



## Integrated Technology and IoT Solutions

[www.manxtechgroup.com](http://www.manxtechgroup.com)



## End to End IoT Solutions

Manx Technology Group is a specialist provider of end-to-end IoT and technology solutions. We can supply and install IoT hardware, sensor systems, communications networks and the cloud and analytics platforms. Our software team can develop the software, dashboards, APIs and undertake any systems integrations with in-house or third party software.

## From Idea to Insight

If you have a technology or operational challenge that you believe can be solved with IoT or sensors, we can assist with the solution development process. Our team can take a concept from idea to insight. Rapid implementation is possible with Libelium's field-proven IoT technology and market-leading cloud platforms from Microsoft.

## Libelium Plug & Sense

Libelium Plug & Sense is a powerful IoT device platform that supports Smart Agriculture, Water, Environment, Cities and Industrial applications. Each device supports a wide range of sensors (150+ supported) and can communicate back to dashboards, cloud platforms and back-office systems.

### ACCELERATE TIME TO MARKET

The Libelium Plug & Sense solution allows you to deploy wireless sensor networks in a secure and scalable manner, without custom software, compatibility issues or unnecessary complexity and cost. The comprehensive, field-proven Libelium hardware accelerates time to market and allows you to focus on the application of the technology, not the technology itself - delivering a competitive TCO.

### WEATHERPROOF CASING FOR INDOOR AND OUTDOOR USE

The units feature a robust waterproof enclosure with quick-plug external sockets to connect the sensors, the solar panel and antennae. The devices can be programmed using USB or OTA (over the air).

### ULTRA-LOW-POWER

The ultra-low power consumption means the units are well suited for remote or isolated deployments where solar, battery or renewables are necessary. Plug & Sense can also be powered using mains, with an outdoor-rated USB cable.





# IoT Applications

## Smart Environment

It is estimated that up to 3.7 million people die per year in the world, prematurely, due to exposure to pollution in cities.



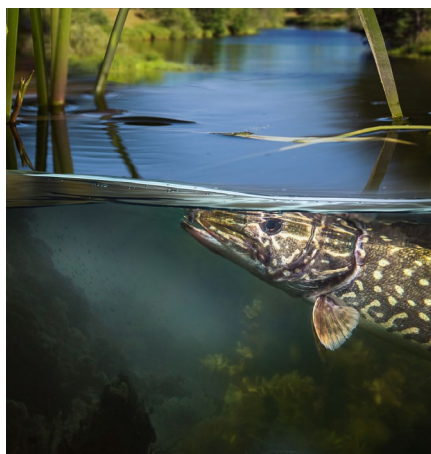
Smart Environment Plug & Sense enables indoor and outdoor air quality monitoring, air quality index (AQI) calculation and weather monitoring using advanced weather stations.

### Sensors:

Temperature, Humidity, Pressure, Solvent Vapours, Luminosity, VOC, Liquefied petroleum gas, Air pollutants, Particulates (PM1, PM2.5, PM10), CO, CO2, O2, CH4, NH3, NO, NO2, O3, SO2, H2, H2S, HCl, PH2, ETO, Cl2.

## Smart Water

The use of IoT smart water systems can be used to monitor water pollution, potable water, flood risks and leak detection.



The Smart Water solution is used to monitor bodies of water for biological characteristics, chemicals and pollutants. The system can be deployed for rivers, sea, lakes and drinking water supplies.

### Sensors:

PH, Turbidity, Conductivity, BGA, COD/BOD, Depth, Flow Rate, ORP, Temperature, Dissolved Oxygen, NO3, CA2, CU2, I, NO3, AG, BR, F, NH4, LI, NO2, NA, Cl, BF, ClO4.

## Smart Parking

Smart Parking through real-time parking apps can lead to reduced pollution and congestion levels. Councils can benefit from intelligent enforcement.



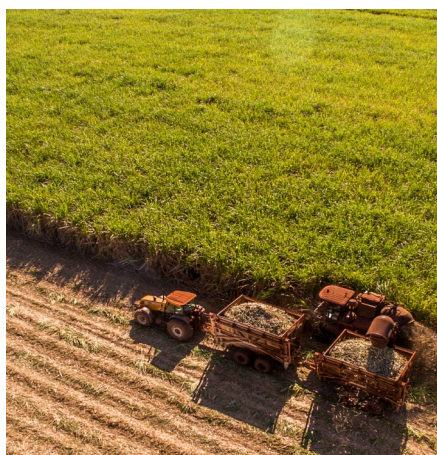
Smart Parking sensors are installed in parking spaces or roadsides, where they transmit space occupancy information to a hosted cloud platform using low power WAN technology (LoRa).

### Technical Details:

Radar and magnetic sensors. Built-in battery with extended battery life. Low power WAN technologies include LoRa and Sigfox. Configurable polling and reporting intervals.

## Smart Agriculture

Agricultural IoT can reduce the environmental impact of farming, create new business models, increase yields, monitor pollution and reduce costs.



Smart Environment Plug & Sense enables indoor and outdoor air quality monitoring and air quality index (AQI) calculation. Smart Environment features.

### Sensors:

Soil temperature, soil moisture, solar radiation (PAR), ultraviolet radiation, leaf wetness, air temperature, humidity, air pressure, pluviometer, luminosity, soil water potential, soil oxygen level, vapour pressure.

## Smart Cities

Aspirational towns and cities can embark on an IoT journey to enhance operations, improve quality of life, monitor pollution and guide policy makers.



Libelium Smart Cities devices can measure pollution, noise and lux levels. The devices are also extendible through their support for industry standard protocols and third party sensors.

### Sensors:

Gases, temperature, humidity, pressure. Noise and Lux levels and distance measurement. Support for a wide range of third party sensors.

## Industry 4.0

Automation, sensors and levels of operational effectiveness are key components of a modern industrial business embracing Industry 4.0 and IoT.



Plug & Sense supports MODBUS, CANBUS, RS485 and 4-20mA allowing you to interface existing plant, machinery and sensors into a unified IoT platform.

### Sensors:

MODBUS, CANBUS, RS485/Serial, 4-20mA. Support for a wide range of third party sensors and software platforms through the extensible Libelium SDK.



## Smart Phone Detection

The **Meshlium Scanner** detects signals from WiFi and Bluetooth devices to determine the number of devices in range. This information can be used to estimate volumes of people, repeat visitors, visitor patterns and demand forecasting. The Meshlium scanner is easy to deploy and suitable for indoor & outdoor use.

## People Counting Sensors

The **Xovis AG series of 3D sensors** can accurately measure footfall, waiting and dwell times, queue sizes, groups, and group size and meta-data relating to the cohorts (i.e. height, gender). Perfect for retail, tourism, education and transportation environments where accurate people flow analytics is required.

EU GDPR and Privacy  
compliant modes

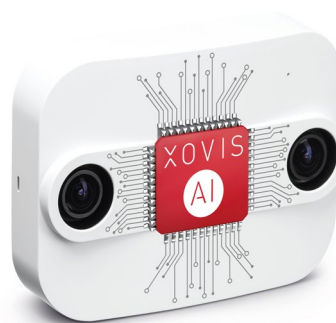


### TECHNOLOGY

- Dual-band WiFi and Bluetooth Scanners
- Configurable scanning interval
- 3G/4G module for direct upload to cloud
- Rugged outdoor casing
- Local web interface and database

### APPLICATIONS

- People counting in airports and harbours
- Crowd counting in outdoor events and public spaces
- Car occupancy
- People analytics (visit time, dwell time, peak times)



### TECHNOLOGY

- Mounted above coverage area
- 3D Stereoscopic image sensors
- AI/Deep Learning
- Crowd counting and tracking
- On-board edge compute
- Customer path analysis
- Group and Queue detection

### APPLICATIONS

- Retail and tourism
- Transportation hubs
- Public spaces
- Indoor and outdoor counting
- People and crowd analytics
- Demand forecasting
- Zone dwell time

99% accuracy

# Solutions for Systems Integrators

Working with Manx Technology Group means that you can leverage our talented and versatile teams of software, network and technology experts. Our solutions team can provide design, development, installation and support services to you, or your clients. We regularly work with partners and academia in an active collaborative role, hardware supplier, or a behind-the-scenes facilitator - helping you to deliver solutions, while respecting your company values, brand and technical approach.

## Services

- Design and development
- Hardware supply
- Installation
- Project management
- Systems integration
- Data analysis
- Visualisation
- Maintenance and support

## Specialist Areas

- Water quality
- Air quality
- People counting
- Asset tracking
- Noise monitoring

## Technologies

- Microsoft Azure
- Amazon Web Services
- Power BI / Tableau
- LoRa / WiFi / 4G / Zigbee
- MSSQL/MySQL
- Blockchain
- C/C#/Node.js/PHP

## DEVELOPMENT SERVICES

Our software development team can assist you with software integration, API and web application projects. We have experience working with a range of technology stacks and platforms, including Azure and AWS.

We can work on a project or outcome basis, or - if you need development resource, our team can work on a time and materials basis.

## CLOUD PLATFORMS

We build and manage cloud platforms using Microsoft Azure and Amazon Web Services. Cloud services provide a highly scalable, powerful and inexpensive platform for your IoT solution.

Our technical team can manage your entire cloud environment, including the infrastructure components, licensing, network, monitoring, security, application and database services.

## SYSTEMS INTEGRATION

If you require the IoT or sensor application to integrate with an existing line of business application, we can provide integration and API development services to make this possible.

Our development team has worked on several integration projects where custom APIs, middleware or platform services have been used to achieve seamless integration.

## SENSOR & HARDWARE SUPPLY

MTG partners with a several hardware and sensor technology vendors. We can use our relationships to provide field-proven, reliable and tested IoT hardware solutions for your project.

## VISUALISATIONS AND DASHBOARDS

End-users value the ability to see key trends, data and insights - in a visual manner.

If your client has a requirement for rich visualisations or dashboards, then off-the-shelf data analysis and visualisation tools such as Microsoft PowerBI and Tableau are a great choice. MTG can work with you to develop custom, interactive visualisations, apps and dashboards that bring your IoT data to life.

## SUPPORT & MAINTENANCE

MTG operates a 24x7 managed IT service business so is well-positioned to take responsibility for the monitoring, management and support of you or your client's IoT infrastructure.

## TRUSTED PARTNER

We regularly work with end-users and systems integrators in our role as a trusted partner. Our discrete, confidential and respectful approach to partner engagements recognises the importance of your client relationships, and your business success.

# Smart Parking Solutions

## FEATURES

- Libelium Smart Parking sensors
- Long battery life
- LoRa Radio
- Radar and magnetic sensing
- Easy to install.

## APPLICATIONS

- Guided parking apps
- Targeted, real-time enforcement
- Data reporting and insights.
- On-Street parking
- EV and disabled space





# Systems Integration & Development Services

Working with Manx Technology Group means you can rely on an exceptionally talented and versatile team of software development, data and technology experts. We can undertake full turnkey delivery or provide assistance in selected areas.

## Services

- Device programming
- Middleware and API
- Desktop software
- Bespoke web apps
- Mobile apps
- Database and analytics
- PowerBI and Tableau
- Azure & AWS
- 3rd party integration

## Examples

- PowerBI IoT Dashboard using Microsoft Azure IoT Hub
- Business API integration
- Mobile web client
- Alerting and notifications
- Interface with third party BMS

## BESPOKE SOFTWARE DEVELOPMENT

We design, develop and support bespoke application software for business. Custom software is an excellent tool to deliver competitive advantage and differentiation in a crowded marketplace.

## CLOUD PLATFORMS

Microsoft, Amazon and IBM cloud platforms serve as a fantastic foundation for your IoT solution. Pay as you go pricing, scalability and the ability to use AI, big data and machine learning will future proof your IoT solution.

## DASHBOARDS AND VISUALISATIONS

Functional dashboards, charts, reports and visualisations are an integral part of any successful IoT project. We can build custom dashboards for web and mobile, featuring rich chart controls and reporting capabilities..

## INTEGRATION

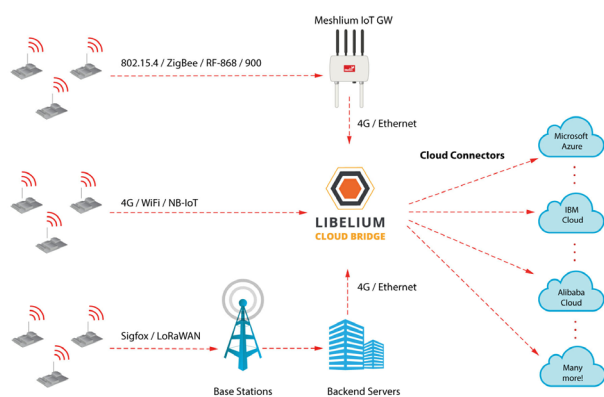
Integration links together multiple business systems and simplifies workflows. An integrated IoT system can provide a single pane-of-glass view of data and trends, in addition to forming a link between key business systems.

## AUTOMATION

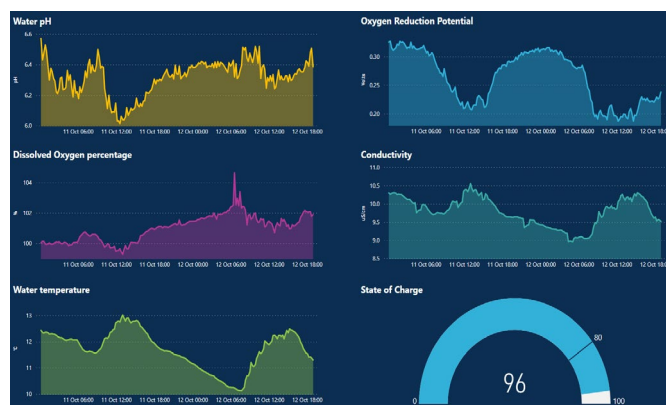
Automation can automate mundane or time-consuming tasks, freeing your staff up to do more productive work. Complex manual processes or workflows can be analysed and automated through the use of software and digital workflows.

## Libelium Cloud Bridge

Simplify the collection and transfer of IoT data from your sensor networks to the cloud. Libelium Cloud Bridge is intelligent middleware for your IoT systems; receiving data and frames from your IoT devices, before transmitting the data to a range of leading cloud platforms. With Cloud Bridge, it takes minutes to configure your devices, so that they can begin sending data to Microsoft Azure, Amazon Web Services (AWS) and other cloud providers.



Overview of the Libelium Cloud Bridge



PowerBI dashboard for real-time river monitoring

## More IoT resources

To learn more about IoT, read our case studies and to stay up to date with IoT product developments, make sure you check out the IoT resources on our website [www.manxtechgroup.com/iot](http://www.manxtechgroup.com/iot)

# Managed Services

Manx Technology Group is an integrated technology provider with a solutions portfolio that extends into managed services. Our technical teams support global infrastructure and IT platforms from our offices in the Isle of Man and Scotland. We provide technical solutions to international organisations including SMB, Enterprise, IoT and service provider clients.

## IT as a Service (ITaaS)

Managed IT services for business. Solutions for SMB, SME and large enterprise. Subscription based IT provision with on-site and remote support and 24x7x365 helpdesk.



Fujitsu, Dell & HPE Desktop, server and network hardware supply. Network consultancy. Service provider and enterprise network support.

## Microsoft Cloud Services

Microsoft Azure, Office 365, Sharepoint and Microsoft Teams. Setup, Licensing, service management, workflows, migration services and support. Collaboration and communication tools.



Office 365, Exchange Online, Office 365 Migration services, Sharepoint consultancy, Microsoft Teams, Microsoft Flow, InTune and Azure Active Directory.

## Managed Security

Next generation firewalls, endpoint protection and systems security covering cloud and on-premise systems. network security, systems hardening and assessment services.



Fortinet Firewalls, Sophos Endpoint Security, Nessus Vulnerability scans, systems hardening, network and systems audits, 24x7 monitoring.

## ON-SITE AND REMOTE SUPPORT

Our engineers and technical teams can support your systems and infrastructure remotely in addition to providing on-site technical support at your business premises.

## 24x7 HELPDESK

The MTG helpdesk is operational 24x7x365 and on hand to provide fault logging, technical support and pro-active response in the event of a fault or service outage.

## TECHNOLOGY PARTNERSHIP

Our fully managed IT service means that MTG is responsible for every aspect of your infrastructure and systems. If you have an in-house IT function - our teams can augment this resource.

# IoT Application Examples

- People counting in public venues and tourist attractions.
- Turbidity and pollution monitoring of rivers.
- Mobile air quality monitoring with IoT.
- Monitoring soil conditions to increase crop yield.
- Using smart-phone detection to monitor car sharing.
- Monitoring pH and ORP levels in fishing ponds.
- Indoor CO2 and VOC monitoring to prevent against sick building syndrome.
- Low power GPS Asset tracking of plant and machinery.
- Queue and people analytics in bus and train stations.
- Smart parking sensors in EV and disabled spaces.
- Monitoring noise levels around concert venues.
- Sensors to detect gate activity on agricultural land.
- People counting to determine retail footfall patterns, group sizes and other indicators.
- Using Blockchain for pollution monitoring.
- Optimising product placement in retail stores.
- Forest, glen and parkland visitor analytics.

## Connect

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