**Introduction**

An appealing solution for unattended surveillance and monitoring applications is Self-powered Wireless Sensor Networks (WSNs). However, WSNs are characterized by multi-hop lossy links and resource constrained nodes while they have to face the coexistence problem with other applications.

In this poster, a Spectrum and Energy Aware Opportunistic Routing (SEA-OR) protocol is introduced. SEA-OR tries to balance the packet advancement, the residual energy and the link reliability.

**System Architecture**

The protocol was designed for an outdoor monitoring system for gas leak detection. A number of sensor units are deployed at the monitoring area. The communication between the sensor units and the control room is over relay nodes.

**Challenges**

1. **Network lifetime.** Network should operate unattended for long periods hence, a scheme should extend network lifetime [2].
2. **Location information.** Trade-off between accuracy and energy consumption/ cost per unit.
3. **Wireless coexistence.** Issues such as spectrum availability detection, interference mitigation and spectrum sharing.
4. **Dynamic changes.** The system needs mechanisms to adopt successfully to a rapidly changing environment.

**Advantages**

1. **Extend network lifetime.** Use of residual energy for node prioritization.
2. **Use of RSSI.** Indicator of the relative location. No extra overhead and used as link quality indicator as well.
4. **Opportunistic routing.** For every packet transmission, the best available path is selected. SEA-OR adapts quickly to dynamic changes, like node and link availability.

**Performance Evaluation**

**Conclusions**

This work introduces SEA-OR protocol for Self-Powered Wireless Sensor Networks. SEA-OR uses a novel prioritization metric to balance residual energy and packet advancement. The protocol is also implemented in self-powered sensor node prototypes.

**References**