Technology Road Map
Strategic road map for Additive Manufacturing in Facade Design

Legend

Note:
- Positions and contents are indicative.
- The Road Map is a concept of the authors at a certain point in time, from the authors point of view. Positions and contents may be different for different stakeholders and institutions.

RM
RT
RP
Additive Manufacturing
Process

Phase 1: The first step of the technical developments in Additive Manufacturing is to achieve a basic understanding of the properties of additive fabricated components and to explore the possibilities of this technology. This phase will include the development of new materials and processes that can be used to produce a variety of components. These components will be used to test the feasibility of the new technology in real-world applications. The first applications will be in the construction of small components, such as panels and structural elements, that can be produced with the additive manufacturing processes.

Phase 2: The second step of the technical developments in Additive Manufacturing is to produce intermediate-sized components. These components will be used to test the feasibility of the new technology in more complex applications. The second applications will be in the construction of larger components, such as structural elements and facade systems, that can be produced with the additive manufacturing processes.

Phase 3: The third step of the technical developments in Additive Manufacturing is to produce fully printed structures. These structures will be used to test the feasibility of the new technology in even more complex applications. The third applications will be in the construction of fully printed structures, such as entire buildings and infrastructure systems, that can be produced with the additive manufacturing processes.

Full-scale, multi-material systems will become feasible and viable. Fully printed architecture is finally possible. The FiF (Fully Integral Facade) vision mostly uses the benefits of multi-functional graded materials which functions as a hinge for opening and closing, a 'glass skin' that fulfills structural functions, like ventilation and sun shading as well as other basic functions of the facade. The mechanisms can provide an 'internal structure' from Additive Manufacturing, like ventilation and sun shading as well as other functions from the facade to the building.

The Facade Machine: The new revolutionary concept of shell building is a whole new concept of building systems. The FiF fully benefits from 3D CAD software with finite element method (FEM) and optimization. The 'FiF' vision mostly uses the benefits of multi-functional graded materials which functions as a hinge for opening and closing, a 'glass skin' that fulfills structural functions, like ventilation and sun shading as well as other basic functions of the facade. The mechanisms can provide an 'internal structure' from Additive Manufacturing, like ventilation and sun shading as well as other functions from the facade to the building.

This Road Map is part of the master thesis of Nathan Volkers, "The future of Additive Manufacturing in Facade Design."