

SIS FAQ

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1. OVERVIEW.

1.1. What is SIS?

SIS is the Standalone Intelligent Sensor Platform. SIS is intended to manage a number of sensors deployed in a home and report on “significant” events. The SIS supports a wide range of off-the-shelf sensors. The SIS can communicate to its owner via email, SMS text messages, and a host of other methods.

SIS is relatively cheap and easy to deploy without any recurring monthly charges.

1.2. What does SIS stand for?

SIS stands for “Standalone Intelligent Sensor” Platform. SIS is “standalone” in the sense that it connects to the Internet via WiFi, requiring only the free Spark Cloud (Spark.io) service to enable SIS to communicate with any Internet connected device. SIS is “Intelligent” because it contains an advanced 32 bit microcontroller which may be programmed to draw inferences from a number of sensors that are connected to SIS. SIS is a “sensor platform” because it integrates multiple wired and wireless sensors.

1.3. What problem(s) is SIS intended to solve?

SIS is intended to detect, infer, record, and notify registered users of “events” that are derived from multiple sensors. Examples of such events include:

- Did my elderly mother leave the house today? What time did she leave and what time did she return?
- Did my grandfather prepare any meals in his kitchen today?
- Alert me if my grandmother did not get out of bed by 9:00 am.
- Alert me if some predetermined combination of temperature and humidity goes out of range in my greenhouse, so that I may intervene to protect my plants.

1.4. Aren't there many solutions already on the market to address these problems?

SIS is intended to fill a market gap between standalone, single function Internet of Things (IoT) devices and complex, expensive, multi-sensor services. SIS is intended to be used in and around the home to sense and record events and to be capable of drawing inferences from multiple sensor events. Single function IoT sensors and multi-sensor services that currently exist in the marketplace all require expensive cloud services to fuse data from multiple sensors into useful information. SIS can perform the sensor data fusion internally and provide access to both raw and processed information from any Internet connected device. No services involving recurring costs are needed.

1.5. What is the current status of SIS?

SIS presently exists as a fully functional breadboard system. It is able to monitor a wide variety of sensors and communicate significant events to a variety of destinations. The base platform has been technically proven.

We are now ready to adapt the SIS to solve a particular use case. We are looking for partners that have specific needs the SIS can address. We will work to understand the use case, adapt the platform to meet the need, and provide a complete prototype to our partner for them to use and provide us feedback.

1.6. What kinds of sensors can SIS accommodate?

SIS is designed to accommodate a wide range of sensors. Inexpensive, battery powered wireless sensors are available to sense door/cabinet/window opening, intrusion/proximity, water level, and vibration. Wireless sensors are easy to install, since no wiring is required. A typical wireless sensor costs \$10 and contains a battery that will last for a year.

A much wider variety of sensors can be wired into to the SIS. Wired sensors are available for all of the above functions, as well as temperature measurement, humidity measurement, water flow measurement, AC power flow measurement, pressure measurement, position/velocity/acceleration measurement, and a great many other real world parameters.

1.7. What is the anticipated cost of a fully functional SIS product?

SIS hardware is expected to cost under \$200 in small quantities. The exact cost will depend upon the sensors and supporting circuitry needed for specific SIS applications. SIS has specifically been developed to be useful without incurring any recurring costs.

1.8. What is the next step?

If you have a use case that may be suitable for the SIS, we would like to talk with you. Please contact us and we can arrange to start the conversation.

2. Technical FAQ.

2.1. What is the technical status of SIS?

SIS presently exists as a fully functional breadboard that contains 315 MHz and 433MHz receivers and firmware decoding of PR2262/2272 and EV1527 protocols. The SIS can also accept wired sensor input from a wide range of analog and digital devices. The SIS firmware contains a complete infrastructure for registering sensors, configuring timezone and daylight savings time attributes, logging and timestamping filtered sensor events, providing remote access to a circular buffer of sensor events, and push notification of sensor events to smart phones, SMS text and voice notification via the free web service IFTTT. SIS is currently accessible via a custom designed web page with Javascript that has specifically been developed for testing and demonstration of the Internet accessibility of the platform. The developers of SIS intend to use

this fully functional and tested infrastructure as the basis to develop full-up versions of SIS to meet the requirements of specific use case scenarios.

2.2. What are the specifications for wireless sensors that are compatible with SIS?

SIS is currently designed and tested with sensors using On-Off Keying (OOK) modulation operating in the 315 MHz and 433.92 MHz bands. These bands are popular because they are available worldwide for unlicensed low power transmission. SIS can decode signals from sensors that use the PT2262/2272 protocol and the EV1527 protocol for encoding sensor address and data information. Typical wireless sensors in attractive packaging that conform to these specifications can be purchased on e-bay for under \$10 each. Since SIS contains an advanced microcontroller, it could be extended to decode additional wireless protocols, as needed.

2.3. What are the requirements for using wired sensors with SIS?

Since the number, variety and specifications for wired sensors is almost unlimited, it is envisioned that versions of SIS will be developed to meet specific wired sensor requirements. Signal conditioning and/or level shifting circuitry may be required between the sensor and the SIS microcontroller. Additionally, since many wired sensors are analog in nature, microcontroller software (firmware) will need to be developed to draw the proper inferences based upon a variety of sensor measurements. The developers of SIS can perform all of this design and testing based upon specific SIS application requirements.

2.4. How does SIS draw inferences from multiple sensors?

SIS contains an advanced microcontroller that can be programmed to draw such inferences based upon specific algorithms. The developers of SIS can do the programming work necessary to tailor SIS to specific sets of problems.

2.5. How does SIS communicate over the Internet?

SIS requires access to WiFi to communicate over the Internet. SIS currently supports IEEE 802.11 a, b and g and may work with n as well. SIS supports WPA2, WPA, WEP and no encryption. SIS works on WiFi home networks and can communicate through NAT and firewalls common to home and small office WiFi routers. A free account with Spark.io is needed to provide the cloud services that connect SIS to the public Internet. Additional services, such as Android and iOS notification, SMS texting and voice notification can be provided via the free IFTTT service.

2.6. What does someone need to do in order to obtain an SIS that is programmed and configured for a specific purpose?

The developers of SIS are seeking interesting real-world applications to build upon the present SIS infrastructure. Given an application of interest, we will add the necessary hardware, firmware and software application/apps to create a fully functional product. The fully functional product will have all necessary circuitry on a printed circuit board, an enclosure, and full documentation for hand assembly of additional prototypes. It will also develop whatever

application software, web software, and/or mobile apps are necessary for user interaction with the product.

3. OTHER FAQ.

3.1. Who are the developers of SIS?

The developers of SIS are Bob Glicksman and Jim Schrempp. Bob is a retired electrical engineer with 42 years of experience in electronic system development. Jim is a software developer, entrepreneur, web master and product designer/builder. Bob and Jim have developed many products independently and have co-developed the “Pill Reminder”. See <http://www.shrimpware.com> for details about the Pill Reminder and other projects of Jim’s.