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Mr. David Ridley
California Air Resources Board (CARB)
Email: david.ridley@arb.ca.gov

Dear David,

I am writing to formally submit my response to the RFI 2023CARB_SMMI-RFI001. I am excited to express my interest in this opportunity and to present Archimedes Controls' credentials and proposal in response to this RFI.

In accordance with the RFI guidelines, I am submitting the following documents and information:

1. This RFI Cover Letter
2. Attachment – A Vendor Profile
3. Attachment – B Vendor Questions
4. Attachment C Rough Order of Magnitude Cost Estimate

I hereby certify that all the information provided in this RFI response is true and accurate to the best of my knowledge at the time of submittal.

California Air Resources Board is known for its commitment to excellence, and I am dedicated to upholding the highest standards in delivering the services required for this project. I am confident that Archimedes Controls' qualifications, experience, and the quality of my response to this RFI make me us an excellent candidate to fulfill the objectives outlined in the RFI.

I look forward to the opportunity to discuss my proposal in further detail and address any questions or concerns you may have. Please do not hesitate to contact me at 301-370-0496 or wenli.yu@archimedescontrols.com to schedule a meeting or request additional information.

Thank you for considering my proposal. I am eager to contribute to the success of this project and to work in partnership with California Air Resources Board. I appreciate your time and consideration.

Sincerely yours,

Wenli Yu

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Enclosures:
Attachment – A Vendor Profile
Attachment – B Vendor Questions
Attachment C Rough Order of Magnitude Cost Estimate

Attachment – A
Vendor Profile

1. Identify the Company Name, address, city, state, and zip code, telephone.

   Archimedes Controls Corp

   3193 Caramello Ct.

   Pleasanton, CA 94588

   301-370-0496

2. Identify the name, title, address, phone number, and email address of the primary contact person for this RFI.

   Wenli Yu, CEO

   920 Pamela Pl.

   Pleasanton, CA 94566

   301-370-0496

   wenli.yu@archimedescontrols.com

3. Provide a brief overview of your company including number of years in business, number of employees, nature of business, and description of clients.

   Archimedes Controls, based in Silicon Valley is a designer and manufacturer of innovative wireless industrial IoT technologies and solutions for mission critical detection, monitoring and warning notification service to infrastructure owners, enterprise control and automation industry since 2016.

   In the past several years we developed a novel wireless environmental measurement and monitoring system (including wired and wireless hardware sensors, gateways/PLCs and cloud-based monitoring management platform) for enterprise environmental security which can be adapted and re-purposed with reasonable efforts and time with manageable technological and operational risks for the purpose of CARB's mobile air quality RFI.

   Archimedes Controls is a small business and currently managed and run by four (4) founders and co-founders.

4. Identify any parent corporation and/or subsidiaries, if applicable.

   N/A

5. Give a brief description of your company's product(s), platform(s), service(s), etc. that may be relevant to this RFI.

   - AC or 12VDC or solar powered with battery backed up A150 Environmental Monitoring System and Platform with GPS location tracking and SOS for emergency notification.
   - A150 system includes wireless sensors Gateway/Programmable Logic Controller (PLC) supporting network connectivity via WiFi, Ethernet, LTE, 5G and LEO satellites. Programmable IO ports for 3rd party device controls like sirens, flashlights, on/off relays, etc.

- A150 system includes environmental sensors - temperature, humidity, PM0.3 – PM10 including PM2.5, airborne particles, airflow speed, atmosphere pressure, wind speed and direction, CO_2, H_2, LPG, CO, propane C_3H_8, methane CH_4, O_3, SO_2, NO_2, formaldehyde HCHO, VOC, ammonia, disaster (mudslide, landslide, flood, object fall, vibration, move, tilt, shake, tamper, etc.), water leak, standing water, smoke, mold, rust, rain level, plus customer requests
- ARCOS Cloud-Based Monitoring Platform for dashboards, reporting, email and SMS notifications, plus OpenSearch analytics tool with AI/ML based anomaly detection.

6. List and briefly describe the projects and/or activities your company was engaged within the last ten (10) years that are similar to the project identified in the RFI.
   - Air Quality Monitoring System (PM0.3 to PM10 including PM2.5)
   - Environmental Monitoring System
   - ARCOS cloud-based (public and private) IIoT Management Platform including dashboards, histograms, custom charts, analytics, custom reports, users management and assets management.
   - Environmental security – access, assets monitoring, water leak detection, airflow, etc.
   - Power consumption monitoring
   - Security camera monitoring
   - Remote gas station automatic fuel level monitoring

7. Are there any of the requirements described in the *Proposed Environment* section not technologically feasible with your existing service(s), product(s), platform(s)?

   - No, but need to know whether arsenic monitoring is for air or water because it typically measures arsenic content in water.

Attachment - B
Vendor Questions

I. General Questions

1. What scale of operation would be required to bid on a future RFP of the concept described here? Are there any minimum requirements necessary at which below you would not be interested in bidding on a proposal of this nature?

Archimedes Controls will provide a fully portable and mobile system meeting the requirements of this RFI to CARB. Archimedes Controls will also provide installation, configuration, testing and verification to a vehicle (either a regular car or a minivan) provided by CARB. The entire installation, configuration, testing and verification will take one day to complete. Archimedes Controls will also provide a needed edge device as part of the portable mobile system so the operator(s) in the mobile vehicle can access the monitoring data in real time. In the meantime, a cloud-based remote management platform ARCOS® either hosted by Archimedes Controls or by CRAB (at the preference of CARB) will be set up prior to the mobile installation for CARB's back office to provide 24x7 monitoring and surveillance. ARCOS® provides not only all needed data management, but also GUI and Analytics tools for visualization (like dashboards, histograms, users management, data archive and export, etc.), warning notifications by emails and/or SMS text messages as well as an AI/ML-based anomaly detection.

There is no minimum requirement necessary that Archimedes Controls would not be interested in bidding on a proposal of this nature.

2. What types of monitoring objectives have you explored using your company's mobile monitoring approaches?

The following monitoring objectives have been explored and realized in our existing system:

- Real time monitoring data viewable by a browser in regular laptops, tablets or mobile devices.
- Supporting anywhere, any place and anytime 24x7 monitoring capability.
- Provides automatic warning alerts and notifications (including data, picture, GPS location) to designated emails and/or SMS text messages with links leading to ARCOS®.
- Preserving and archiving all the data for 10 years or even more as required.
- Providing AI and ML based analytics tools so an "out-of-normal" can be detected by the analytics tool.
- Providing 5G/LTE-4G connection by T-Mobile as part of the mobile system so real time monitoring data will be sent to the cloud server.
- Providing security mechanism for data security.
- Providing a long-term investment security with over-the-air cloud software upgrade and maintenance.
- Providing support and service for the entire mobile system, software and cloud service.

3. What are the advantages and limitations of your company's mobile monitoring services?

- Advantages: Powered by latest IoT technologies; low initial and life-time investment; low operational cost; fully tested system with low maintenance cost, standard based; and open source based.
- Limitations: Hardware sensors require annual calibration by Archimedes Controls in order to keep their measurement accuracy; 5G/LTE-4G mobile network connection requires monthly subscription; annual maintenance agreement will be required to keep support and services; the system may require 15 min warm up time in cold winter days before a certain accuracy can be reached.

II. Engagement and Coordination

1. Describe your interpretation of what community engagement should look like throughout the process of conducting mobile air monitoring in communities.

   Community engagement shall include community communication including program schedule and air quality monitoring plans, community hearings and inputs before the program can be funded and approved to pursue. Once the mobile monitoring program is up and running, a regular measurement data and technical interpretation shall be made available to the involved and impacted communities.

2. What experience do you have with community and public engagement? Is any of this experience directly related to air monitoring activity and data dissemination?

   We will need assistance from local environmental agencies and organizations in community and public engagement as we have had limited experience in these areas.

3. What is your experience coordinating with community members, CBOs, regulated industry, academia, and governmental agencies when planning monitoring objectives and data analysis and communication?

   We have had some experiences with local government and city councils in Silicon Valley in smart cities events. Attended several EPA related conferences.

4. Please provide the number and size ($) of technical projects previously managed for coordination and communication with both community and technical contractors.

   About $20K.

5. How would you apply your engagement and coordination model on a statewide scale?

   We will reach out to the CA EPA and appropriate agencies to develop a statewide engagement and coordination plan for this program if or proposal is finally selected.

III. Mobile Monitoring Technologies and Capabilities

1. How many mobile monitoring platforms do you currently own and operate? How long have these platforms been in operation? a. What areas/sources/locations do you have experience conducting mobile monitoring?

We own four platforms (two in Taiwan, one in France and one in Indonesia) for 2-4 years which can be easily converted to mobile systems.

b. Has collected data been used to support community emission reduction, enforcement, or other actions? Please provide examples.
The one in France is used for community air quality reports and forecast but detailed information is not available.

2. Please provide operational information on your company's current mobile monitoring capabilities. This should answer the following questions: a. What frequency can platforms be deployed?

433MHz for wireless sensors if needed, 5G(n71:600MHz,n41:2.5GHz), LTE-4G (B2:1900MHz, B4:1700MHz/2100MHz, B12:700MHz, B71:600MHz, B66:1700MHz/2100MHz) operated by T-Mobile.

b. What days/hours are the platforms generally in use?

Our systems are typically in 24x7 operations.

c. What pollutants can be monitored and with what frequency?

Our system can operate for monitoring pollutants listed in the RFI. The system uses 5G/LTE-4G frequency bands operated by T-Mobile (listed in 2. Above).

d. What types of instrumentation do you use? Describe all relevant methodologies.

We integrate off-the-shelf air and gaseous sensors into our self-developed A150 and ARCOS system. No other instrumentation will be required.

e. What level of coverage or scale of monitoring can be accomplished within a community? (For example, how would you approach characterizing emissions from a source or identifying a leak? How long would that take?)

Since each mobile system can cover a small area of interest, therefore a community-based route-by-route drive test would be strongly recommended, and a pre-scheduled community route plan shall be developed prior to the start of the program. Depending on the frequency of community update is needed, the entire program may need more than one mobile system.

f. How do you determine that you've adequately characterized a given area?

We will conduct a test drive in 5 selected communities to determine the adequate characterization for a given area in RFP and RFQ.

g. What workflow processes or software do you have for managing mobile monitoring?

A fully tested and deployed cloud-based software platform ARCOS® will be used in this program.

3. Describe your usual approach or strategy to mobile monitoring. Include, if possible:
a. Drive plan and operational logistics

We are proposing a daily 2-shift drive test plan with 2 operators in each shift of 8 hours excluding holidays and weekends.

b. Staffing

Four (4) operating personnel staffing – 2 operators in each mobile vehicle (one driver, one managing the monitoring system) for 16 hours daily from Monday through Friday excluding holidays and weekends.

c. Power requirements (e.g. battery powered, requires generator, etc.)

Each mobile system includes a 24-hour battery pack charged by the vehicle's 12VDC from lighter's plug. The backup battery pack will be switched automatically when the vehicle's engine is stopped.

d. Consumables

Certain sensors and the battery pack require annual calibration and test or replacement if such a calibration fails.

e. Quality control procedures

Standard Archimedes Controls' Quality Control, PDP processes and manufacturing warranty.

f. Performance and acceptance criteria (e.g. precision, bias, limit of detection)

- Will be provided as part of the warranty
- Standard accuracy: +/- 5%

g. Data logging and storage

- All measurement and monitored data are stored and archived in ARCOS® database and
- Edge based server in each mobile system and
- Cloud-based server hosted in data center.

h. Notifications and communication

- Thresholds for warnings can be set initially and updated remotely thereafter, and
- Warnings can be sent by emails and/or SMS text messages

4. Please provide an estimated cost to operate all applicable mobile monitoring platforms as a function of time (e.g. 1 week of monitoring) deployed and/or measurements taken. a. These cost estimates should include all costs associated with mobile monitoring operation. This includes but is not limited to: i. Direct costs – instrumentation consumables and repairs, vehicle operation costs, staff cost to operate platforms, recharging requirements.

Direct monitoring operational cost for one month per vehicle (mobile monitoring equipment, cloud management cost, direct labor cost, auto insurances, vehicle operation, vehicle mileage cost, mobile networking connection, labor overhead, etc.):

Estimated fully loaded operational cost: $200K/month

ii. Indirect costs – support staff costs, associated insurance for operation, administrative overhead, any required permits.

Estimated: $25K/month

iii. Data Management – costs to move data from raw data collected by instrumentation to the final data products requested by CARB.

Estimated: $25K/month per mobile system

b. How often are invoices and payments typically required?

We will invoice an initial setup cost (including all needed equipment) plus monthly service fees (including everything mentioned above for the operation).

5. If an RFP is developed based on the information provided here, how much preparation time is required to deploy the platforms and begin monitoring? a. Do you have recommendations for a minimum timeline to achieve potential monitoring objectives described here?

The delivery time is 6 months from RFP. We recommend a period of 6-12 months of time to achieve potential monitoring objectives since some air qualities are seasonal.

b. What is the maximum number of platforms that you could deploy by early 2025?

We can deploy 10 to 30 systems by early 2025.

6. Do you have experience developing Community Air Monitoring Plans (CAMPs) as defined by the CARB Community Air Protection Program Blueprint5 or similar? Please provide examples of community-focused monitoring plans or similar.

   We do not have one for now, but we can develop one as required.

7. Do you have existing standard operating procedures (SOPs) or quality assurance project plans (QAPPs) for your mobile monitoring approach?

   We do not have a ready to use SOP but we do have a standard warranty policy.

IV. Data Collection, Storage, Reporting

1. In what format do you generally provide data to your clients? What is your final data product?

   Data will be provided in MySQL database and in the forms of dashboards, histogram graphs, tables and lists, Excel format, bar charts, pie charts, dials and customized formats as user's GUI.

2. Do you have off-the-shelf, or modifiable-off-the-shelf, data management products compatible with mobile monitoring data?

   Yes. Our ARCOS® was designed and developed for this type of purposes.

3. What is your experience in mobile monitoring data analysis and visualization? Specifically, do you have any experience using ESRI products to manage and visualize data?

   Yes, we have integrated Google Earth in ARCOS® for mapping and tracking applications.

4. What is your experience in public dissemination of complex information? To what extent have you generated data visualization for the public?

   Our OpenSearch tool is designed for public dissemination of complex information and data visualization for the public.

5. What suggestions do you have for handling large amounts of data from a variety of sources (e.g. multiple mobile monitoring platforms) into cohesive data visualizations?

   Our in ARCOS® platform with OpenSearch was designed for supporting multiple sites, units and large numbers of sensors data with different user privileges. We recommend creating one ARCOS® for each mobile vehicle and one tab/site for each community to be monitored.

V. Feedback

1. Provide input on the requirements or areas listed in this RFI. Specifically, CARB is looking for: a. Availability of existing systems that perform all or a portion of the requirements in Section II – C. New systems cannot be built using funds in a potential RFP.

Please add detailed measurement range and accuracy requirements for each monitoring pollutant.

a. Availability of systems that perform all or portion of the requirements in Section II-C:

   1 mobile system

b. Detailed measurement range and accuracy requirements for each monitoring pollutant:
   - CO2:
     - Measurement Range: 400 – 10,000 PPM
     - Accuracy: +/- 10%
   - PM0.3, PM0.5, PM1.0, PM2.5, PM5.0 and PM10:
     - Measurement range: 0 to 2,000 ug/m3
     - Resolution: 1 ug/m3
     - Accuracy: +/-10%
   - HCHO:
     - Detection range: 0 – 1.0 mg/SM
     - Resolution: 0.001
     - Accuracy: +/-10%
   - Flammable Gas (LPG) – H2, CH4, CO, Propane:

- Detection range: 200 – 10,000 ppm
- Resolution: 10 ppm
- Accuracy: +/- 10%

- CO:
  - Detection range: 0 – 1,000 ppm
  - Resolution: 0.1ppm
  - Accuracy: +/- 10%
- O3:
  - Detection range: 0 – 20 ppm
  - Resolution: 0.02ppm
  - Accuracy: +/- 10%
- NO2:
  - Detection range: 0 – 10 ppm
  - Resolution: 0.02ppm
  - Accuracy: +/- 10%
- SO2:
  - Detection range: 0 – 20 ppm
  - Resolution: 0.02ppm
  - Accuracy: +/- 10%

b. Questions, suggested modifications, or additions to the proposed environment that would allow or encourage potential bidders. Please include justifications for any suggested changes and concept modifications.

Attachment - C
Rough Order of Magnitude Cost Estimate

Rough Order of Magnitude	
Estimated range of cost per month of full-time monitoring. *This may be costs associated with conducting monitoring, engagement activities to support monitoring, or both. If this is not applicable, please specify a different time range or more appropriate metric to quantify your capabilities. Please describe what "full-time monitoring" looks like for you and itemize costs with as much specificity as possible.*	$250,000/month for each vehicle system
Estimated range of cost to complete a full year of monitoring.	$3M per vehicle system

Answers and Assumptions Used in Cost Estimate
Please answer, in as much detail as possible, the State's questions (1-4) below. *Also, please provide details pertaining to the assumptions, expectations, and/or performance parameters used as the basis of the cost estimate.*
THE STATE's QUESTIONS and VENDOR'S RESPONSE/ANSWERS: 1. What is the timeline for your mobile platform(s) (that is, how many platforms do you have operational right now, and what is your timeline for launching more)? Will your platform(s) depend on additional funding to reach and sustain maximum planned capacity? 2. Approximately how much monitoring can be accomplished in the period of a month? A year? 3. Are there any requirements that would preclude you from competing should an RFP be released? If yes, what suggested changes would allow you to compete? 4. Are any of the goods, products, or services you've identified in your RFI response available on a Federal GSA or State of CA LPA? If yes, please identify the contract type, name, and number. **VENDOR'S ASSUMPTIONS:** What assumptions have you made in preparing a response to this RFI?

THE STATE's QUESTIONS and VENDOR'S RESPONSE/ANSWERS:

1. What is the timeline for your mobile platform(s) (that is, how many platforms do you have operational right now, and what is your timeline for launching more)? Will your platform(s) depend on additional funding to reach and sustain maximum planned capacity?

   We have four mobile platforms in operation now. We can easily deploy more systems as need in a rate of one system per month.
   We currently have only a portion of the monitoring capabilities running in these systems. However, we can build additional needed systems by adding all required ove-the-shelf sensors and operational capability to deploy, reach and sustain planned capacity in 9 months.

2. Approximately how much monitoring can be accomplished in the period of a month? A year?

   About 50% of the monitoring can be accomplished in a period of a month and >90% can be accomplished in a year after fully deployed.

3. Are there any requirements that would preclude you from competing should an RFP be released? If yes, what suggested changes would allow you to compete?

   No known one at this moment.

4. Are any of the goods, products, or services you've identified in your RFI response available on a Federal GSA or State of CA LPA? If yes, please identify the contract type, name, and number.

   Further search for answers will be needed for this question.

VENDOR'S ASSUMPTIONS:

What assumptions have you made in preparing a response to this RFI?

Only technical feasibilities based on our current system and our understanding of this RFI at this submittal.