



# Fraunhofer ADAPTRONIK

## FRAUNHOFER ADAPTRONICS ALLIANCE



1 LEAF (design: Adrian Madaj, art academy Burg Giebichenstein)



2 virtual prototype

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## LEAF -HOW IS MY PLANT?

### Motivation

LEAF serves as a communication tool for the domestic flora. Attached to the flower pot LEAF senses the growing conditions of the plant. Temperature, humidity and light conditions are detected and evaluated by the integrated electronics.

Symbolized by leaves, the resulting information can be visualized.

The smart pointers move and deform analogous to the needs of the plants for light, water and temperature.

The deformation is caused by a structurally integrated actuator made of shape memory material.

### Functionality

Shape memory material refers to a nickel-titanium alloy that remembers after deformation when heated again to its original

shape. Available are such materials as wires, sheets and tubes.

The shape of the chosen object can be set user-defined by a thermomechanical treatment.

For LEAF shape memory wires are used, which stretch when heated.

A great advantage of the shape memory technique is the simple design of the actuator system and the large energy density.

Actuator tasks can mostly be solved with very small actuators, which often can be completely integrated into a surrounding structure.

In the case of LEAF the actuator wires are completely embedded in an elastomeric matrix.

This opens up new possibilities for product design. The energy-saving operation of the shape memory actuators also allows a battery-supported operation of LEAF.



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smart<sup>3</sup> materials solutions growth

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