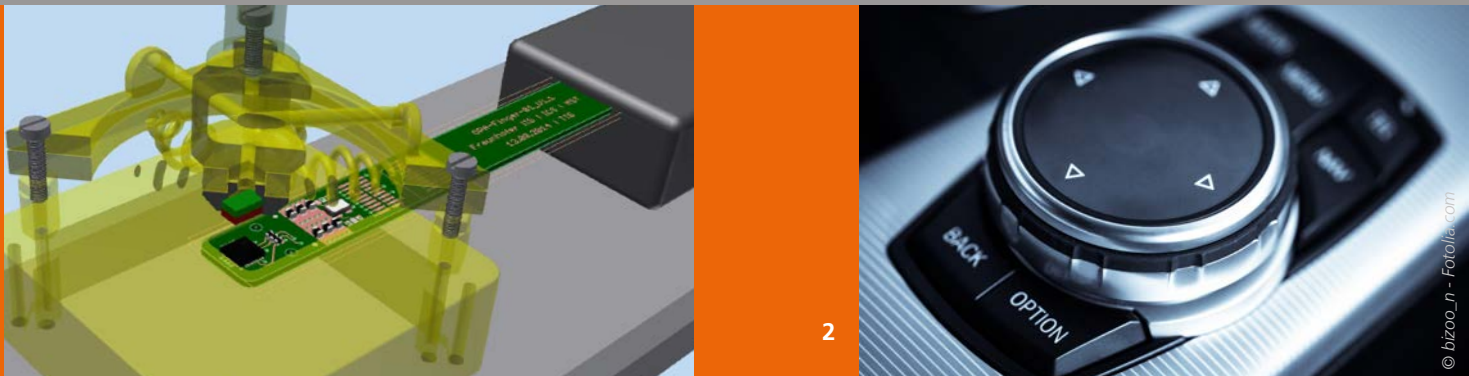


1

1 Prototype of a 6D measuring system as CAD model



2

2 6D application example: human interface device in modern vehicles

HALLINMOTION – 6D position measurement with HallinOne®

Reliable, robust, precise – the special properties of the HallinOne® technology and the smart evaluation of algorithms mean that up to six mechanical degrees of freedom can be determined with just a single IC.

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Mode of operation

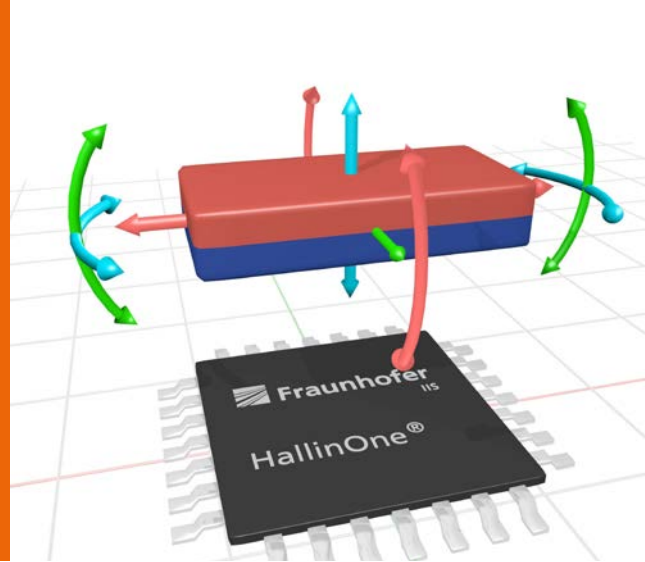
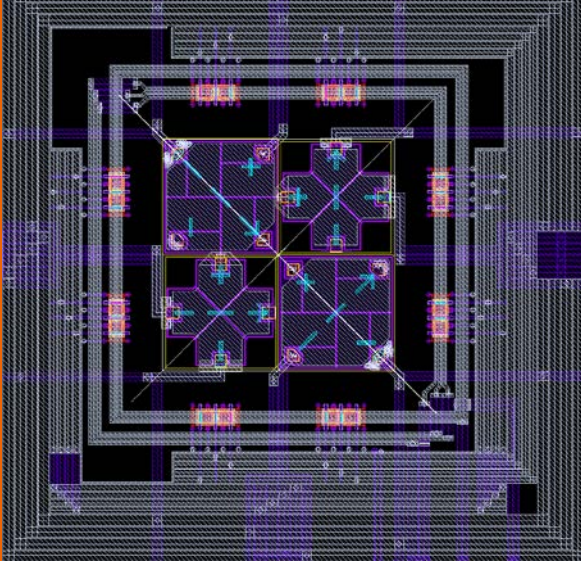
“HallinMotion”, the algorithm developed at Fraunhofer IIS for multidimensional position measurement, allows to determine all six mechanical degrees of freedom with a single measurement system for the first time. The measuring system, which comprises a magnet and a sensor chip, allows very high measurement rates with maximum precision. It offers robust resistance to variations in temperature and external magnetic fields.

The new algorithm can also be used where a higher precision of existing 1D or 2D systems is impaired by disruptive lateral motion. This allows existing applications to be made more robust and simpler.

Smart self-monitoring also means that it can be used in safety-critical applications.

Features

- Contactless absolute position measurement (even through non-magnetic materials)
- Higher degree of positional accuracy due to capturing rotary and lateral motion
- Independent of temperature and external magnetic fields
- Cost-effective due to the integration of the sensor in CMOS technology
- Self-monitoring by means of integrated coils on the sensor chip
- Precision down to the micrometer range



3 Pixel cell (3D magnetic field sensor) of the HallinOne® technology

4 Six degrees of freedom of movement

6D application examples

- Control elements in the areas of automotive, household devices, and construction and agricultural machines (use in safety-relevant applications and tough environments such as dust, dirt, and vibration)
- Chassis monitoring systems
- Robotics
- Control of CAD applications
- Monitoring of high-precision motion sequences down to the micrometer range
- Multi-sensor applications replaced by a single sensor IC

Characteristics

Typical measurement data for a real application:

Sampling rate:

f: 100 Hz

Range of motion:

X,Y: -5 to 5 mm

Z: 3 to 5 mm

α, β : -20° to 20°

φ : -90° to 90°

Precision:

X,Y,Z: approx. 0.05 mm

α, β, φ : approx. 1°

Our offering

- Investigation and drawing-up of system concepts
- Analysis and reduction of the effect of rotary and lateral motion in position systems
- Feasibility study
- Safety analyses (FMEA, FMEDA, safe failure fraction)
- Development of customer-specific hall sensor ICs (ASICs)
- Set-up of prototypes
- Transition to series production/qualification