A power efficient wide operating range accelerometer with in-sensor compute

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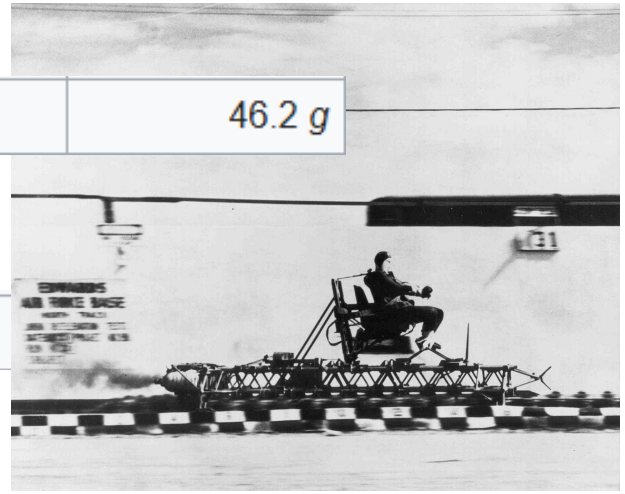
What quantity is equal to 0 for an object in free-fall?

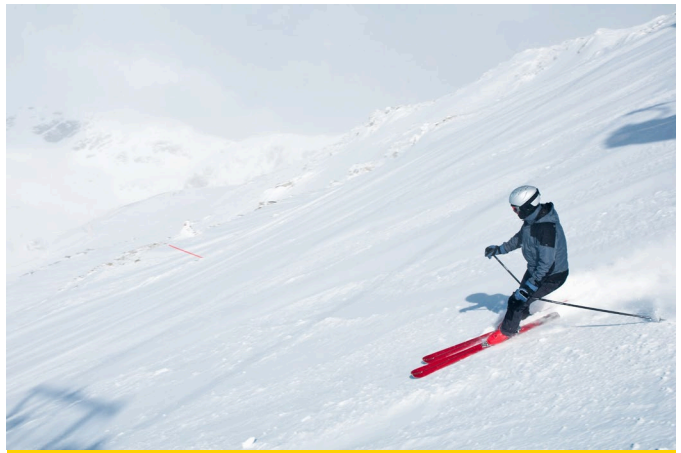
Orders of magnitude (acceleration)

WIKIPEDIA
The Free Encyclopedia

2000 Toyota Sienna from 0 to 100 km/h in 9.2 s[26]	0.3075–0.314 *g*
Standing on Earth at sea level–standard	1 *g*
Maximum for human on a rocket sled	46.2 *g*
Formula One 1994 Monaco Grand Prix Karl Wendlinger[34] Crash	



Orders of magnitude (acceleration)



10g – 50g
50g – 170g (1),(2)

>45g (4)

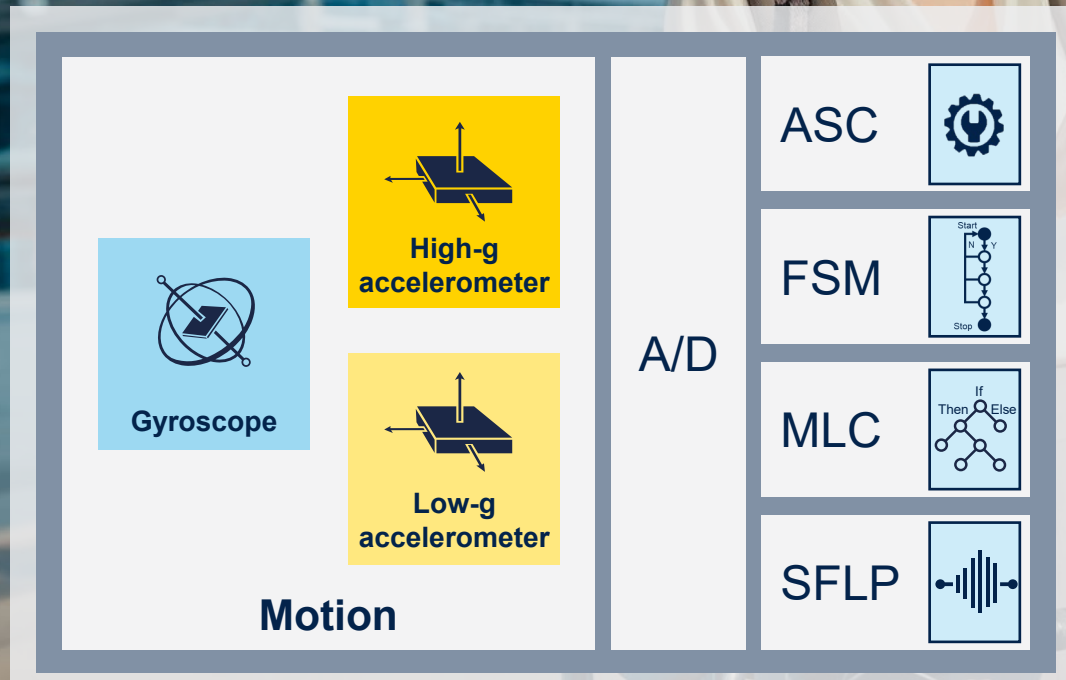
50g – >200g (3)

>50g (5)

(1) 10.3389/fphys.2018.00204
(2) https://doi.org/10.1016/j.jsampl.2023.100028
(3) https://doi.org/10.1016/j.smhs.2019.09.001
(4) Internal ST test

Introducing the LSM6DSV320X

New sensor for accurate and efficient measurement of both high and low acceleration levels



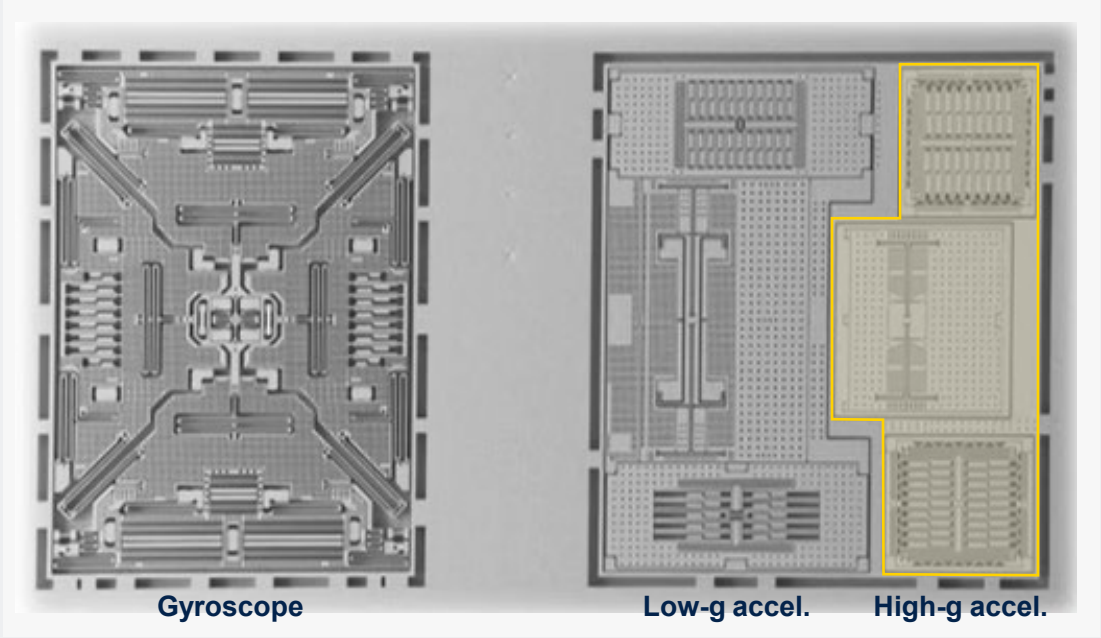
Embedded intelligence for a power efficient management of all sensing channels

Edge AI and self-configuration:

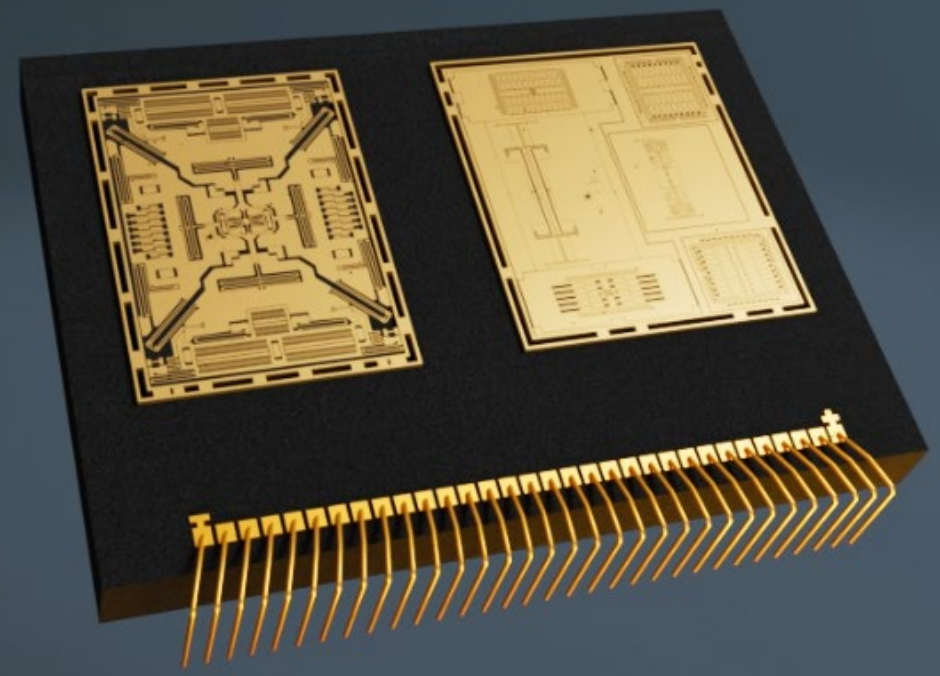
- Finite state machine (FSM)
- Machine learning core (MLC)
- Adaptive self-configuration (ASC)
- Sensor fusion low power (SFLP)

LSM6DSV320X
Differentiating features for new applications

Industry-first high performance 6-axis IMU with a **dedicated high-g accelerometer** for intensity impact and shock detection

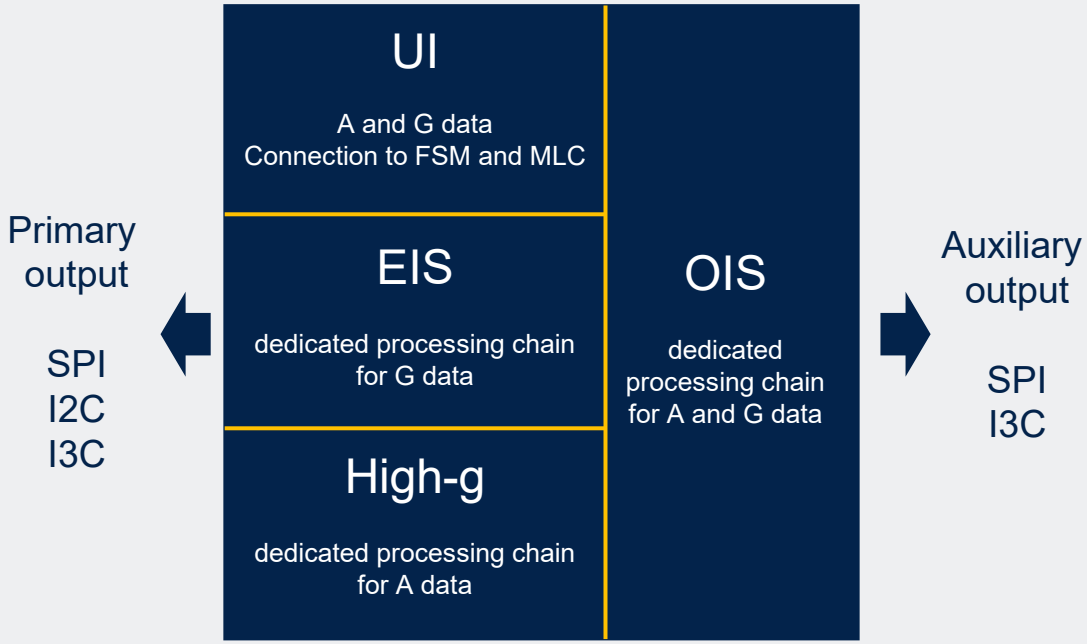


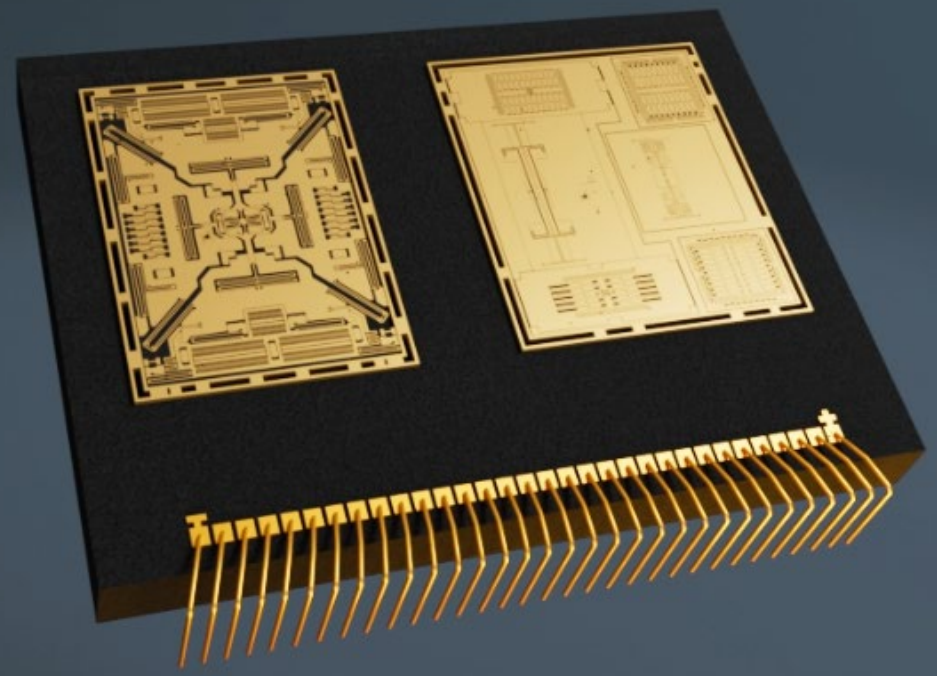
Top view of MEMS unit of LSM6DSV320X



LSM6DSV320X
Differentiating features for new applications

Multi-core enables advanced partitioning





UI = user interface
EIS = electronic image stabilization
OIS = optical image stabilization
A = accelerometer
G = gyroscope

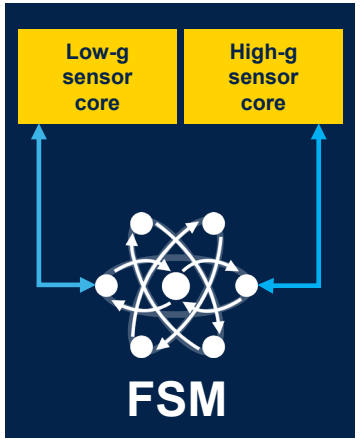
Library for fusing high-g and low-g data: MotionXLF

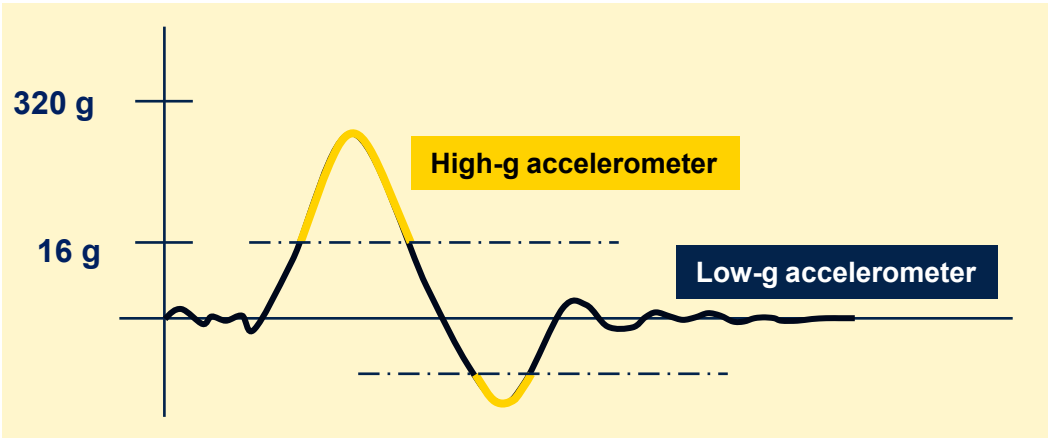
High-g data are characterized by poor resolution and high dynamic range

Low-g data are characterized by high resolution and poor dynamic range

Handles time-varying offset evolution, discontinuity, noise profile inconsistency

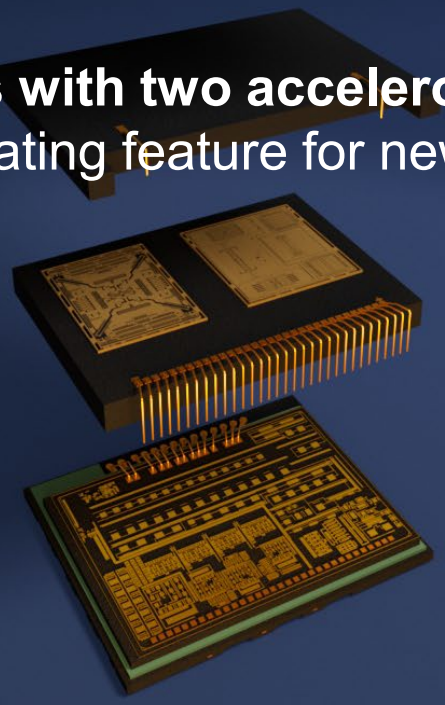
Finite State Machine manages the activation and deactivation of the high-g accelerometer for optimal power efficiency



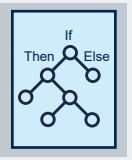


You and all around you
Connecting users with their environments

IMUs with two accelerometers
A differentiating feature for new applications



Enhanced **contextual awareness** with an IMU embedding AI and advanced processing features

MLC 

FSM

ASC

SFLP

Emergency calls activation

Asset tracking & damage sensing

Intense movements tracking

Concussion monitoring

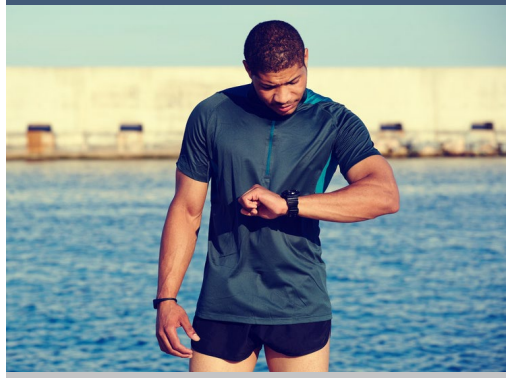
MLC = machine learning core
FSM = finite state machine
ASC = adaptive self-configuration
SFLP = sensor fusion low power

You and all around you

Smartphone & foldable

- Emergency call
- Activity recognition
- Step counting
- Lid angle detection
- Image stabilization

Wearable



- Emergency call
- Intense sports tracking
- Wrist tilt
- Activity recognition
- Step counting

Smart tags & IoT

- Shock and drop impact tracking
- Context awareness
- Motion tracking

PC, laptop, and tablet

- High impact recording
- Lid angle detection
- In and out of bag
- Lap versus desk

Gaming

- High impact recording
- Intense gestures
- Motion tracking

A product for you and all around you

Industry-first IMU with dual MEMS accelerometer
Accurately measures up to 320 g full-scale range

New applications for personal electronics and IoT
Emergency call, drop & fall tracking, concussion monitoring, etc.

Miniaturized AI-enabled sensor with context-awareness
for reducing system-level complexity and enhancing efficiency

Our technology starts with You

Find out more at st.com/LSM6DSV320X

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