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ST solution for Dead reckoning based on TeseoIII

Sept 2020

ST Dead Reckoning Overview

ST Dead Reckogning providing accurate position in all conditions

- Updates car position / velocity when GNSS satellites signal is not available (tunnels, obscured areas …)
- Improves car position / velocity when GNSS satellites signals are marginal (urban canyons, partially obscured areas)

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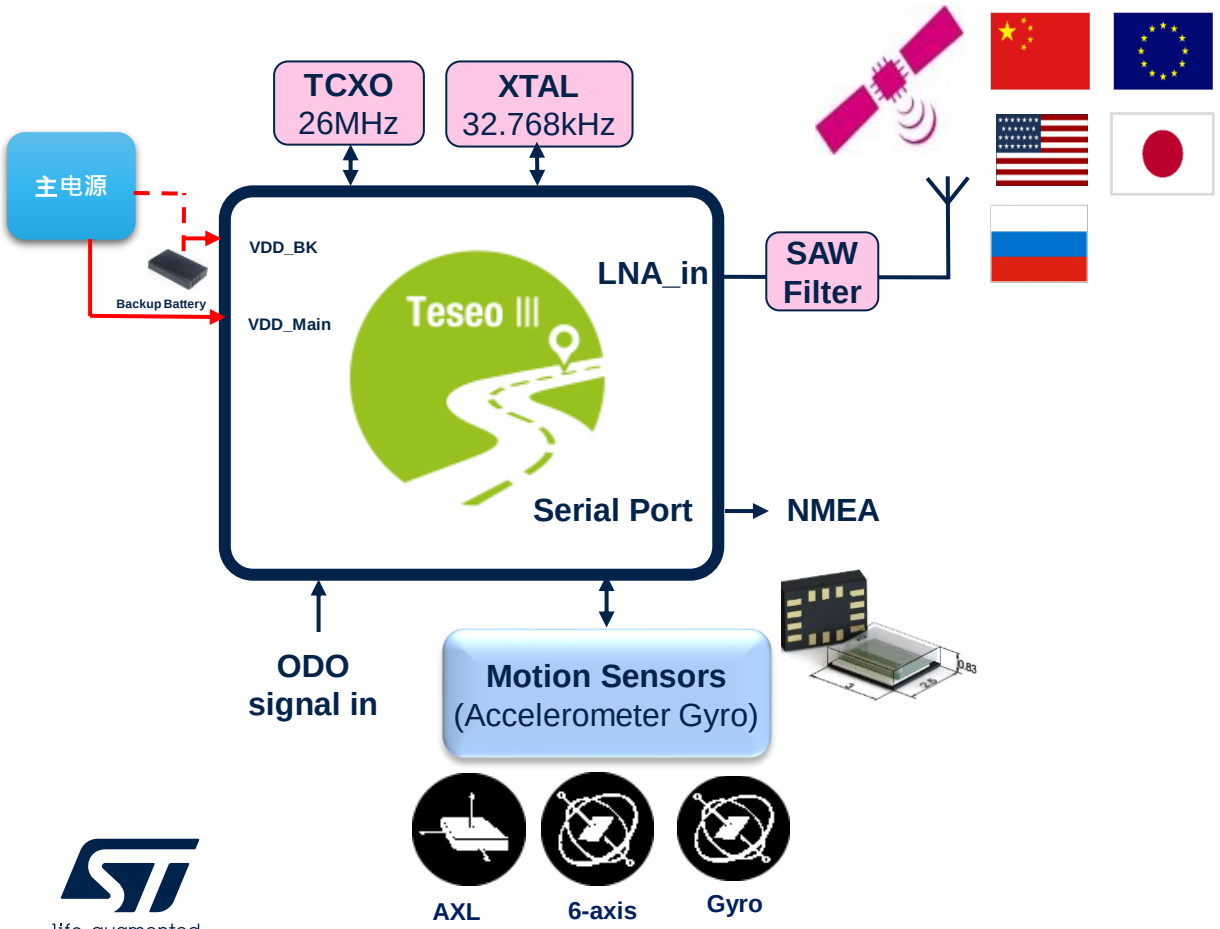
TeseoIII DRAW High Level HW Block diagram

ST offering DRAW / DRUM Turn-Key solution



ST offer

- **TeseoIII GNSS chipset** Automotive/Industrial grade
- **DRAW / DRUM FW** running on TeseoIII already in production with major car makers WorldWide
- **6-axis IMUs sensor** Automotive/Industrial grade

TESEO III	FLASH	CAN IF	ST DR FW	GRADE LEVEL
STA8089FGBD / STA8090FGBD	YES	YES	YES	INDUSTRIAL
STA8080FGABD	YES	YES	YES	AUTOMOTIVE

Motion Sensors	6-AXIS	GRADE LEVEL
LSM6DSL/R	6-AXIS	CONSUMER
ISM330DLC	6-AXIS	INDUSTRIAL
ASM330LHH	6-AXIS	AUTOMOTIVE

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TeseoIII GNSS receiver

Since 1993, number one in accuracy

- **Unique automotive scalable solution**
  - **MCU, Stand alone**
- **Pioneer in Multiconstellation**
  - **GPS, GALILEO, GLONASS, BeiDou, QZSS**
- **State-of-the-Art Autonomous & Predictive AGNSS**
- **Proprietary Dead Reckoning Automotive Way (DRAW) sensor fusion**
- **Industrial and Automotive Grade options**

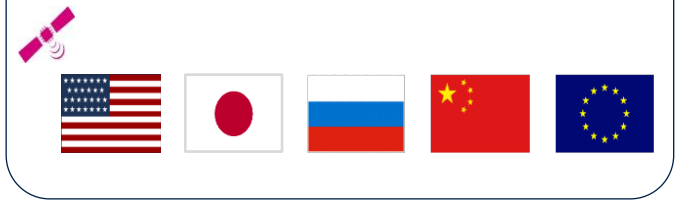
Teseo Certification for eCall

GALILEO

eCall

Improves Position Accuracy

More Satellites = Better Accuracy



ST AGNSS
Techniques used by Teseo to speed-up TTFF

	Ephemeris	Source	Duration	Warm start TTFF (50%)
GPS Only	Real	Satellite	2-4Hrs	33s
Multiconstellation Only	Real	Satellite	30min	25s
A-GNSS	Predictive	Satellite	6 days	1-4s
P-GNSS	Predictive	Server	14 days	1-4s
Real Time	Real	Server	2-4Hrs	1s

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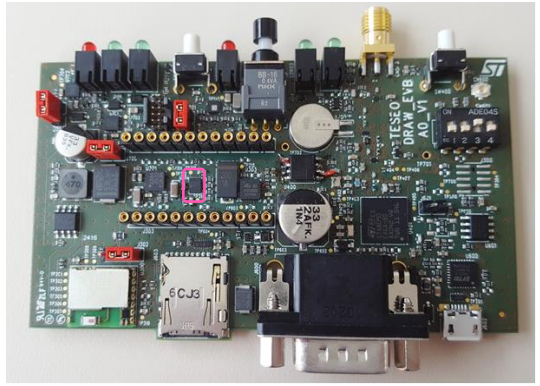
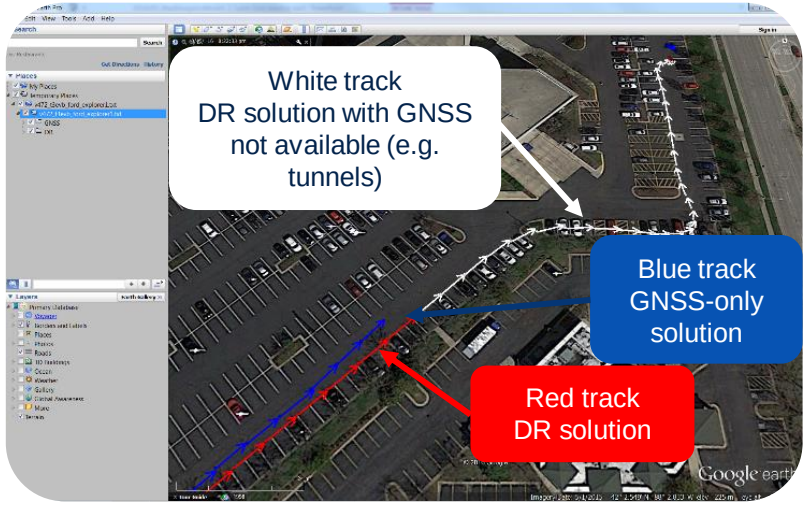
TeseoIII DRAW Evaluation Kit

ST TeseoIII DRAW Evaluation Board





TeseoIII DRAW Evaluation Board (HW description)

- STA8089/90 TeseoIII Chipset
- ST ASM330LHH / LSM6DSR 6x axis IMU
- Analog/Digital external sensor support
- CAN bus access through OBD2 connector

TeseoIII Software and Tool

- GNSS SW Library
- DR SW Library
- CAN driver
- Data capturing/logging Application (SD or UART)
- Real time DR/GNSS output (performance demo)
- Full data capturing o(development & post processing)

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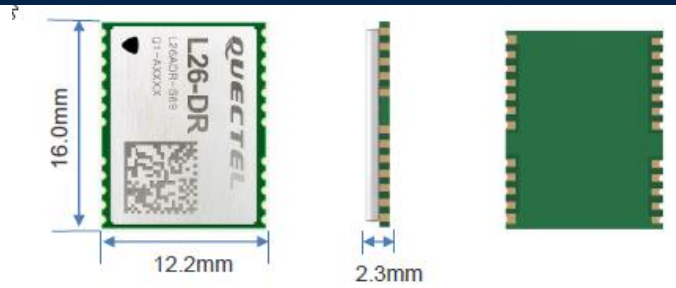
L26-DR/UDR Modules: QUECTEL

L26DR Module for DRAW / DRUM based on TESEOIII and ST IMU



Automotive Grade	Industrial Grade
AL26DR-S89A	ADR: L26ADR-S89
	UDR: L26UDR-S89

- Speed input through wheel tick, UART and CAN bus
- Dead Reckoning Algorithm integrated
- Sensor's RAW data output w/ NMEA messages
- Wake up mechanism via host and sensor
- Active antenna detection functions integrated

Multi-constellation GNSS	GPS L1/Galileo E1 C/A GLONASS L1 C/A BD2 B1 C/A QZSS	
Support 48 channels	Support 48 channels	
SBAS	WAAS, EGNOS, MSAS, GAGAN	
Horizontal Position Accuracy	Autonomous	1.8m CEP
Velocity Accuracy	Without Aid	<0.1m/s
Acceleration Accuracy	Without Aid	0.1m/s²
Timing Accuracy	1PPS	3.9ns CEP*
TTFF @-130dBm without AGPS	Cold Start	<32s
	Warm Start	<25s
	Hot Start	<2s
Sensitivity	Acquisition	-147dBm
	Tracking	-163dBm
	Reacquisition	-156dBm

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ST-1612x Module: LOCOSYS

ST-1612x Module for DRAW / DRUM based on TESEOIII

ST-1612A-DBX/DGX

GNSS Module

16 x 12.2 x 2.4 mm

Automotive Grade

ST-1612i-DBX/DGX

GNSS Module

16 x 12.2 x 2.3 mm

Professional Grade

HIGHLIGHTS

- Base on ST TESEO III Engine Chip.
- Fully Automotive Dead Reckoning.
- Supported Odometer, UART and CAN bus input.
- Integrated 3D Gyro and 3D accelerometer.

- **ST-1612A-DBX/DGX** module has been able to meet V2V Spec 1.5m 1sigma accordingly to SAE J2945/1 requirements.
- Operating Temperature ranges from -40 ~ 85°C.
- LOCOSYS IATF 16949 certificated production line.

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TH8xx Module: TIANHRE

TH8xx Modules for DRAW / DRUM based on TESEOIII

TH800

TH800模块尺寸为16 X 12.2 X 0.2mm，兼容主流尺寸GNSS模块，是成都天合世纪推出的一款支持三模定位的高性价比导航定位模块。具有高灵敏度、抗干扰、高

TH810

TH810模块尺寸为16×12.2×0.2mm,兼容主流同尺寸GNSS模块，是成都天合世纪推出的一款支持三模定位的高性价比导航定位模块。内置6轴MEMS传感器及DR

TH830

TH830模组，是成都天合世纪推出的一款支持亚米级室内外三维定位模组，内置气压计，6轴MEMS传感器，支持惯性导航。可在复杂环境下（隧道，地下停车场，...

Thank you

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