Challenge #2
Proactive detection of fallen electrical (power line) conductors

Help Desk :

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Opportunity
Contract research, consulting engagement

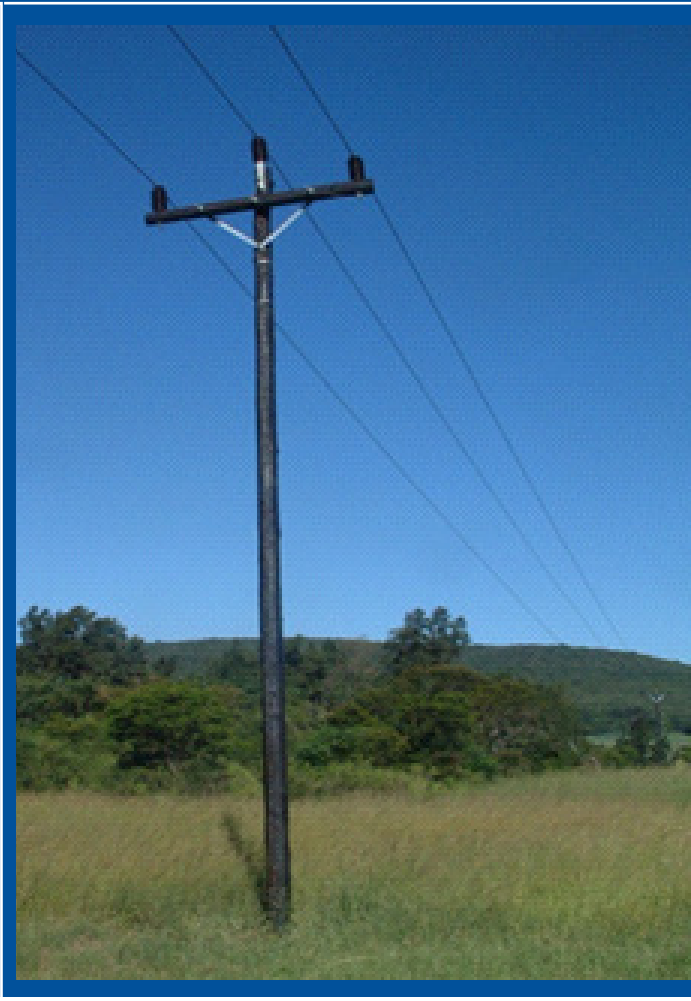
Timelines
Phase 1 – Technology evaluation in 3-6 months

Phase 2 – Prototype development in 6-9 months

Phase 3 – Proof of concept in 3 months

Proposals may jump to advanced phase depending upon technology maturity

Financials
Phase 1 – Funding commensurate with proposed activity, according to sponsor's normal commercial agreement.



Challenge description

Eskom Holdings SOC Limited invites proposals for technologies that will provide early detection of sagging, slipping, or fallen overhead conductors used for electricity distribution and delivery.

The successful technology and technique will:

- Provide accurate and instantaneous information about conductor continuity and position
  - o Permit proactive identification of im pending conductor failure
  - o Monitor each conductor on a pole individually and report status collectively
- Have ability to transmit data to a long-term storage facility
- Be retrofittable to existing overhead lines, preferably without power interruptions during installation
  - o Be safe
  - o Be compact, requiring minimal installation space
  - oRemain intact if a conductor breaks
- Be robust and suitable to weather conditions
- Be compatible with sponsor's existing supervisory and communication architecture2
  - o Able to communicate conductor faults to the relevant network control centre and maintenance team
  - o Integrate and complement the conventional network protection already deployed
- Rely on minimal infrastructure and maintenance support
  - o Functionality tests after commissioning and installation will be easy
- Provide a cost effective solution both from capital and operational perspective

Background

Eskom is a vertically integrated electricity business consisting of generation, transmission and distribu-

tion underpinned by a strong customer focus capability. Furthermore Eskom is the dominant electricity generation business in South Africa and is a significant electricity supplier for the mining sector and municipalities in South Africa.

Eskom sold 218,591 GWh of electricity to more than 4 million customers in fiscal 2010. Eskom serves customers through a transmission, distribution, and reticulation network of 379,651 km of overhead lines (excluding underground networks). During 2010, they added 149,901 customers and expanded the overhead distribution and reticulation networks by 716 and 7368 km, respectively.

Eskom has a very strong focus on customer satisfaction, environmental, health and safety performance and delivery of a reliable product to the end customers. Considering the massive expansion of the overhead networks and customer growth, Eskom would like to take all reasonable precautions to ensure the safety of the public, employees, animals or any other objects which accidently make contact with any live components of the networks. Falling conductors is one of the key risks for overhead lines which confronts Eskom.

This request considers overhead lines that operate at the following voltages:

- 3 Phase/ 3 wire
  - o Sub-transmission (HV): 44-132 kV
  - o Medium voltage (MV): 6.6-36 kV
  - o Intermediate voltage (IV): 1-3.3 kV
- Low voltage (LV): < 1 kV (Single phase/2 wire and 3 Phase/4 wire

Most of the incidents associated with low hanging conductors, downed conductors, or broken conductors relate to the MV overhead networks while very few are related to the HV overhead networks. Eskom will consider solutions which address any or all of these voltage ranges.

In the case of low hanging conductors, one conductor on a pole may sag lower than the others. Sagging conductors may not touch the ground or other conductors. However, being able to detect sag will permit proactive correction before more significant problems occur.

Approaches not of interest

The following approaches are not of interest:

- Commercially available electric field sensors or fault path indicators that do not provide early detection of impending failure
- Fluorescent lighting tubes used as electric field sensor
- Light-emitting Diode (LED) systems placed across wood pole gap or used as an electric field sensor

Appropriate responses to this challenge

Responses from **companies** (small to large), **academic researchers,** other **research institutes**, **consultants, venture capitalists, entrepreneurs**, or **inventors** are welcome. For example:

I am a **representative** from a **company or academia** focused on developing or commercializing multi-node fault detection systems.

I am a **representative** from a **company or academia** that can provide a partial solution that will permit development of a robust system.

I am a **representative** from a **company or academia** with technology which should provide a solution ready for testing and transfer to commercial use.

I am a **representative** from a **company or academia** with technology which should provide a solution but that requires further research and development to ready it for transfer to commercial use.

Responding to this challenge

Your Response should be an executive summary (about 3 pages). The Response should briefly describe your relevant background and expertise, relevant project examples, your proposed approach, and the details of project engagement.

Appropriate responses will use the proposal template and address the following:

- High level description of proposed technology including:
  - o Working principle
  - o Availability of technical data such as specifications, communication protocol, ease of installation, maintenance requirements and cost.

  - o Technology maturity (theoretical model, concept, prototype, ready to commercialize, commercialized)
- ❖ Pathway to commercial scale including timing and estimated budget
- ❖ Estimated system cost
- ❖ Position on intellectual property including patent references
- ❖ Desired relationship with sponsor
- ❖ Willingness to work with third parties

Team description and related experience

Response evaluation

Eskom will evaluate the Response using the following criteria:

- ❖ Overall scientific and technical merit of the proposed approach
- ❖ Approach to proof of concept or performance
- ❖ Potential for proprietary position (i.e., is the technology novel or protectable)
- ❖ Economic potential of concept
- ❖ Respondent's capabilities and related experience
- ❖ Realism of the proposed plan and cost estimates

The client will contact respondents with highly responsive proposals for next steps

Non-confidential disclosure

By submitting a Response you represent that the Response does not and will not be deemed to contain any confidential information of any kind whatsoever.

By submitting a Response, you acknowledge that Eskom reserves the sole and absolute right and discretion to select for award all, some, or none of the Responses received for this announcement. Eskom also may choose to select only specific tasks within a proposal for award. Eskom has the sole and absolute discretion to determine all award amounts.

End notes

[1]Eskom may disclose additional technology requirements if they select your proposal for further consideration.

[2]Eskom operates an extensive Ultra High Frequency (UHF) communication network and also makes use of a GSM network.