Low-cost wireless nano-satellite IoT gateway for SpaceX / Swarm Technologies

Summary

Profile type	Company's country	POD reference
Technology offer	**Germany**	**TODE20220223003**

Profile status	Type of partnership	Targeted countries
EXPIRED	**Research and development cooperation agreement** **Commercial agreement with technical assistance**	**• World**

Contact Person	Term of validity	Last update
Johannes BÖHMER	**23 Feb 2022** **23 Feb 2024**	**23 Feb 2024**

General Information

Short summary

A German SME has developed a wireless nano-satellite IoT gateway (SpaceX/Swarm) that is much more cost-efficient than conventional products (<10 EUR per month). It enables bi-directional communication and a 3-fold redundancy with one hardware unit. Autonomous operation with solar power supplies is possible. Commercial agreements with technical assistance with users (operators of sensor networks in agriculture, maritime, environment monitoring or others) are sought, also distribution partners.

Full description

SpaceX is the world's largest operator of satellite networks that provide Internet in areas where previously no or insufficient Internet connection was available. Among other things, SpaceX aims at establishing a global satellite network for the Internet of Things (IoT), based upon Swarm technologies.

In order to facilitate a smooth transfer of data from sensor networks into the cloud via the satellite an interface, a so-called IoT gateway, is needed.

A German SME, a pioneer in the field of IoT sensors, has developed a novel wireless nano-satellite IoT Gateway, that is much more cost-efficient than other solutions on the market (communication cost of less than 10 EUR per month per gateway). Due to the technology developed, gateways or sensor nodes can be manufactured at a fraction

of the cost of conventional solutions. The gateway enables a 3-fold redundancy with one hardware unit for critical applications: Space X + LoRaWAN (Long Range Wide Area Network) + Sigfox. Fully autonomous operation of the unit is made possible by mini-solar power supplies.

- bi-directional IoT satellite communication
- VHF Transceiver 2m Band @ 1kbps
- GPS Receiver integrated
- SRD (short-range device) / ISM (industrial, scientific and medical) Options: LoRaWAN, Sigfox, wireless M-BUS
- 4 Analog Inputs: 0V -10V, 4mA – 20mA
- 2 Digital Inputs / 2 Digital Outputs (MOSFET)
- RS485 Modbus RTU Interface
- Ethernet Interface / USB-C Interface
- real time clock with battery backup
- temperature / humidity / pressure sensor
- SD card connector for data storage
- power supply: external 5V / 0.7Apeak - 25V DC
- operating temperature range: -20°C to +50°C
- enclosure: Aluminium
- dimensions: 11.5 x 6.5 x 13.5cm
- Sat antenna length /4: 22cm
- GPS / SRD antennas: customer specific

Application fields include sensor networks for the monitoring of agriculture, environment, climate, energy grids, ground transportation and logistics, industrial IoT (IIoT) and remote alarm networks.

Advantages and innovations

- Very low communication costs compared to other products on the market (<10 EUR per month per unit)
- Fast and reliable data transfer (bi-directional communication channel with 1kbps, a maximum packet size of 192 bytes and maximum transmission time of 3.7sec)
- Autonomous operation with mini-solar power supplies is possible
- Very small size of the complete solution (size of a cigarette box)
- Security is ensured by means of AES 256 encryption
- 3-fold redundancy with one hardware unit possible for critical applications: Space X + LoRaWAN + Sigfox

Technical specification or expertise sought

Stage of development

Already on the market

IPR Status

Secret know-how

Sustainable Development goals

• Goal 9: Industry, Innovation and Infrastructure

IPR Notes

Partner Sought

Expected role of the partner

The German SME is looking for partners, private or public, willing to use the IoT gateway for sensor/monitoring networks that rely on data provided by SpaceX IoT satellites. Ideally the partners would be operators of these networks.

Application fields include environmental monitoring, monitoring of energy grids, precision farming, drought detection and irrigation systems, water monitoring and maritime industry (fish farming), sensors on buoys, forest fire detection, weather and climate change monitoring, transportation and logistics tracking (containers), industrial IoT or remote alarm networks.

Parnerships sought are commercial agreements with technical assistance. The role of the partner would be the integration of the product into existing or planned monitoring infrastructures. Customer-specific support will be given by the German SME in order to transfer the necessary knowhow.

Also distribution partners are sought. They should have the necessary technical background and ideally existing contacts to relevant customers. Role to be performed would be to sell the product and provide technical assistance to end-custumers.

Also partners seeking joint custumer-specific hardware development are of interest.

Type of partnership

Research and development cooperation agreement

Commercial agreement with technical assistance

Type and size of the partner

• **Other**

• **SME 50 - 249**

• **SME 11-49**

• **University**

• **R&D Institution**

• **Big company**

• **SME <=10**

Dissemination

Technology keywords

- **06005002 - Sensors & Wireless products**
- **01006003 - Mobile Communications**
- **01003025 - Internet of Things**
- **01003023 - Environmental and Biometrics Sensors, Actuators**
- **01006008 - Satellite Technology/Positioning/Communication in GPS**

Market keywords

- **05007004 - Monitoring equipment**
- **01004001 - Local area networks**
- **01004002 - Data communication components**
- **01004007 - Network test, monitoring and support equipment**
- **02006004 - Data processing, analysis and input services**

Targeted countries

- **World**

Sector groups involved

Media

Images

IoT Gateway