Project Update: February 2022

Due to the Covid-19 pandemic and complete lockdown, the project was suspended from February to October 2021. Under the present circumstances the project is expected to be completed on or before August 2022.

Objectives

Not achieved:

- Pole installation at the project site, mounting circuits and infield system testing - it will be executed once Objectives 2 and 3 all are fully achieved.
- Monitoring, maintenance, feedback data collection and infield system impact analysis - it will be executed once Objective 4 is achieved.
- Final report generation - it will be executed once Objectives 1-5 all are achieved.

***RPS: Roadkill Prevention System**

Field survey to identify five 'roadkill' hotspots for system implementation – Fully Achieved

Note 1: Field survey to identify five 'roadkill' hotspots for system implementation: A Month Wise Report

January 2021: Process initiated during January 2021 with Meeting DFO, Sathyamangalam Tiger Reserve, Mr. Arunlal (IFS). We have submitted project details and plan of execution to DFO for his approval (Fig. 1).

Fig. 1. Our team meeting with former DFO Sathyamangalam Tiger Reserve (Sathyamangalam Division), Mr. Arunlal (IFS).

February 2021 to October 2021: Project was on halt due to pandemic and complete lockdown

November 2021: New DFO of Sathyamangalam Tiger Reserve, Mr. Kripashankar (IFS) has visited our Laboratory and seen our system prototype and suggested the way forward (Fig. 2).

Fig. 2. Our team meeting with present DFO Sathyamangalam Tiger Reserve (Sathyamangalam Division), Mr. Mr. Kripashankar (IFS)

December 2021: We have surveyed the forest department suggested areas to identify the high conflict hotspots. As per the suggestion for the forest department a straight stretch of 4 km road is identified for installation of system units (shown in Fig. 3).

Fig. 3. Earlier units with blue stars and proposed new units with red stars

The identified 'road section' starts on busy NH-209 after Bannari Temple and stretches up to start of uphill climb to Thinbom (shown in Fig. 4). Total length of the 'road section' is approximately 4 km and having four highly active elephant corridors along with regular animal crossing points.

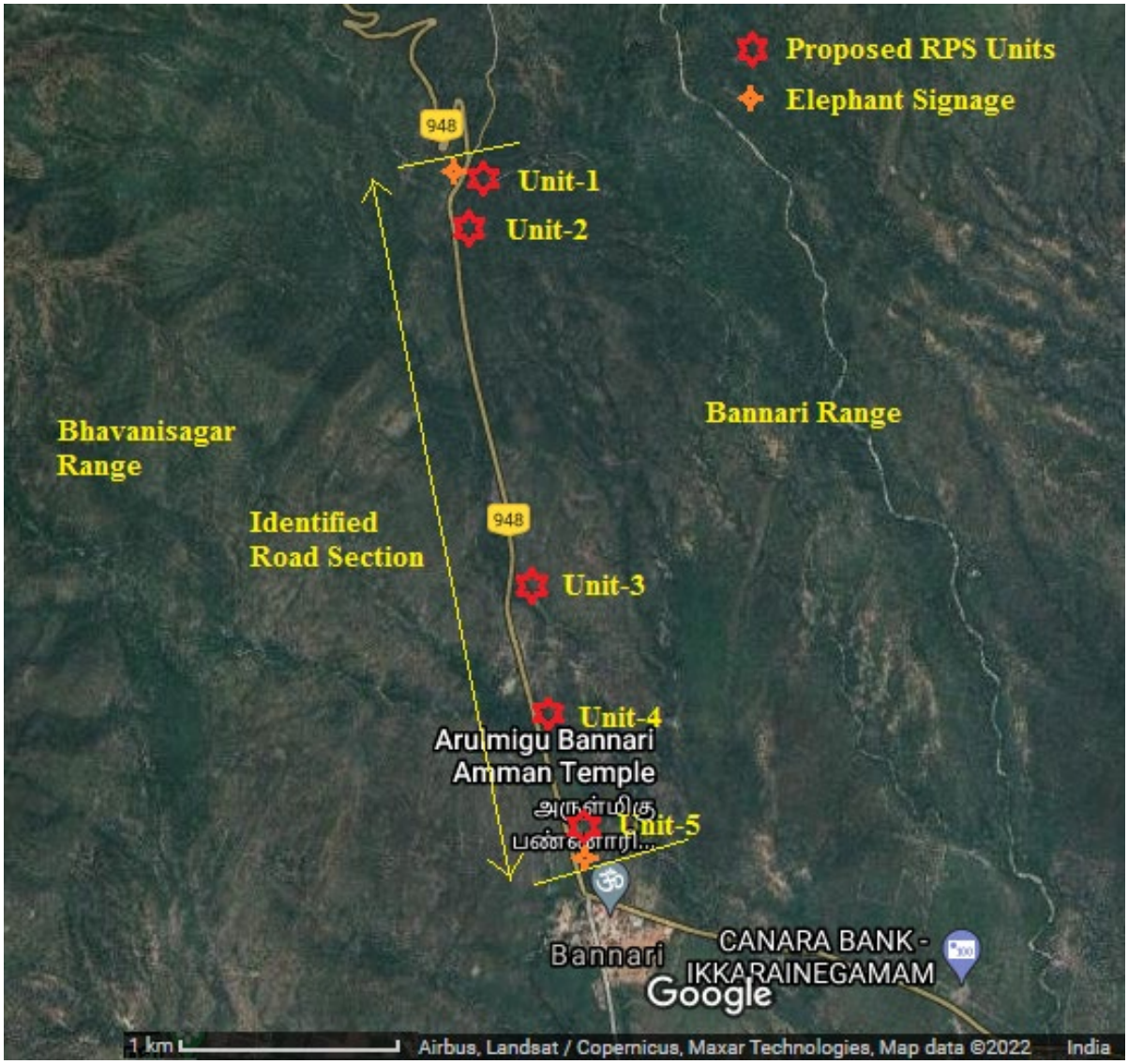


Fig. 4. Indentified 'Road section' for RPS unit installation (Starting location: 11.554466, 77.137919 and End location: 11.584401, 77.133456). Red Star: location of proposed RPS units and Orange Star: Installed Elephant Signage.

The 'road section' section is directly passing through the core area of Sathyamangalam Tiger Reserve. It's a plain and straight road which triggers high vehicular speed and thus causes notable roadkill. Some pictorials from our proposed system unit location are given below.

Fig. 5. Recently a leopard has fallen victim of roadkill (picture from proposed RPS Unit-2 location)

Fig. 6. A male sambar deer grazing at roadside (picture from proposed RPS Unit-3 location, source: our group)

Fig. 7. A male elephant eating at roadside (picture from proposed RPS Unit-4 location, source: our group).

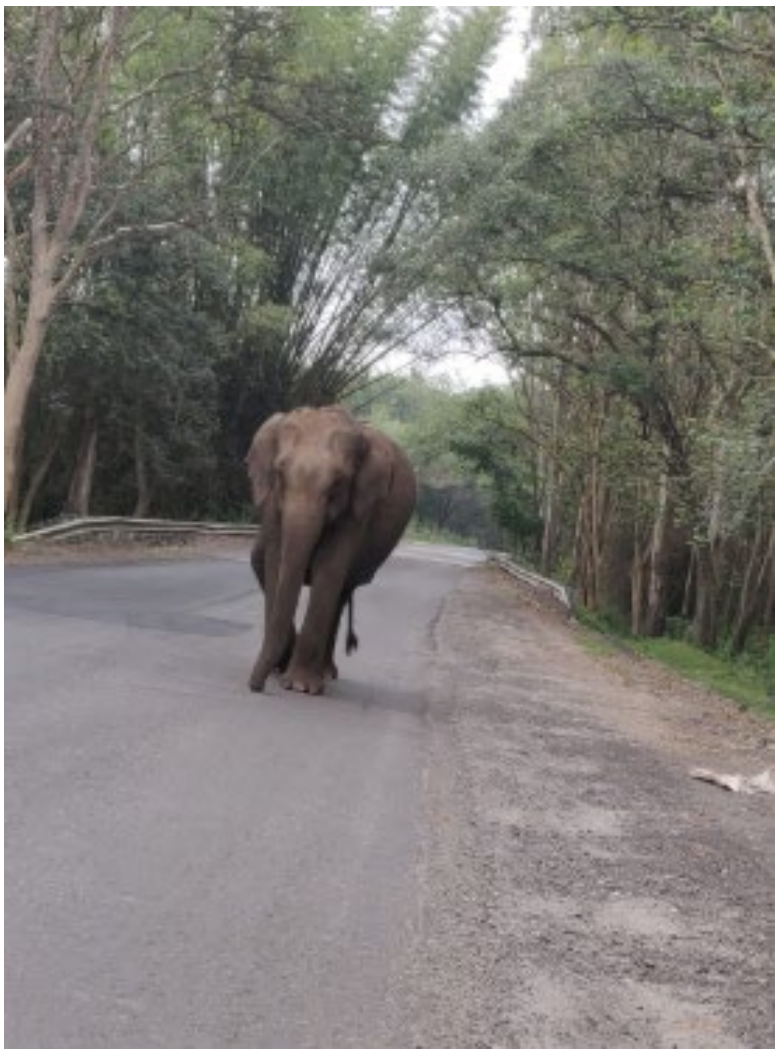


Fig. 8. A male elephant blocking the road traffic during early evening (picture from proposed RPS Unit-5 location, source: our group).

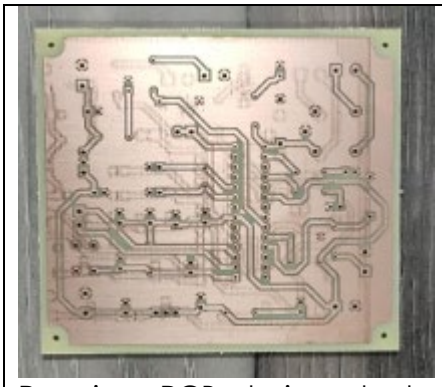
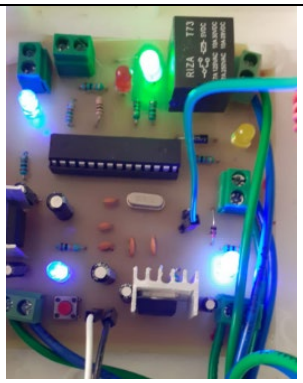
January 2022: Two automated 'Electronic Elephant Signage (EES)' are installed at the beginning and at the end of the 'Identified Road Section' with the help of forest department. The EES is an indigenously designed automated low-cost system with long range visibility. The EES is installed to acquire response data of the vehicles during nighttime. Those data will be helpful in optimizing color, texture, size, height and orientation of EES units which are going to be integrated with final RPS.

 Electronic Elephant Signage installed at Forest Check post point near to Bannari Temple on NH-209	 Electronic Elephant Signage installed at the starting of the uphill to Thinbom on NH-209	 For video click the picture above or follow the link below https://youtu.be/7_vUu_v6k2o

Electronic circuit design, programming, and testing of all RPS* units – Partially Achieved

Note 2. Electronic circuit design, programming, and testing of all RPS units

January 2021: The transmitter and receiver circuits, we have used in previous two units are designed by manually soldering discrete circuit component. Such circuit malfunctions during long run and power consumption is relatively high. Hence, as per the plan, PCB has been designed for transmitter and receiver circuit at our college advanced PCB design facility. Circuits are tested successfully and expected to have longer life under extreme climatic conditions.

 Receiver PCB designed at our college PCB design facility	 Testing of receiver PCB functionality	 Testing of transmitter PCB functionality

January 2021: We have completed design of highly advanced compact LASER fence design for our RPS and presently the design is under testing. Present advanced RPS design is having following advantageous features w.r.t. earlier design.

- ✓ Present RPS is having especial 180° by 180° clam for easy and better alignment.
- ✓ In new design, especial almunuam frame holds the receiver solar panel which allows easy and better alignment adjustment at receiver side.

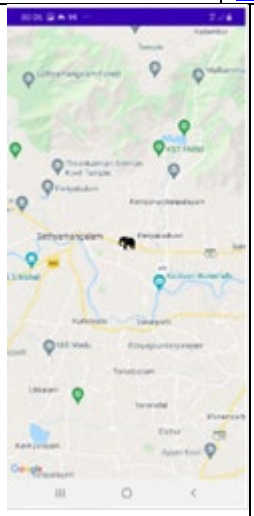
- ✓ Entire design is shifted to 9-volt w.r.t 12-volt design in earlier case. Such voltage shift reduces system overall power consumption and thus minimises system malfunction due to low battery charge during monsoon.
- ✓ Transmitter, receiver and warning unit circuits are entirely converted into PCB for better reliability and longer life.
- ✓ Present RPS is working with 4G network w.r.t 3G network for earlier design which makes the present system faster.
- ✓ Present RPS is integrated with Electronic Animal Signage for better response from the vehicle to avoid potential roadkill.
- ✓ The present **RPS comes with 'Mobile App'** whereas earlier it was mobile SMS. Once permitted the system detection information can be accessed through 'Mobile App' from every corner of the world through internet.

New RPS transmitter unit

New RPS receiver unit

For system video click the picture above or follow the link below
https://www.youtube.com/watch?v=IbVartBneMs

Our mobile app for Compact LASER Fence. It's having two features, 'Show Map': System units on Google map and 'Report': Detection data in excel format



System unit is showing on Google map ('Show Map' option). Clicking the icon, you can see the last data received.

Electronic Elephant Signage will be used to alert approaching vehicle to avoid roadkill. Also, plan is there to create other small animal signage along with elephant signage.

Total 5 sets and each set contain four poles: one transmitter pole, one receiver pole and two warning light poles. In together 30 poles – Partially Achieved
Note 3. Pole design has been started February 2022 and expected to be finish on or before March 30th of 2022.

Outcomes:

- ✓ The new advanced RPS is a highly advanced ultra low-cost design which is easy to install and maintain.
- ✓ The new RPS is low power 9 volt design with professional standard PCB for longer endurance and less malfunction.
- ✓ The new RPS comes with '**electronic animal shape display**' to warn vehicle about animal road crossing. Such high-tech approach is expected to show better performance in reducing roadkill due to its long-range visibility during night.
- ✓ The **RPS comes with 'Mobile App'** which will make it accessible from anywhere of the world over internet.

More important outcomes will be added once system installation is completed.

Sharing:

We will be applying for patent, but we don't have any interest in getting financial benefit from it. Once ready, our advanced RPS technology will be offered to interest individual or group for animal conservation across the globe.
More details will be added with 'Final Report'.

Timescale:

Activity	**Month-Year**		**Grant Use (% of total grant)**
	Anticipated Duration	**Actual Duration**	
Field survey to identify five 'roadkill' hotspots for system implementation	January 2021 to March 2021 (3 Months)	January 2021 to February 2021 (2 months) November 2021 (1 month)	25% (Total proposed under this head 25% of total grant)
Electronic circuit design, programming, testing of all RPS units	April 2021 to July 2021 (4 month)	January 2021 (1 month) December 2021 to March (2022)	20% (Total proposed under this head 29.41% of total grant)
Total 5 sets and each set contain four poles: one transmitter pole, one receiver pole and two warning light poles. In together 30 poles	May 2021 to July 2021 (2 months)	February 2022 to March 2022 (2 months)	8.26% (Total proposed under this head 8.26% of total grant)
Pole installation at the	July 2021 to	April 2022 to	3.50% with

project site, mounting circuits and infield system testing	September 2021 (3 months)	June 2022	committed cost of system installation (Total proposed under this head 3.50% of total grant)
Monitoring, maintenance, feedback data collection and infield system impact analysis	September 2021 to December 2021 (4 months)	May 2022 to August 2022 (4 Months)	15.36% with committed cost of data collection, monitoring and maintenance (Total proposed under this head 15.36% of total grant)
Consumables	Throughout project duration	Throughout project duration	3% (Total proposed under this head 5.88% of total grant)
Manpower	Throughout project duration	Throughout project duration	8%** (Total proposed under this head 17.64% of total grant)
Final report filing and field implementation	December 2021 (One Month)	August 2022	-

Note: Due to pandemic and complete lockdown project was on a halt since February 2020 to October 2022. Under present circumstances the project is expected to be completed on or before August 2022.

** One temporary technical assistant has been appointed since December 2022 for smooth execution of project work components

Publicity:

As on date, we have installed four Electronic Elephant Signage with Rufford logo in Sathyamangalam Tiger Reserve area (Please find Page. No. 9). We are going to install long lasting metal signboard at the system location with Rufford Org. Logo.

Demo video of Electronic Elephant Signage https://youtu.be/7_vUu_v6k2o

Demo video of Electronic Elephant Signage Compact Roadkill Prevention System test unit https://www.youtube.com/watch?v=IbVartBneMs