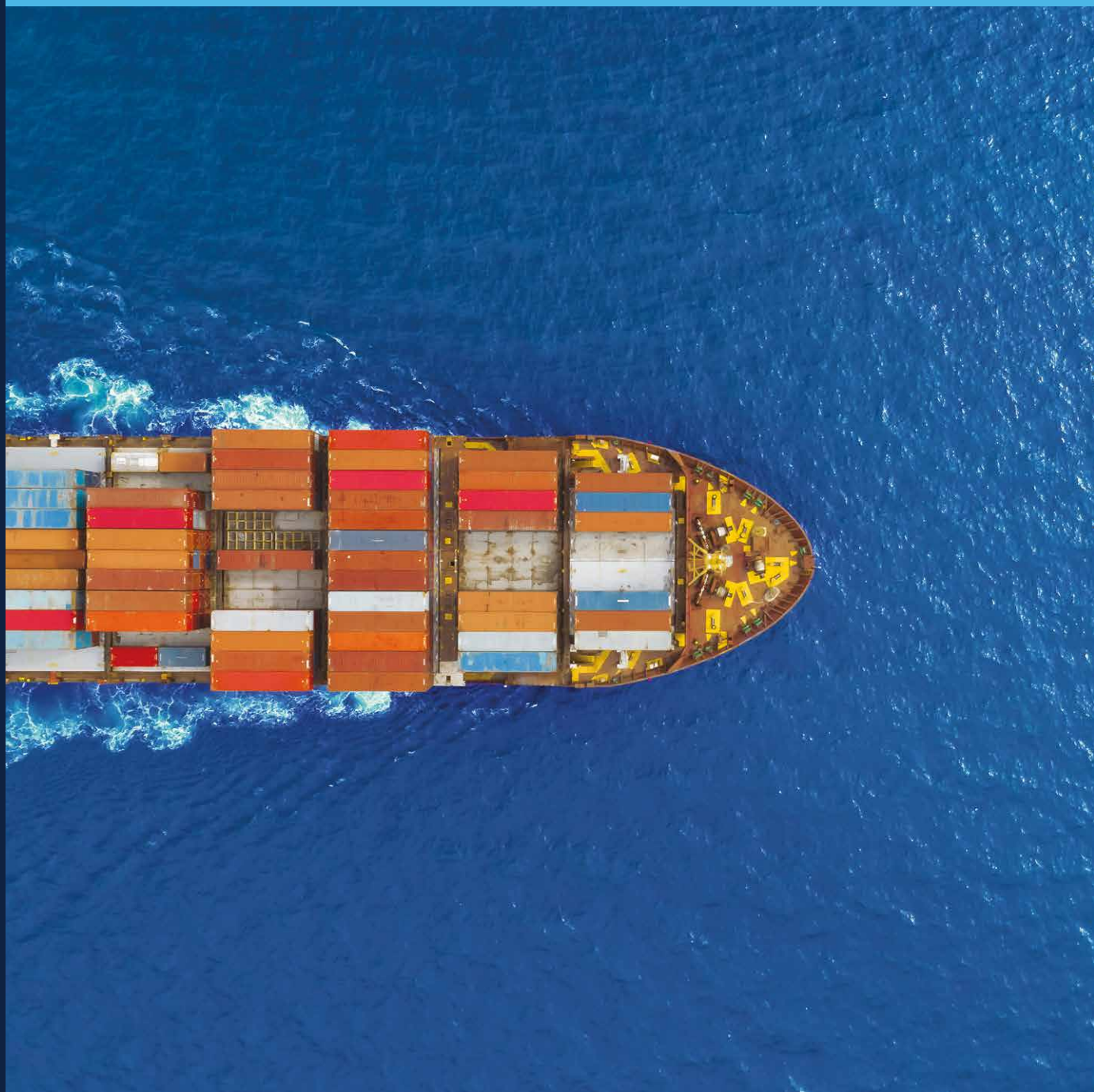




Asset tracking a complete solution from ST





















Introduction



In global manufacturing and commerce, raw materials, components and final goods travel long distances before arriving at the final destination. The direct or indirect value of a product often justifies the cost associated with, for example, monitoring and tracking shocks across a logistics chain or recording food storage and transportation temperatures in a cold chain.

Tracking relies predominately on GNSS location technologies or wireless triangulation positioning, while the continuous monitoring of storage conditions is based on various sensors, depending on the physical variables involved.

APPLICATIONS AND SEGMENTATION

 Outdoor real-time monitoring	 Containers	 Fleet management	 Livestock monitoring	 Mobility sharing	 Tractor
 Indoor localization & warehouse logistics	 RTLS	 Mobile assets	 Pallet	 Smart parcels	 Work safety
 Good guarantee	 Cold chain	 Food	 Medical		
 Disposable	 Letters	 Packages	 Parcels		

ST 360° PORTFOLIO DELIVERS 100% FLEXIBILITY

Outdoor real-time monitoring
Containers, livestock monitoring, e-bike, fleet management, pet, tools management



Industrial logistics
Pallets, racks, indoor/outdoor locations



Good Guarantee
Cold chain, food, medical, smart parcels



Disposable
Letters, packages, parcels



Processing 	Sensing & actuating 	Security
Connectivity 	Power & energy management 	Signal conditioning & protection

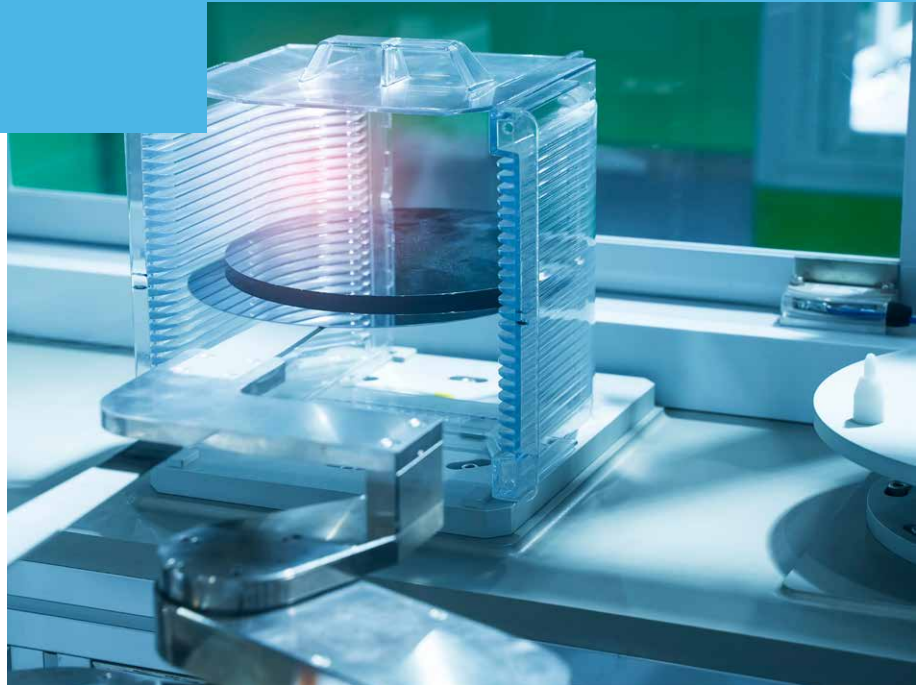
Multiple applications, one platform, one vendor

ST OFFERS FOR ASSET TRACKING BY APPLICATIONS NEEDS

ST offers an extensive range of environmental sensors (temperature and pressure), inertial sensors (accelerometers, gyroscopes and magnetometers), smart sensors with machine learning core and proximity sensors. ST also provides a very wide range of receivers, low-power microcontrollers, EEPROM memories and high efficiency power management ICs for low-power wireless connectivity such as Bluetooth Low Energy and 802.15.4, short range NFC, UHF readers, low power wide area networks (LPWAN) like LoRaWAN® and Sigfox, Cat-M1 and NB-IoT cellular connectivity and GNSS positioning.

	Processing and security	Sensing	Connectivity	Power management	Complexity (number of sensors, connectivity)
Outdoor real-time monitoring 	<ul style="list-style-type: none"> Dedicated MCU Dedicated secure chip 	<ul style="list-style-type: none"> HI-G Temperature Pressure 	<ul style="list-style-type: none"> UHF Bluetooth LoRa zigbee GNSS NB-IoT LTE-M 	<ul style="list-style-type: none"> Shield Battery 	
Indoor localization & warehouse logistics 	<ul style="list-style-type: none"> Dedicated MCU Embedded security 	<ul style="list-style-type: none"> HI-G ToF 	<ul style="list-style-type: none"> UHF Bluetooth LoRa LWB zigbee WiFi NB-IoT LTE-M 	<ul style="list-style-type: none"> Battery 	
Good guarantee 	<ul style="list-style-type: none"> Dedicated MCU Embedded security 	<ul style="list-style-type: none"> HI-G Temperature Pressure 	<ul style="list-style-type: none"> UHF Bluetooth LoRa NB-IoT LTE-M 	<ul style="list-style-type: none"> Battery 	
Disposable 	<ul style="list-style-type: none"> Sensor with processing Embedded security 	<ul style="list-style-type: none"> Temperature Pressure 	<ul style="list-style-type: none"> UHF Bluetooth NB-IoT LTE-M 	<ul style="list-style-type: none"> Battery 	

Key products



SENSORS

To support the design of ultralow power tracking and monitoring solutions, ST offers an extensive range of temperature, humidity and pressure sensors, inertial measurement units (accelerometers, gyroscopes and magnetometers) and proximity sensors.

Accelerometers	
H3LIS331DL	High-g shock accelerometer
LIS2DW12 LIS2DH12 LIS2DU12	Ultralow power
LIS2DTW12	With embedded temperature sensor
LIS2DUX12 LIS2DUXS12	Ultralow power with MLC and QVAR

iNEMO® Inertial module	
LSM6DS032	6x IMU
LSM6DSV16X LSM6DSV32X	6x IMU with MLC
LSM6DS016IS	6x IMU with ISPU

Magnetometer	
LIS2MDL	Magnetometer

Pressure sensors	
LPS22DF ILPS22QS*	Precision pressure sensor
LPS28DFW* ILPS28QSW	Waterproof pressure sensor

Temperature sensors	
STTS22H	Digital temperature sensor
LM235 STLM20	Analog temperature sensor

MEMS Microphones	
MP34DT05-A MP23DB01HP	Digital high-performance microphone
MP23ABS1	Analog high-bandwidth microphone

FlightSense™ Time-of-Flight sensor	
VL53L4CD	Proximity sensor
VL53L0X	Ranging sensor
VL53L4CX	Long distance and multi-target ranging
VL53L1CB	Extra-long distance & multi-target
VL53L5CX	Multizone ranging sensor
VD6283TX	Ambient light
VL53L7CX	Multizones ToF sensor (large FoV)
VL53L8CX	High perf multizones ToF sensor



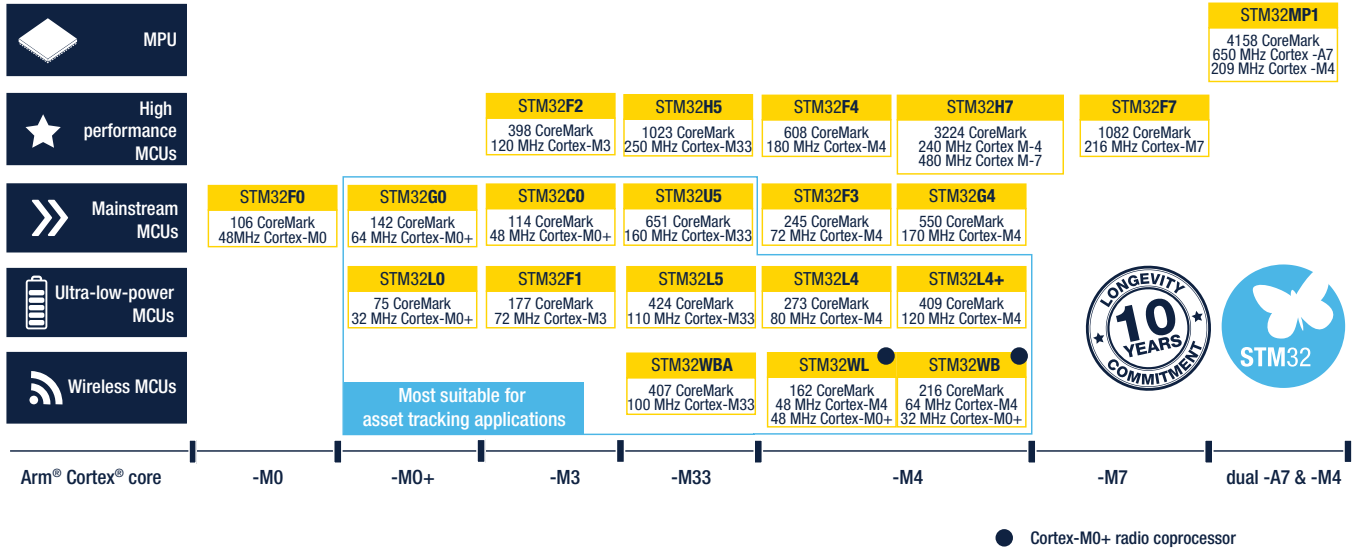
IR sensor	
STHS34PF80	Presence detection sensor

Note: * industrial option for 10Y longevity

STM32 32-BIT MCUs AND MPUs

The STM32 family of 32-bit flash microcontrollers and microprocessors based on the Arm® Cortex® M and Cortex-A processor is designed to offer new degrees of freedom to MCU users. It offers a 32-bit product range that combines very high performance, real-time capabilities, digital signal processing and low power-low voltage operation, while maintaining full integration and ease of development.

The unparalleled range of STM32 devices, based on an industry-standard core and accompanied by a vast choice of tools and software, makes this family of products the ideal choice both for small projects and for entire platform strategies.



WIRELESS CONNECTIVITY SOLUTIONS

The ST portfolio of transceivers, network processor ICs and fully certified modules support major wireless technologies, including NFC, RFID HF and UHF, UWB, Bluetooth Low Energy, BLE MESH, 802.15.4, Zigbee, OpenThread, sub-1GHz long-range networks (6LowPan), low power wide area networks (Sigfox, LoRaWAN®, Cat-M1 and NB-IoT) and positioning.

NFC & RFID	
ST25TV	NFC/RFID tags
ST25DV-I2C	Dynamic NFC/RFID tags
ST25R	NFC Readers
ST25RU	RFID UHF Readers for UHF

Bluetooth Low Energy	
BlueNRG-2	Highly energy-efficient Bluetooth 5.2 and module
BlueNRG-M2	
STM32WBA5/10/15	Bluetooth 5.4 wireless SOC with integrated balun
30/35/50/55	
BlueNRG-LP/LPS	Bluetooth LE
STM32WB1MMCH	Multiprotocol module (Bluetooth 5.4)
BALF-NRG-02D3	Balun & filter
MLPF-NRG-01D3	
MLPF-WB55-0xE3	
MLPF-WB-0xE3/E3	

Sub-1 GHz	
S2-LP	Sub-1 GHz Sigfox compatibility
S2-LPTX	Sub-1 GHz transceiver
SPIRIT1, STS1TXQTR	STM32 Sub-1 GHz SOC
STM32WL33 / 55* / 54 / E5* / E4	LoRaWAN®/Sigfox compatibility
BALFxB-WL-0xD3	Balun & filter
BALF-SPI2-0xD3	STM32 Sub-1 GHz module
STM32WL5MOC	LoRaWAN®/Sigfox compatibility



Cellular	
STM32WM*	Cellular connectivity
ST4SIM	eSIM

Positioning	
TESEO-LIV3x	GNSS module
TESEO-LIV4F*	GNSS Multi-Bands module



WPAN	
STM32WB	Bluetooth LE 5.4 / 802.15.4, Zigbee, Thread, proprietary wireless SOC (integrated balun and module)
STM32WB5MMGH	
BAL-UWB-01E3	Balun for UWB
STM32WU *	Ultrawide band connectivity




Note: * available soon
** LoRa is only supported on STM32WL5/E




Complementary products

POWER MANAGEMENT

ST is a leading supplier in power management and mixed-signal ICs for mobile applications, offering a wide range of products, from simple power management ICs up to highly integrated devices that mix power management blocks with advanced analog and digital functionalities.

 DC/DC converters	
ST1PS01/02 ST1PS03	Synchronous converter, Output voltage flexibility, 400 mA output current, Nano-quiescent current (500 nA) for extended sensors battery life

 Voltage regulators	
STLQ020	200 mA ultralow quiescent current LDO
LDLN030	Low Iq, ultralow noise 300 mA LDO with power good
LDLN025	Low Iq, ultra low noise 250 mA LDO
LD59030	Low Iq, ultralow drop 300 mA LDO

SIGNAL CONDITIONING

STMicroelectronics offers a wide analog portfolio, including high-performance amplifiers and comparators, featuring low power, high precision and tiny packages for industrial, automotive and consumer applications. The range of products allows easy and fast integration of analog products. For more information visit www.st.com/opamps



TSZ12 series Zero-drift CMOS amplifiers	<ul style="list-style-type: none"> • Very low offset 5 μV max • Very low drift in temperature 30 nV/$^{\circ}\text{C}$
TSZ18 series Zero-drift & high-speed amplifiers	<ul style="list-style-type: none"> • Very low offset 25 μV max • Very low drift in temperature 0.1 $\mu\text{V}/^{\circ}\text{C}$ • Excellent speed/power ratio 3 MHz/1 mA
TSU11 series Nanopower amplifiers Zero-drift	<ul style="list-style-type: none"> • 900 nA current consumption • Only 150 μV max input offset voltage • Operating from 1.5 V
TSU10 series Nanopower amplifiers	<ul style="list-style-type: none"> • 580 nA current consumption • Operating from 1.5 V
TS88 series Nanopower comparators	<ul style="list-style-type: none"> • 200 nA current consumption • Operating from 0.9 V • Push pull & open drain



PROTECTION

ST's large portfolio of protection devices and ICs are certified and meet or exceed international protection standards for electrical hazards on electronics boards in the demanding industrial market. Standard and advanced innovative packages (flow-through μDFN , WLCSP and PowerQFN) minimize board space and help improve layout options. For more info refer to <https://www.st.com/en/protection-devices.html>

Protection	
EMIF06-MSD02N16	SD card protection
ECMF02-4CMX8	USB 2.0 dataline
ESDA7P120-1U1M	DC-DC protection
USBULC6-2M6	ESD protection
TCPP01-M12	USB TYPE-C power delivery protection

Design support

ST provides different hardware and software solutions to help designers in their job. Starting from product evaluation boards for a comprehensive evaluation of ST products, to solution evaluation boards tailored to one or more application features ST also offers a fast and modular prototyping system, the STM32 open development environment (ODE), which lets you combine STM32 microcontrollers with a broad range of expansion boards for sensing, connectivity, power, audio, motor control and more.

The ST software development tools complement the ST hardware ecosystem with programming tools, firmware libraries, middleware stacks to reduce the design complexity.

KEY PLATFORMS

NFC & RFID



Smart and flexible NFC tracker

Solution board
STEVAl-SMARTAG2

Firmware packs
FP-SNS-SMARTAG2
DSH-ASSETTRACKING
Web cloud dashboard
STAssetTracking APP
Mobile APP

TARGET APPLICATIONS



Bluetooth Low Energy



Bluetooth LE enabled wireless IoT node

Solution board
SensorTile.boxPRO

Firmware packs
FP-ATR-BLE1
DSH-ASSETTRACKING
Web cloud dashboard
STAssetTracking APP
Mobile APP

TARGET APPLICATIONS



Sub-1 GHz, Bluetooth Low Energy, GNSS and NFC



LoRa and BLE Tracker Node

Solution board
STEVAl-ASTRA1B

Firmware packs
FP-ATR-ASTRA1
STAssetTracking APP
Mobile APP
DSH-ASSETTRACKING
Web cloud dashboard

TARGET APPLICATIONS



At STMicroelectronics we create technology that starts with You



Order code: **BR2309ASSTRACK**

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