

# Energy Harvesting, Storage and Management for Automated Environment Monitoring in the East African Region

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PROGRESS REPORT – FEBRUARY

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# Administrative Progress

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- ❑ Doctoral Committee presentation was scheduled for Feb 20 but postponed
- ❑ New date is Wednesday March 1

# Revisions: Specific objectives are now 3

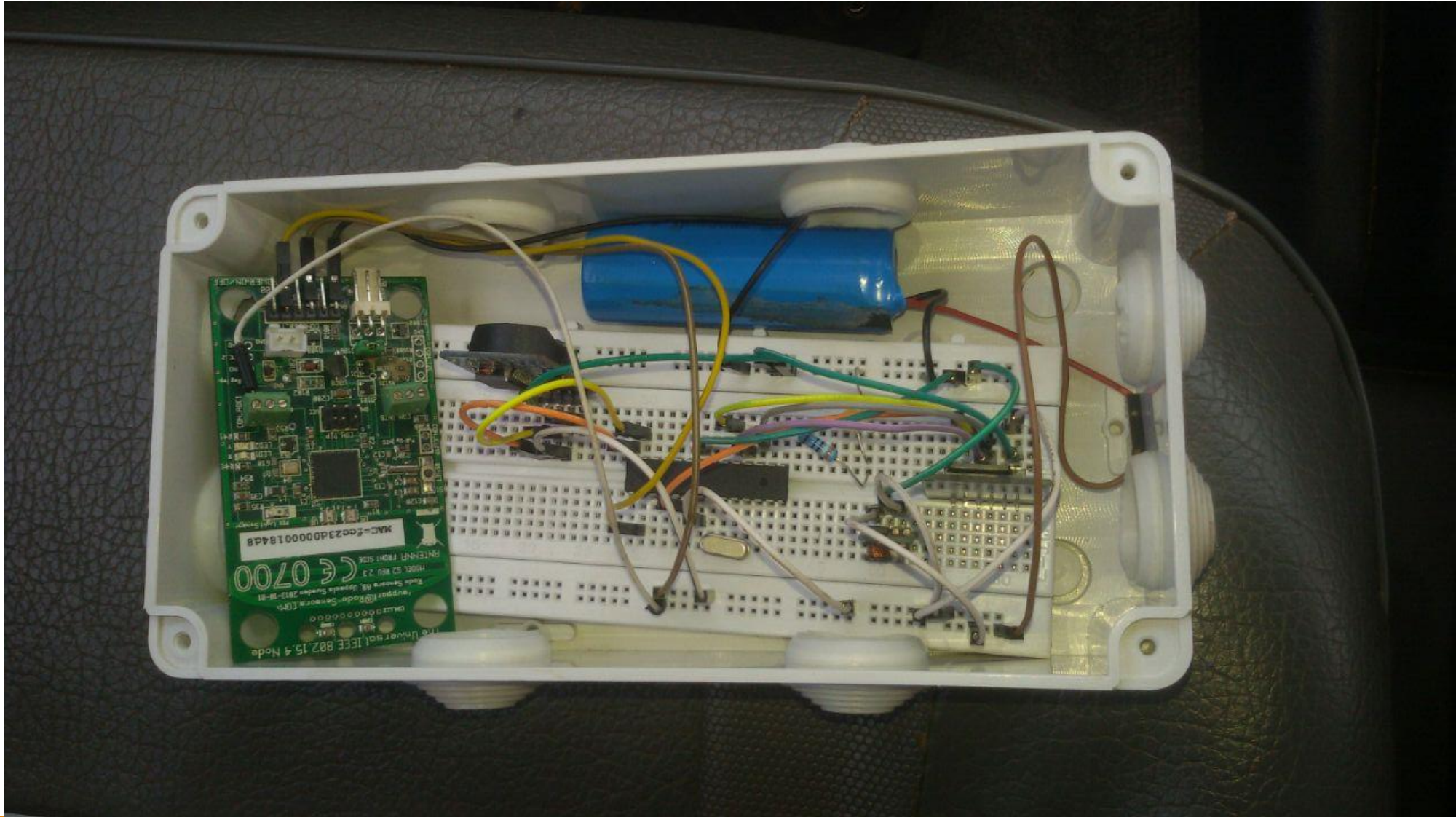
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**To design a very low power data acquisition unit/gateway** so to obtain longer battery lifetime especially during autonomy periods and fewer charge-discharge cycles. Gateway functionality is: Receive, Timestamp, Store and Transmit. Basic functionality.

**To obtain evidence-based sizing data for energy harvesting units to be deployed with AWS in the region** so as to obtain the practical minimum unit sizes required to sustain a given continuous power consumption in typical environmental conditions.

**To evaluate the performance of emerging battery technologies at high environmental temperatures** to obtain the best suited for (hot regions in) the East African Region. Scope: charge accumulation rate and self-discharge of supercapacitors especially at high temperatures

# Low Power Gateway - Progress



# Low power benchmarks

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National Instruments	4.5W
Zenaro et al	4W
Rajgarhia et al	1W
WIMEA Gen1	1.2W
WIMEA Gen2	1.2W
ADCON	0.6W
Current design	0.15W -- current benchmark

# On-going experiments

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- ❑ Worst case scenario power consumption – 9 hours running on single 2000mAh battery: 24 hours expected
- ❑ Power consumption in sleep-mode vs frequency
- ❑ Power consumption in sleep-mode vs voltage
- ❑ Scheduling sleep-wake up states – working version is complete. A few challenges
- ❑ Batching writes to external memory
- ❑ Power consumption vs Transmission frequency
  
- ❑ Target is: IEEE AFRICON 2017
- ❑ Submission Deadline moved from March 31 to April 17.

# March plans

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- ❑ Present to doctoral committee and get date for HDRC
- ❑ Finish experiments and Submit Paper: ***Practical Design Guidelines for Ultra-low Power Gateways in Environment Monitoring Wireless Sensor Networks***
- ❑ Set up test bed for Solar sizing experiment
- ❑ Obtain more supercapacitor samples for self-discharge experiment