

## STM32Cube function pack for IoT node with NFC, BLE connectivity and environmental, motion and time-of-flight sensors

Application	FP-SNS-FLIGHT1		
Middleware	BLE	NDEF	Meta Data Manager
	MotionFX/AR	MotionCP/GR	Gestures
Hardware Abstraction	STM32Cube Hardware Abstraction Layer (HAL)		
Hardware	STM32 Nucleo expansion boards X-NUCLEO-53L0A1 (Sense) Y-NUCLEO-IKS01A2 or X-NUCLEO-IKS01A1 (Sense) X-NUCLEO-IDB05A1 or X-NUCLEO-IDB04A1 (Connect) X-NUCLEO-NFC04A1 (Connect)		STEVAL-BCNKT01V1 evaluation board
	STM32 Nucleo development board		



### Features

- Complete firmware to develop an IoT node with NFC, BLE connectivity and environmental, motion and time-of-flight sensors
- Middleware libraries for sensor data fusion, accelerometer-based real-time activity recognition and hand gesture detection
- Compatible with BlueMS application for Android/iOS, to perform sensor data reading, motion algorithm features demo, proximity-based hand gesture detection demo and firmware update (FOTA)
- Sample implementation available for [STEVAL-BCNKT01V1](#) evaluation board and for [X-NUCLEO-NFC04A1](#), [X-NUCLEO-IKS01A2](#) (or [X-NUCLEO-IKS01A1](#)), [X-NUCLEO-53L0A1](#) and [X-NUCLEO-IDB05A1](#) (or [X-NUCLEO-IDB04A1](#)) connected to a [NUCLEO-F401RE](#) or [NUCLEO-L476RG](#)
- Easy portability across different MCU families, thanks to [STM32Cube](#)
- Free, user-friendly license terms

### Description

The [FP-SNS-FLIGHT1](#) is an [STM32Cube](#) function pack which let your IoT node connect to a smartphone via BLE and uses a suitable Android™ or iOS™ application like the BlueMS app to view real-time environmental sensor data, motion sensor data and proximity sensor data.

The package also enables advanced functionalities such as sensor data fusion, accelerometer-based real-time activity recognition and real-time hand gesture detection. It uses the NDEF standard for simple and secure Bluetooth pairing, storing the necessary information on the NFC tag, thus simplifying the device configuration. This package, together with the suggested combination of the STM32 and ST devices, can be used to develop wearable applications, or smart things applications in general.

The software runs on the STM32 microcontroller and includes all the necessary drivers to recognize the devices on the STM32 Nucleo development board and expansion boards as well as on the [STEVAL-BCNKT01V1](#) evaluation board.

Product summary	
STM32Cube function pack for IoT node with NFC, BLE connectivity and environmental, motion and time-of-flight sensors	<a href="#">FP-SNS-FLIGHT1</a>
Ranging sensor expansion board based on VL53L0X for STM32 Nucleo	<a href="#">X-NUCLEO-53L0A1</a>
Motion MEMS and environmental sensor expansion board	<a href="#">X-NUCLEO-IKS01A2</a>
Dynamic NFC/RFID tag IC expansion board	<a href="#">X-NUCLEO-NFC04A1</a>
BlueCoin starter kit	<a href="#">STEVAL-BCNKT01V1</a>

## 1 Detailed description

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### 1.1 What can you do with STM32Cube function packs?

The [STM32Cube](#) function packs leverage the modularity and interoperability of STM32 Nucleo and X-NUCLEO boards, and STM32Cube and X-CUBE software, to create function examples, embodying some of the most common use cases, for each application area.

These software function packs are designed to exploit as much as possible the underlying [STM32 ODE](#) hardware and software components to best fit the requirements of final users' applications.

Moreover, function packs may include additional libraries and frameworks which do not present the original X-CUBE packages, thus enabling new functionalities and creating a real and usable system for developers.

### 1.2 What is STM32Cube?

[STM32Cube™](#) is an STMicroelectronics initiative that helps you reduce development effort, time and cost. STM32Cube covers the STM32 portfolio.

STM32Cube version 1.x includes:

- STM32CubeMX, a graphical software configuration tool that allows the generation of C initialization code using graphical wizards.
- A comprehensive embedded software platform specific to each series (such as the STM32CubeF4 for the STM32F4 series), which includes:
  - the STM32Cube HAL embedded abstraction-layer software, ensuring maximized portability across the STM32 portfolio
  - a consistent set of middleware components such as RTOS, USB, TCP/IP and graphics
  - all embedded software utilities with a full set of examples

### 1.3 How does STM32 ODE function pack complement STM32Cube?

This software is based on the STM32CubeHAL. It extends STM32Cube by providing a board support package (BSP) for the BlueNRG-MS, dynamic NFC tag expansion boards, sensor expansion board and proximity sensor expansion board and middleware components for communication with other Bluetooth devices, for sensor data fusion and proximity-based hand gesture detection.

Moreover this package contains protocols and libraries useful for sensing applications based on BLE communication: MotionFX, MotionAR, MotionCP, MotionGR, Gesture Detect (for further details, refer to the related web pages on [www.st.com](http://www.st.com)).

## Revision history

**Table 1. Document revision history**

Date	Version	Changes
01-Mar-2016	1	Initial release.
05-Dec-2016	2	Updated title, cover image, Features, Description Added STM32 ODE compatibility.
20-Feb-2017	3	Updated cover page image and Features and Description sections. Updated section How does STM32 ODE Function Pack complement STM32Cube? Added X-NUCLEO-IKS01A2 expansion board compatibility information.
29-Mar-2017	4	Updated cover page image, features and description. Updated <i>How does STM32 ODE function pack complement STM32Cube?</i>
19-Jul-2017	5	Updated cover image, features and description.
05-Sep-2018	6	Updated cover image, features and description.

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