The use of Unmanned Aerial Systems (UAS) to Remotely Collect Data for Road Infrastructure.

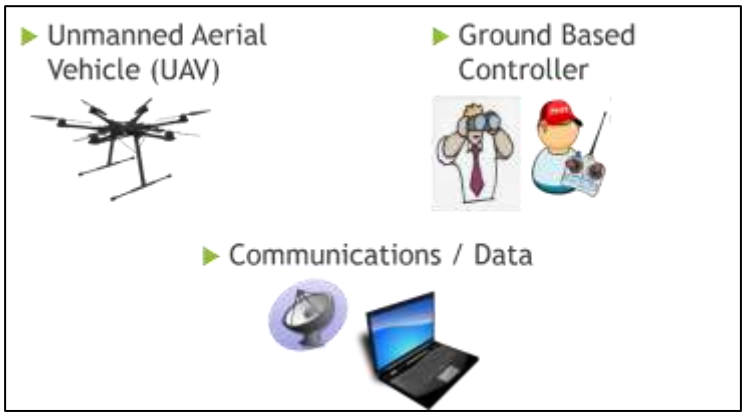
CALL FOR PROPOSALS

Deadline: March 11, 2017

1 PURPOSE AND STRATEGIC SIGNIFICANCE

1.1 Introduction

The World Road Association (PIARC) has established a Special Projects fund to enable it to respond outside the usual four-year Technical Committee cycle to emerging issues and priorities identified by its members. This paper is a Call for Proposals for the "The use of Unmanned Aerial Systems (UAS) to Remotely Collect Data for Road Infrastructure." An UAS is comprised of Unmanned Aerial Vehicle (UAV) or sometimes called drones, ground based



controller, and a communications / data terminal. Figure 1 is a visual representation of a UAS.

1.2 Purpose

The purpose of this proposed project is to assist transport decision-makers in understanding the use of UAS and associated success.

We have seen an increase in the use of Unmanned Aerial Vehicles (UAV) with various payloads to remotely collect data. Some of the more common payloads we are seeing used in several countries are high definition (HD) video cameras, LiDAR, hyperspectral data, radar, and others. UAVs are particularly well suited to gather data in environments where access is hazardous or difficult, to rapidly cover large open areas, and generally to access other locales where robotic data collection is determined to be more efficient or safer.

Figure 1: Unmanned Aerial System (UAS)

Over that past couple of years, we have seen a rapid growth in the highway industry's use of this technology, both in construction and maintenance. In addition, several countries are using UAS for traffic management and quick response to emergency situations (traffic accident, natural disaster, etc.). What began as HD still imagery progressed to video, quickly followed by other types of imagery/data as sensor technology miniaturized and became less costly. It appears that there may be no limit to the use of UAS in planning, asset management, design, construction, operations, and maintenance of highways. In particular, we would like an international comprehensive synopsis of where the technology is being used in the highway industry with a brief description of its success and areas for improvement.

2 METHODOLOGY AND APPROACH

2.1 General

There are numerus opportunities for the use of UAS in the highway industry. This study will help us understand the international usage and associated success. In addition, this study will look at how the technology supports the national and international security of our highways. This will allow the PIARC members the opportunity to leverage the experience of others to expedite the efficient, economical, and safe international deployment and mainstreaming of the technology. There is the added benefit that since this technology is relatively new, there are still the opportunities to foster common approaches in data integration rather than seeing a proliferation of divergent approaches, as we do work and live in an international economy.

2.2 Approach

Proposals in response to this Call should include a description of the approach to be taken to collect and compile the information being requested. The proposal should answer the following questions about the tenderer's approach:

1. How will the study collect international information regarding the users and respective use of UAS with roads? (i.e. surveys, experts, literature review, etc.)
2. How will the study collect UAS related example standards, example data management standards, best practices, inspection guides, regulation etc.?
3. How will the study identify UAS successes or areas for improvement?
4. What will be the study milestones?

2.3 Key areas

Please describe the key areas for consideration in the framework:

1. What will be the study's means of collecting information from different areas of road administration (i.e. planning, asset management, design, construction, operations, and maintenance) from international road sector including successful and unsuccessful case studies?
2. Low and middle income countries (LMIC) represent an important share of PIARC membership and it is crucial that their needs are addressed within PIARC activities. How case studies from LMIC will be gathered? How LMIC needs and low cost UAS applications will be collected?
3. How will the study collect differing usages of UAS (i.e. real time monitoring, data gathering, performing function, etc.)?
4. What will be the studies criteria used to identify if the use of UAS was a success or area for improvement?

3 FINAL DELIVERABLES

The final deliverables will comprise:

1. A **report** presenting the international use of UAS with respective success and areas for improvement. The report shall include example specifications, data management practices, case studies, inspection guides, emergency response plans, and other guides and best practices associated with using UAS.

2. An **executive report** that will describe the rationale behind the framework, explain the methodology for your work, summarize response, and explain how this report can be used by countries, including LMIC.

3. A chapter inside the report with possible **specific recommendation for LMIC**.

4. An accompanying illustrated **presentation** for distribution and use in webinars and/or international conferences such as World Road Association's Council meeting (October 23-26, 2017) in Bonn, Germany with representatives for the 121 PIARC member countries, and the TRB 2018.

The final products will be submitted in electronic form in English. The World Road Association will ensure translation into French and Spanish. In addition, they will make it available for free in the World Road Association's Virtual Library to ensure a large world outreach for the report.

4 KEY DATES

The proposal should also include a proposed draft of a work schedule. The schedule should identify dates or time frames for accomplishing major milestones in the project. The work schedule will include bi-monthly status reports and dates or time frame for an interim product or products that allows adequate time for review and feedback prior to the final deliverable. The schedule should also include a proposed schedule for periodic conference calls to report on progress. The schedule must be completed and all final products delivered within six months of the commencement of the project, and in any case final deliverables must be submitted prior to September 23, 2017.

5 PROPOSED BUDGET

Please provide a general budget for the project. The funding requested from PIARC should not exceed 25,000 Euros, though the total budget may be higher (using complementary funding or contributed services or resources). The budget should include a general itemization of the costs of the major work elements of the project.

6 PROPOSED EXPERTS AND INTERNATIONAL NETWORK

The proposal should also include a description of the relevant expertise that qualifies the tenderer to undertake the project. Specifically:

1. Please describe any past or current work projects that relate to the subject of this proposal.

2. Please also identify the person or persons who will be working on this project, describing their roles and estimated contribution to the project, and providing information on their backgrounds, experience and expertise.

3. Please provide information about any other international network, other than the World Road Association, from which tender could be leveraged from.

7 PROJECT OVERSIGHT

The project will be overseen by a project evaluation and steering committee called "Project Oversight Team (POT) to select the preferred supplier and assist in the development of the project. These experts will be drawn from PIARC membership, and will include representatives from Technical Committee D1 Asset Management and B.1 Road Network Operations/Intelligent Transportation systems and the PIARC Executive Committee.

The POT will assess tenders and select the preferred supplier based on its assessment of:

- how well tenders address the project objectives and deliverables;
- the value for money offered by the tenderer, including additional contributions leveraged by the project; and
- the capacity of the tenderer to deliver the specified outputs.

The POT will oversee progress of the Project, including participating in periodic calls, bi-monthly status reports, reviewing interim and final products. The POT will also provide any relevant information from the PIARC work to the selected tenderer (e.g., information obtained from surveys) for use in the project. In addition to review and oversight by the POT, input may also be sought from the other members of Technical Committee D.1 Asset Management and B.1 Road Network Operations/Intelligent Transportation systems and the PIARC Executive Committee, and from members of any other relevant PIARC Technical Committees.

8 PROPOSAL SUBMISSION

Proposals should include the elements identified in this Call for Proposals. Specifically, they should include:

1. An outline of the Approach to be used for the project, including responses to the questions in Section 2.2;

2. An identification of the key issues to be considered, including the information requested in Section 2.3;

3. A work schedule, as described in Section 4.

4. A budget, as described in Section 5.

5. A list of proposed experts and possible international networks, as described in Section 6.

Proposals should be submitted electronically in English to the World Road Association General Secretariat at:

info@piarc.org

no later than:

March 11, 2017

For any questions, please send E-mail to info@piarc.org