



J.A.M.E.S

Welcome to J.A.M.E.S

AME 2022 European User Forum

How to Design AME

—

an Overview



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Team CTO

01 J.A.M.E.S Vision of AME Environment

02 Additive Electrification: Step by step

03 Additive Electrification: Merging Technologies

04 Methodology of “3D Wiring”

05 Design Process and Features

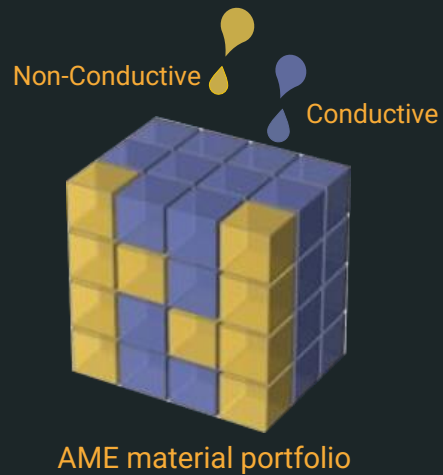
06 System Designer Viewpoint

07 Outlook



J.A.M.E.S

01 J.A.M.E.S Vision of AME Environment



Design abilities

- Electronical and mechanical functionality
- eCAD & mCAD
- Simulation tools



AME processes & 3D printer facilities

- Process combinations
- Suitable to fit requirements
- Reproducibility

Product & Quality



New AME products

- Combination of different materials and AME processes
- Increased technology readiness level
- Long term stability
- Fitting to the needs

01 J.A.M.E.S Vision of AME Environment



Design abilities

- Electronical and mechanical functionality
- eCAD & mCAD
- Simulation tools

02 Additive Electrification : Step by step

Additively Manufactured Electronics (AME)

AM

Free volume formfactors

- Mechanical requirements (e.g., lightweight, stiffness, heat resistance, ...)
 - ➔ Material & AM-Process selection (conductive or non-conductive)



By adidas



By Siemens

AME

Formfactor driven physically electrical requirements (e.g., RF-antenna style, thermal radiation)

- ➔ conductive Material & AM-Process selection (or conductive surface)
- ➔ 3D MID-structures (conductive wiring on the existing 3D surface)



By Additive Drives



By Swissto12

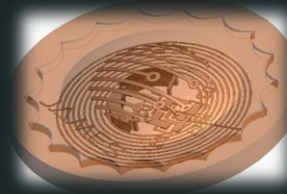


By Teproa

AME

Electrification (active/passive) of the desired volume

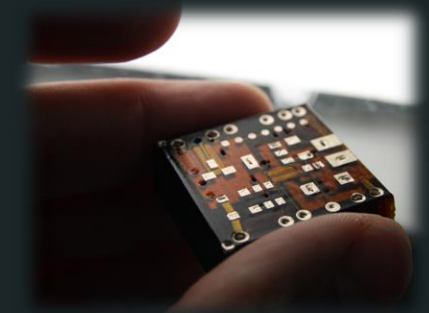
- Material & AM-Process selection for (conductive and non-conductive)
- Make use of the three-dimensional design freedom for electrical routing



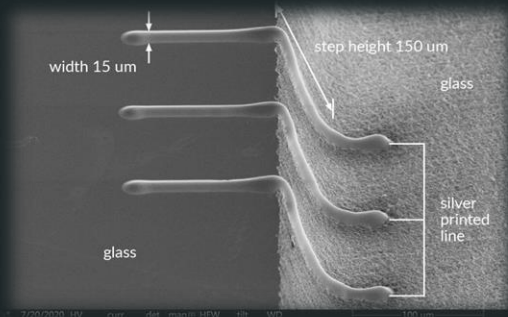
03 Additive Electrification : Merging Technologies

Additively Manufactured Electronics (AME)

- Integration of electronic functionality into a free shaped formfactor
- Combination of mechanical and electrical requirements by process, material, and especially **Design**
- AME comprises the field from Chip Level to bigger system applications



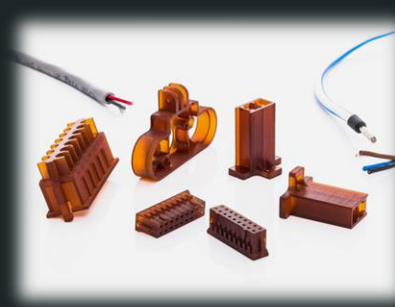
By J.A.M.E.S



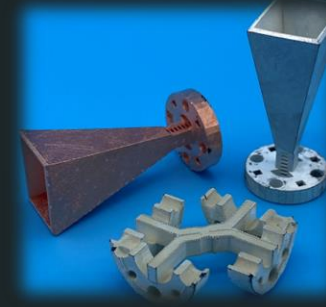
By XTPL



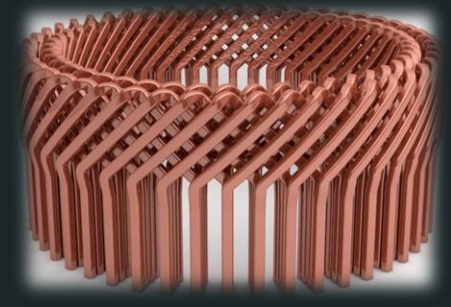
By FhG IKTS



By Cubicure



By Golden Devices



By Additive Drives

04 Methodology of “3D Wiring”

Breaking electronic performance limitations by Design

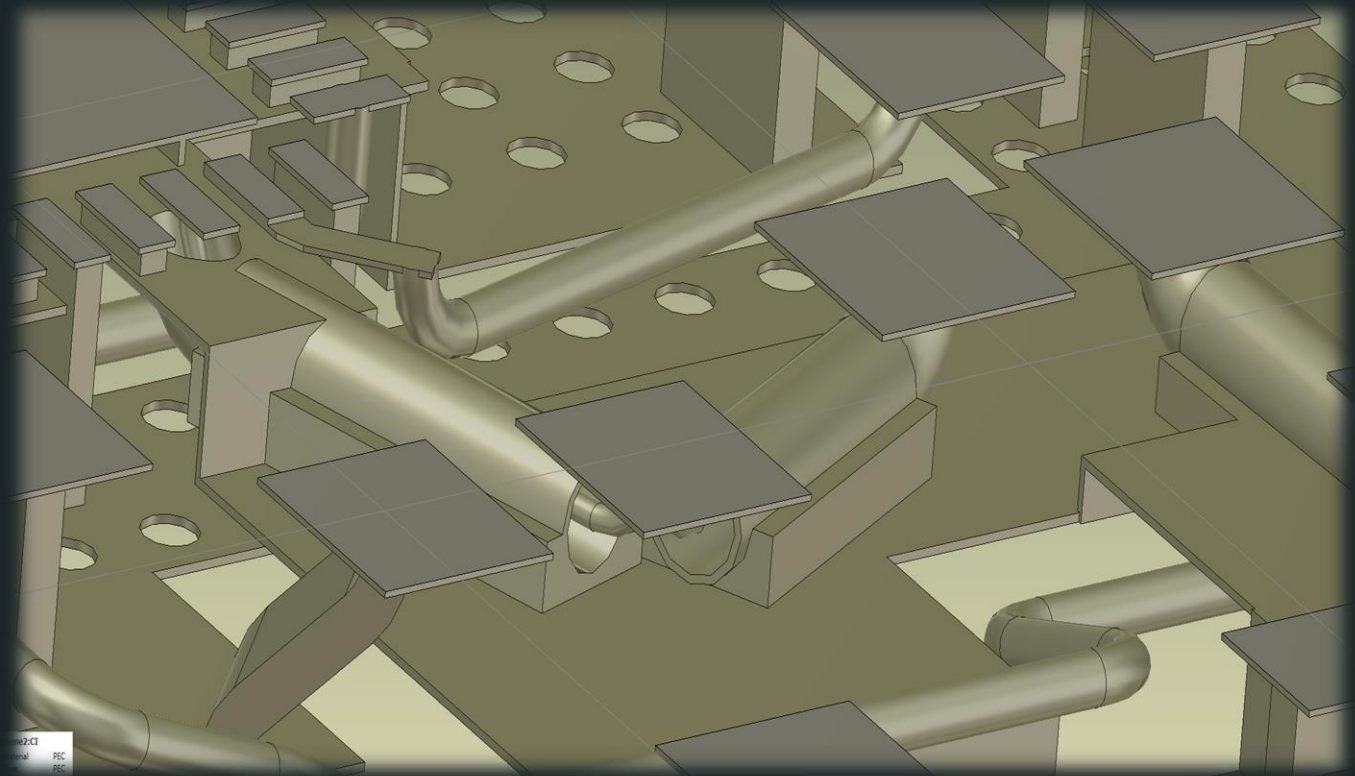
Talk about

- Blocked Space
- Unwanted crosstalk
- RF-reflections
- Signal integrity/latency

- Weight
- Placed interfaces
- RF-cabeling

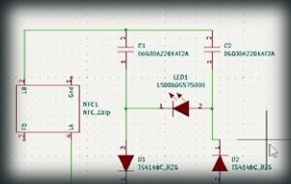
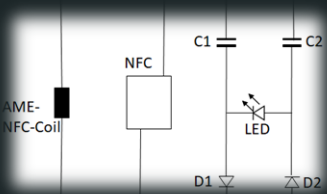
- Manual cabling/tuning
- Power efficiency
- Installation space

- Individualisation
- Security issues

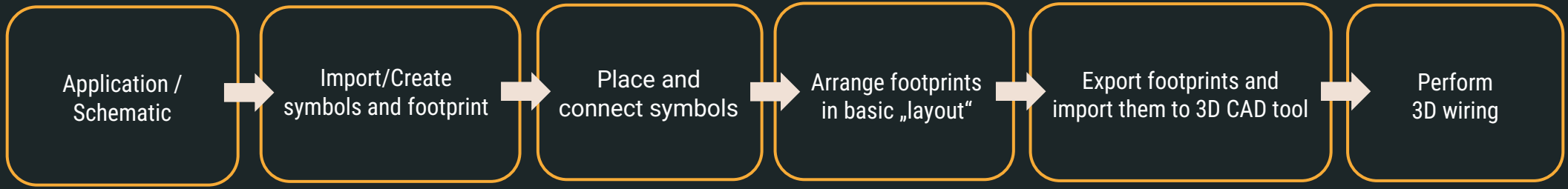
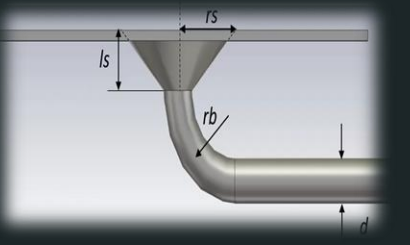
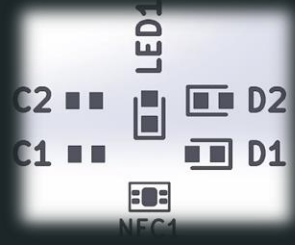
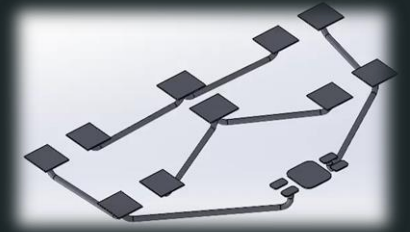
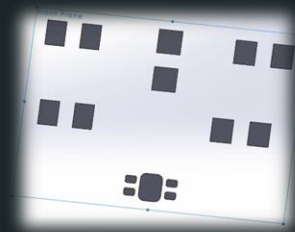


05 Design Process and Features

- Educational design example **J.A.M.E.S** Coin (Near field communication Tag)
- Process from schematic to **AME** design



Can I print C1, C2 ?

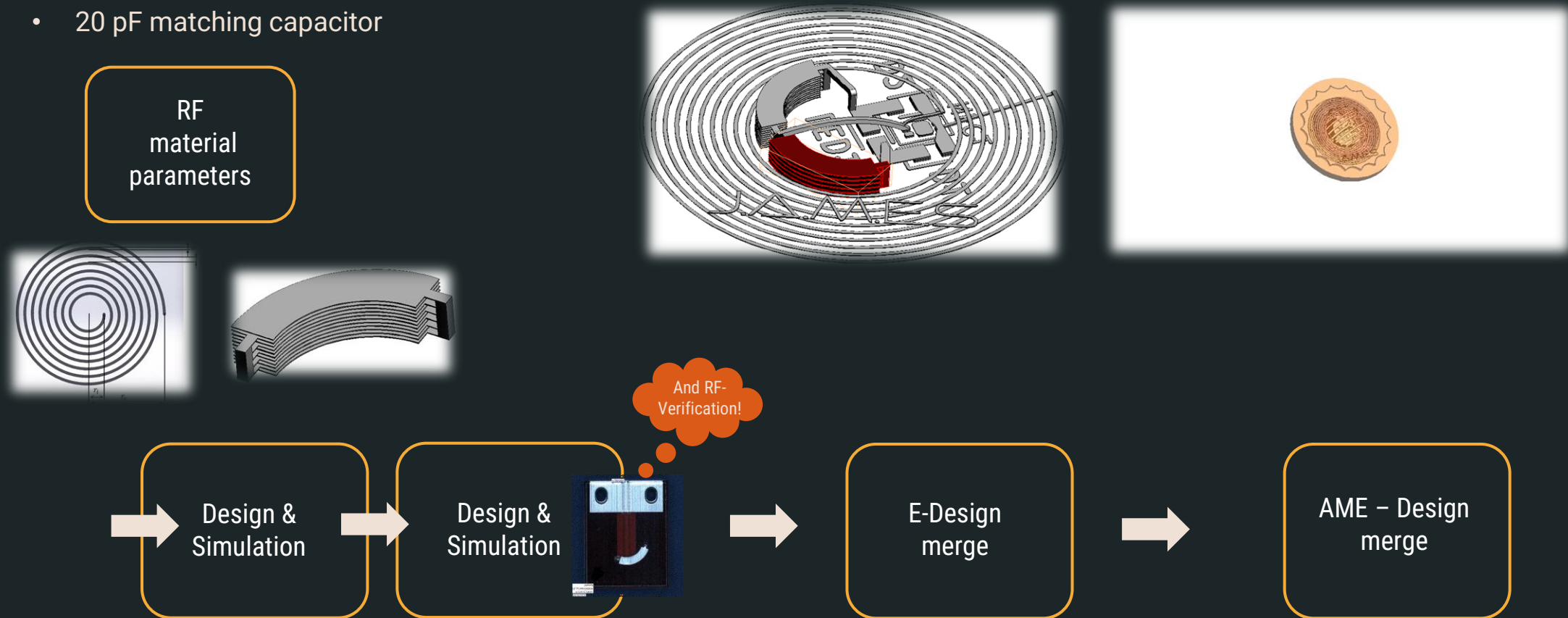


05 Design Process and Features

Design of printed components

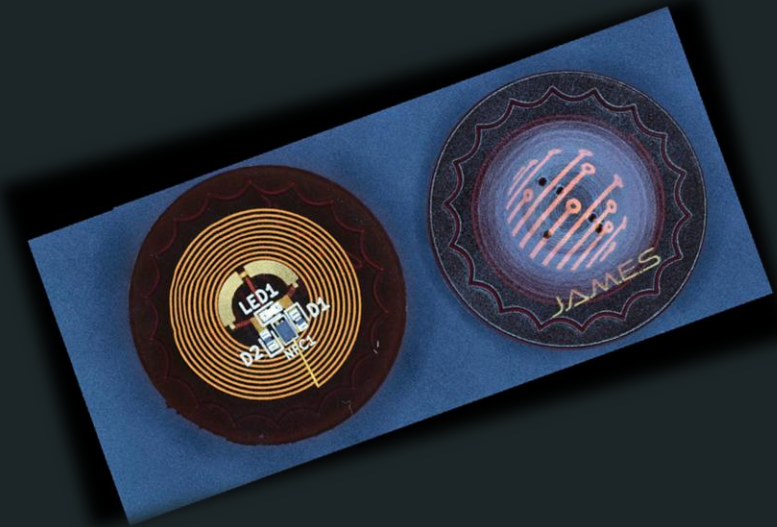
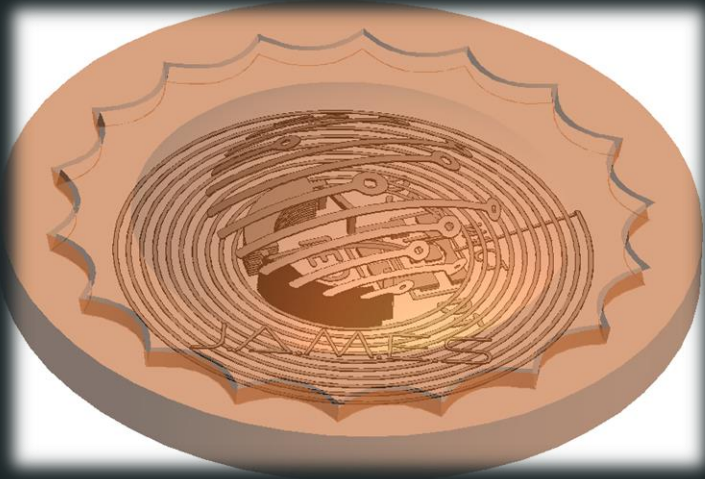
- NFC antenna coil for 13,56 MHz
- 20 pF matching capacitor

and merging to complete AME-Application



05 Design Process and Features

Educational Design "J.A.M.E.S Coin NFC on AME print C"



06 System Designer Viewpoint

Education
of
How to **AME**

3D printing Processes
Materials

Portfolio &
Fundamentals

By Process Owners

Know-how Database

Direct Link to
the **experts**

From
Academia and
Forum Users

Requirement

Searching for Additive Solutions,
Mechanical & Electrical Issues

07 Outlook

- Changing the mindset of design and manufacturing
- Increasing demands will help to drive TRL to a useable product level
- **J.A.M.E.S** provides an ecosystem to bundle AME know-how from one hand
- **J.A.M.E.S** invites you to participate and increase the readiness level of **AME** up to a concrete product streamline

Thank You



J.A.M.E.S