

**Category:** Electronics & Optoelectronics

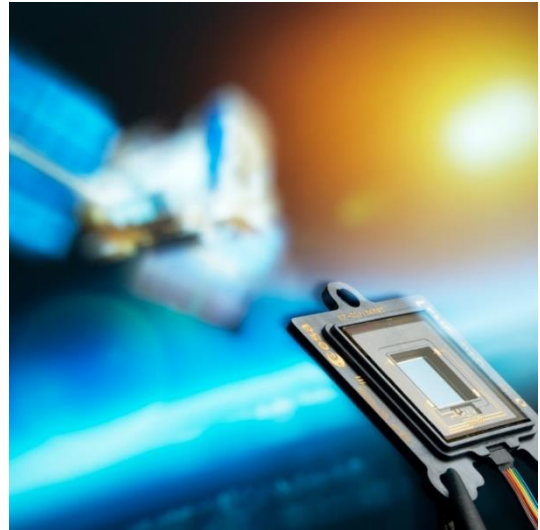
**Reference:** TD-DE-1033

### Weight reduction and miniaturization of mechatronic assemblies through spatial electronics

MID (Mechatronic Integrated Devices) technology enables the manufacture of three-dimensional, injection-molded circuit carriers and the integration of mechanical, electronic, thermal, fluidic and optical functions in components of virtually any shape. The associated advantages result in an increased degree of miniaturization, the implementation of new functions and applications, and the shortening of process chains.

Laser direct structuring can be used to efficiently create conductor path structures on three-dimensional components.

In a project funded by ESA, MID technology was used in a sun sensor. Compared with the conventional design, the new structure based on MID technology is only a quarter of the weight and half the height. This means that the sun sensor can also be used in cubesats. In addition, with the new setup, the effort required to align important sensor components, which is crucial for measurement accuracy, can be reduced by two-thirds. The tests carried out were passed successfully.



Conventional solution



MID solution

### Innovative Aspects:

Spatial electronics makes it possible to optimize existing systems and products with a view to the diverse requirements of space applications.

Compared to the conventional design of electronic systems on printed circuit boards, the third dimension allows more degrees of freedom in product design.

In particular, this allows savings in installation space, weight and the number of individual components required. In the case of components from the field of high-frequency technology, the third dimension makes it possible to shorten conduction paths and thus reduce signal losses to a minimum.

#### Reduction of

- diversity of parts
- Assembly and logistics effort
- Release effort
- Suppliers
- Variety of materials
- Costs

#### Advantages with MID technology

- 3D - circuit layout realizable
- Function integration
- Miniaturization
- Shortening of process chains



#### Application Areas:

Key areas of application for MID technology are automotive engineering, industrial automation, medical technology, the household appliance industry, telecommunications technology, measurement and analysis technology, and aerospace.

#### Cooperation:

The supplier has both extensive knowledge in design and a wide range of technological options for manufacturing MIDs from different base substrates (thermoplastics, ceramics, thermosets). With the possibilities of additive manufacturing, it is also possible to implement structures that are optimized in terms of lightweight construction. Digital process chains that do not require tools and masks also allow a particularly high degree of flexibility, e.g. for the individualization of assemblies and sensor systems.

The supplier has been working for many years in the field of MID technologies, assembly and interconnection techniques, and 3D microassembly, and has extensive expertise in these areas. The range of services covers the entire process chain, from the initial idea to small series production.