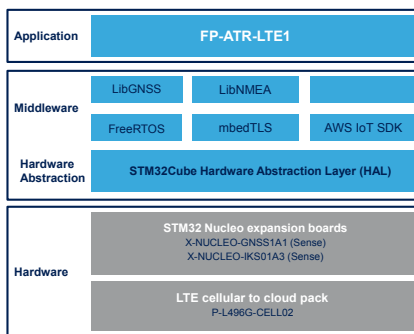# STM32Cube function pack for asset tracking with LTE connectivity, GNSS and MEMS sensors

Features

- Complete firmware to connect a node with GNSS and MEMS sensors to a cellular network using LTE communication technology
- Middleware library with FreeRTOS, mbedTLS and Amazon Web Services SDK
- Software interface to access GNSS module (Teseo-LIV3F), temperature and humidity sensor (HTS221), pressure sensor (LPS22HB), and motion sensors (LSM6DSO, LIS2MDL and LIS2DW12)
- Sample implementations available for X-NUCLEO-GNSS1A1 and X-NUCLEO-IKS01A3 expansion boards when connected to a P-L496G-CELL02 LTE cellular to cloud pack
- Easy portability across different MCU families, thanks to STM32Cube
- Free, user-friendly license terms

Description

The FP-ATR-LTE1 is an STM32Cube function pack that allows you to connect an IoT node to Amazon Web Services using LTE cellular connectivity and view GNSS and MEMS sensor data using standard application layer protocols.

It fully supports security and protocol requirements to interface with AWS cloud thanks to the integrated Amazon AWS IoT SDK.

This software, together with the suggested combination of STM32 and ST devices, can be used to develop asset tracking and other related applications. ST also provides an asset tracking dashboard for sensor data visualization.

The package contains examples that implements sensor data reading from a local or a remote device on the Internet.

The software runs on the STM32 microcontroller and includes drivers for the Teseo-LIV3F-based GNSS module, and for the MEMS motion and environmental sensors.

Product summary

STM32Cube function pack for asset tracking with LTE connectivity, GNSS and MEMS sensors	FP-ATR-LTE1
Cloud Amazon-based web application for asset tracking	DSH-ASSETRACKING
GNSS expansion board based on Teseo-LIV3F module for STM32 Nucleo	X-NUCLEO-GNSS1A1
Motion MEMS and environmental sensor expansion board for STM32 Nucleo	X-NUCLEO-IKS01A3
LTE Cellular to Cloud Pack with STM32L496AG MCU	P-L496G-CELL02
Applications	Cloud Connectivity
	Mobility Services
	Tracking
	Wireless Connectivity

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1 Detailed description

1.1 What can you do with STM32Cube function packs?

STM32Cube function packs leverage the modularity and interoperability of STM32 Nucleo and X-NUCLEO boards together with STM32Cube and X-CUBE software to create function examples for some of the most common use cases of different application technologies.

These software function packs are designed to exploit the underlying STM32 ODE hardware and software components as much as possible to best satisfy the requirements of final user applications.

Moreover, function packs may include additional libraries and frameworks that are not present in the original X-CUBE packages, thus enabling new functionalities allowing real and usable system for developers.

1.2 What is STM32Cube?

STM32Cube is a combination of a full set of PC software tools and embedded software blocks running on STM32 microcontrollers and microprocessors:

- STM32CubeMX configuration tool for any STM32 device; it generates initialization C code for Cortex-M cores and the Linux device tree source for Cortex-A cores
- STM32CubeIDE integrated development environment based on open-source solutions like Eclipse or the GNU C/C++ toolchain, including compilation reporting features and advanced debug features
- STM32CubeProgrammer programming tool that provides an easy-to-use and efficient environment for reading, writing and verifying devices and external memories via a wide variety of available communication media (JTAG, SWD, UART, USB DFU, I2C, SPI, CAN, etc.)
- STM32CubeMonitor family of tools (STM32CubeMonRF, STM32CubeMonUCPD, STM32CubeMonPwr) to help developers customize their applications in real-time
- STM32Cube MCU and MPU packages specific to each STM32 series with drivers (HAL, low-layer, etc.), middleware, and lots of example code used in a wide variety of real-world use cases
- STM32Cube expansion packages for application-oriented solutions

1.3 How does this STM32Cube function pack complement STM32Cube?

This software is based on the STM32CubeHAL hardware abstraction layer for the STM32 microcontroller. The package extends STM32Cube by providing a board support package (BSP) for the LTE cellular communication expansion boards, the GNSS sensor expansion board and the environmental and motion MEMS sensor expansion board.

The drivers abstract low-level details of the hardware and allow the middleware components and applications to access sensors data in a hardware-independent manner.

The package also includes middleware implementing application program interfaces for easy interaction of an STM32 Nucleo-based development kit with Amazon web services (AWS). Developers can use it to prototype end-to-end IoT applications, by registering the STM32 Nucleo-based development kit to the AWS IoT cloud platform and easily start to transmit and receive sensor data and commands in real-time.

Revision history

Table 1. Document revision history

Date	Version	Changes
06-Apr-2020	1	Initial release.
17-Feb-2021	2	Updated cover page features, description and product summary table.

IMPORTANT NOTICE – PLEASE READ CAREFULLY