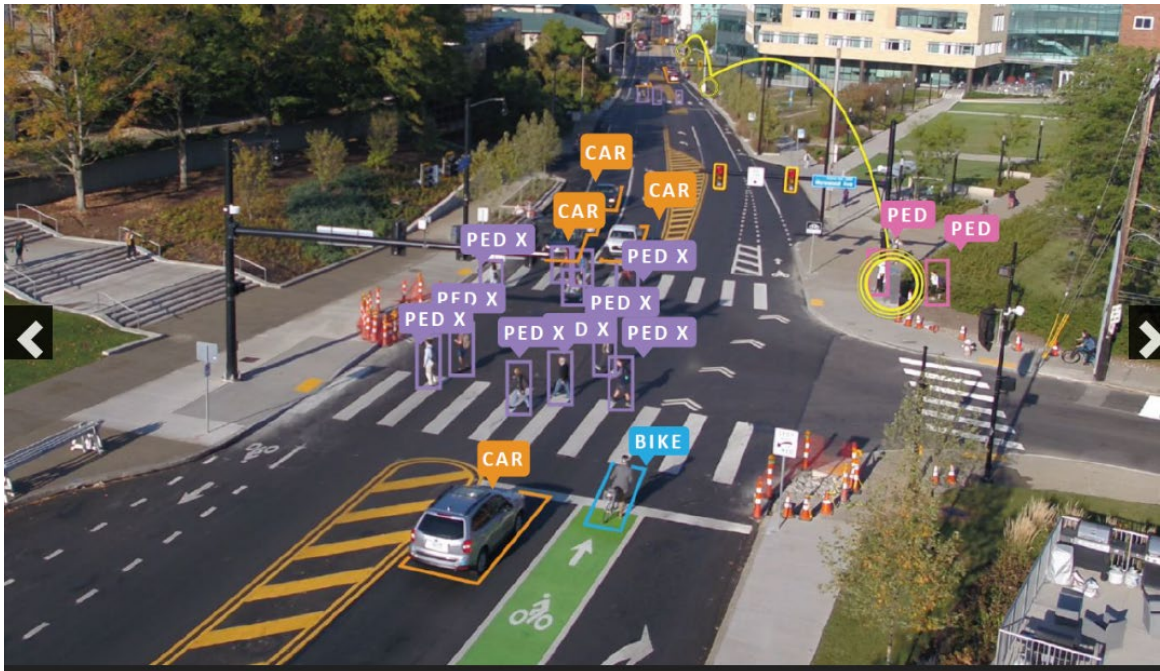
**SmartSpines improvements are broadly divided into three categories:**

- Signal Infrastructure Upgrades
- "Smart" Software Implementation
- Traffic Management Center (TMC) Construction




Vehicular detection technologies (in-ground loops, cameras, radar) are constantly evolving and this project will assess and implement technology that best fits Pittsburgh's needs.

Passive pedestrian detection technologies can detect the presence of pedestrians waiting to use a signalized crosswalk and provide them a pedestrian phase without the need for depression of pedestrian pushbutton. This project will assess the state of this emerging technology and how it interacts with the SmartSpines goals.

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**What is a Smart Loading Zone?**

- Smart Loading Zones use **license plate reader** technology to automatically bill registered users for their use of a zone.
- Users **must be registered** or may receive a violation
- **One time registration** unlocks use of all 47 zones


**Smart Loading Zones Pilot Goals**

- Improve **safety** for pedestrians, cyclists, and other curb users
- Reduce illegal parking and double-parking of loading vehicles by creating reliable curb access
- Increase delivery **efficiency** and reduce dwell time
- Increase parking turnover for restaurants and small businesses
- Align parking and loading policies with **real-time data**
- **Decrease emissions** from unnecessary idling and circling
- Use lessons learned to inform future curb management decisions

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**Double Parks decreased 40%**
Before: 17.97 avg double parks / zone / day
After: 9.15 avg double parks / zone / day

**Turnover increased 49%**
Before: 25.26 avg parks / zone /day
After: 37.74 avg parks / zone /day

**Average park duration decreased 23%**
Before: 37.12 minutes
After: 26:56

**2,800+ registered users**
91% cars
7.6% vans
1% freight

**Fleet Registrations**
Amazon
WS Vending
Uber, Lyft, Doordash, and Grubhub

**Adoption**
-Currently around 1-2% of parks are by registered users
-Majority of parks are not paying
Revenue to date: $9,000

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## DOMI Sensing Opportunities and Needs in Transportation / Civil Infrastructure

Understanding the degradation of infrastructure assets => Better decision making
(e.g.. Bridges, roads, side walks, retaining walls.)

Facilitating Pittsburgh ingenuity => new methodologies and increased mobility equitably
(e.g. Dig Once Policies industry,
and university partnerships)
(the region grows when we are all mobile)

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**Other possible applications?**

Bring us your ideas, let's discuss, connect with the right team and go after the right grants!