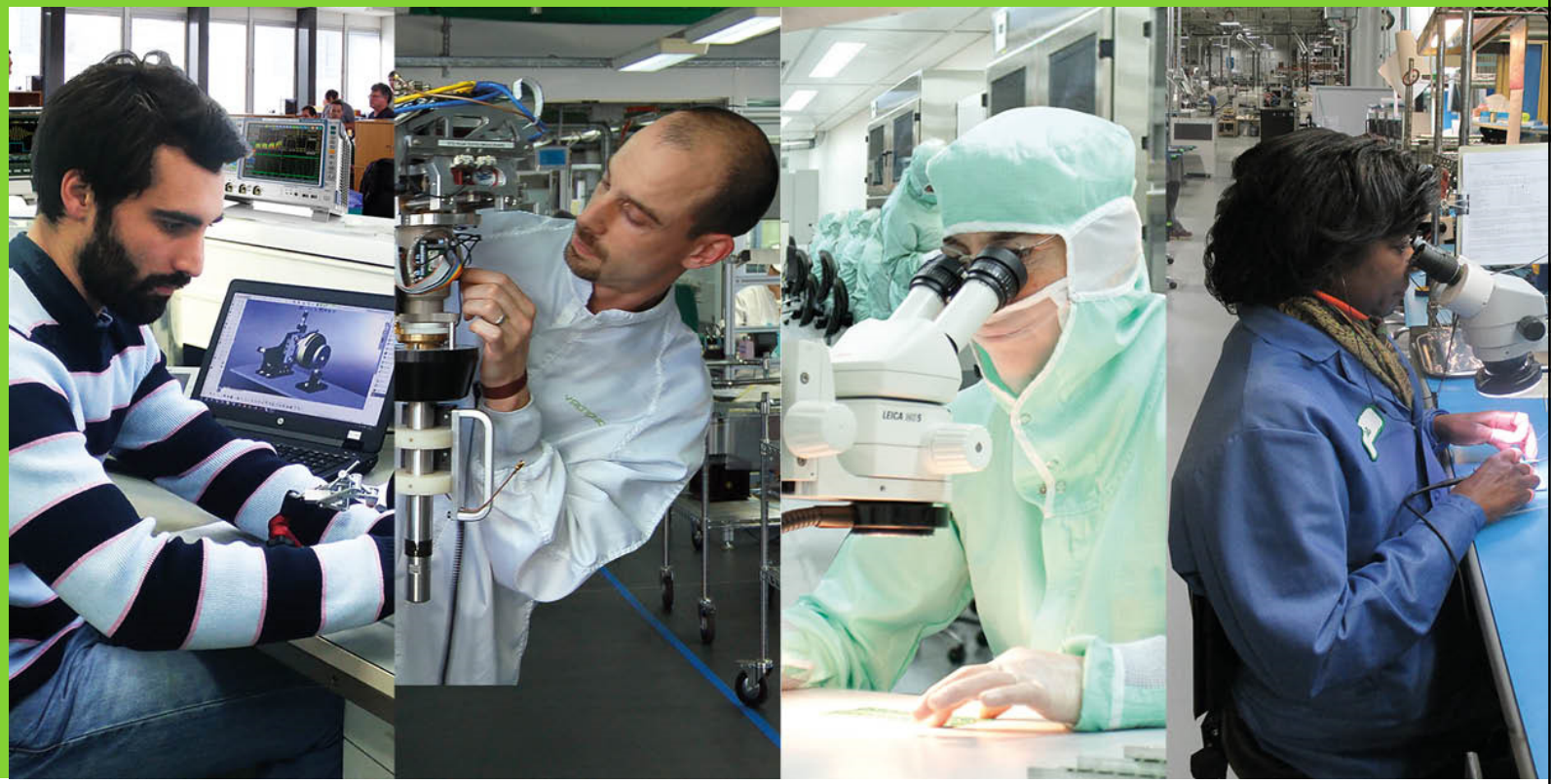
# GUIDING INNOVATION TO SUCCESS

**Smart electronic developments to avoid hidden expenses**



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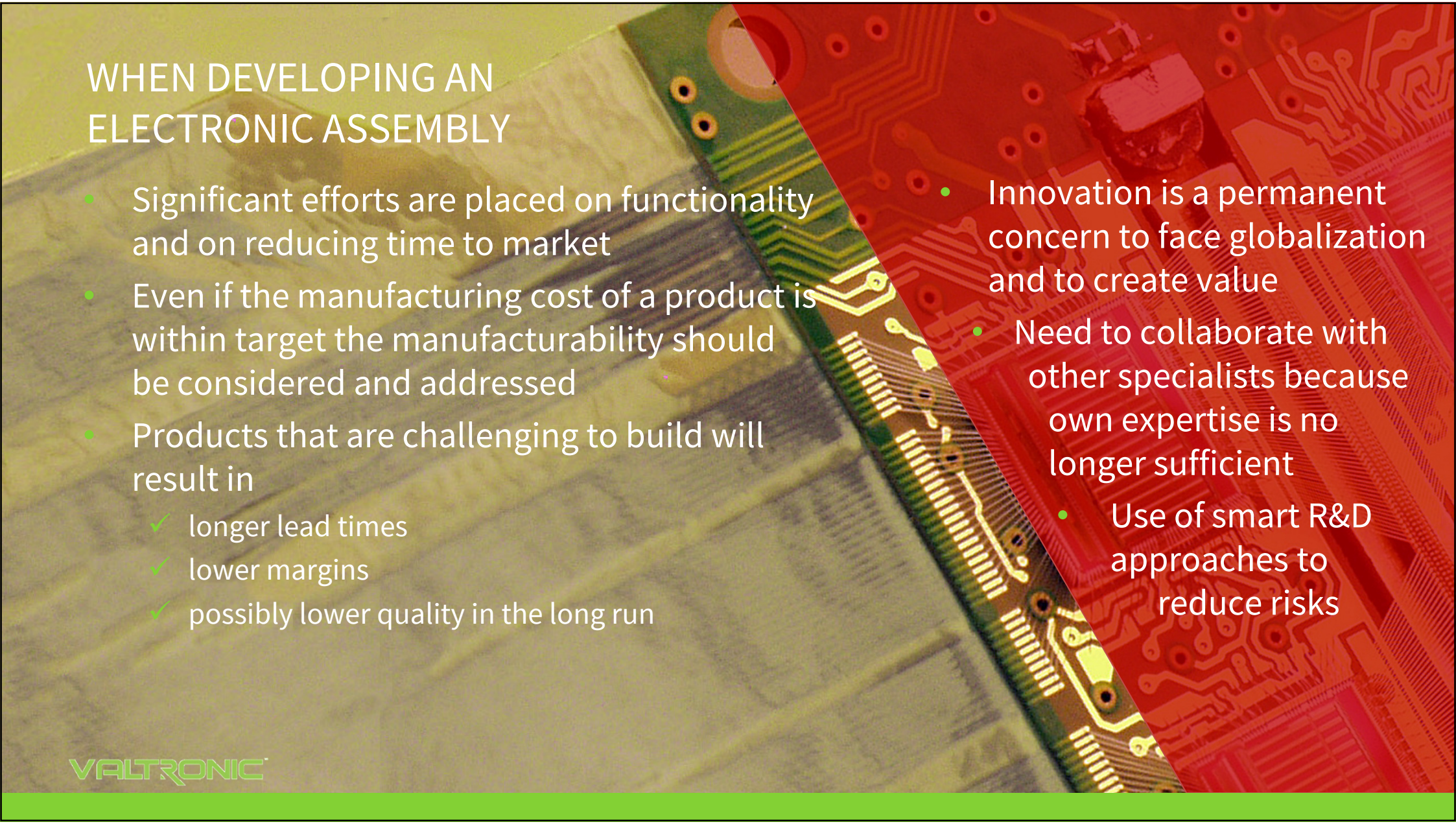
# VALTRONIC GROUP KEY FIGURES

- We develop, industrialize and manufacture miniaturized medical devices
- R&D and Manufacturing sites: Switzerland, Morocco and USA
- More than 1’000 projects since its creation in 1982
- R&D Specialists for Class I to III devices
- 350 qualified employees worldwide
- More than 70 skilled Engineers
- ISO 13485 + FDA registered
- 25’000 $m^2$ Manufacturing
- 540 $m^2$ cleanroom
- Swiss Group

# WHEN DEVELOPING AN ELECTRONIC ASSEMBLY

- Significant efforts are placed on functionality and on reducing time to market
- Even if the manufacturing cost of a product is within target the manufacturability should be considered and addressed
- Products that are challenging to build will result in
  - ✓ longer lead times
  - ✓ lower margins
  - ✓ possibly lower quality in the long run



- Innovation is a permanent concern to face globalization and to create value
- Need to collaborate with other specialists because own expertise is no longer sufficient
- Use of smart R&D approaches to reduce risks

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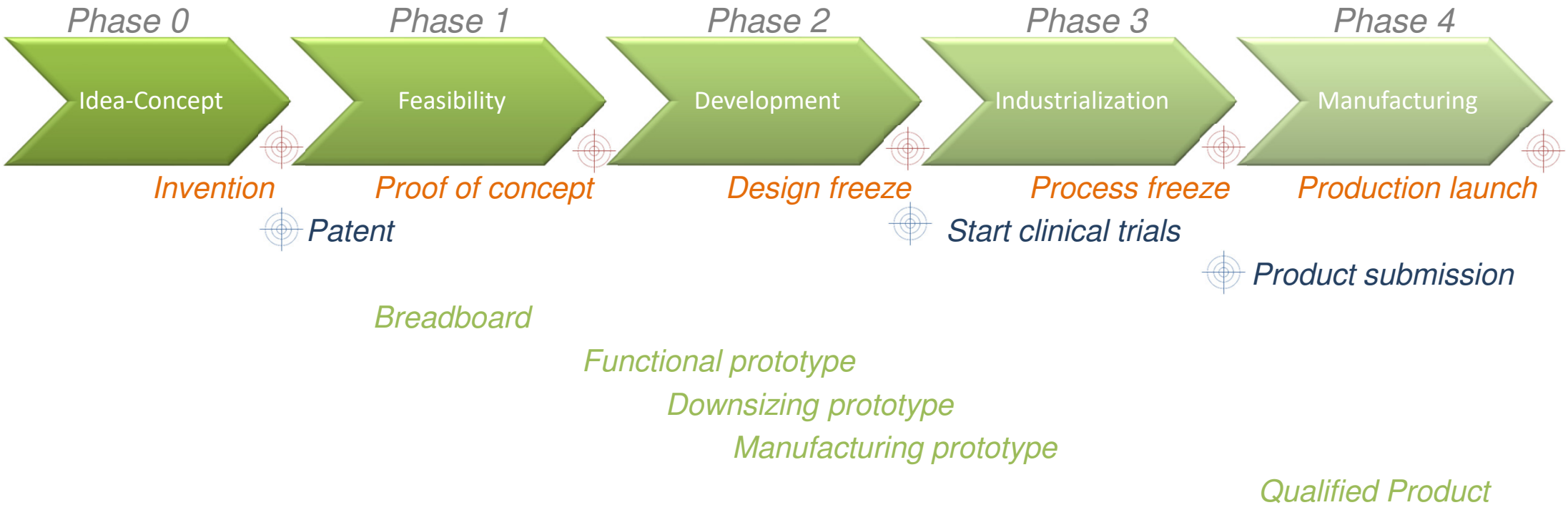
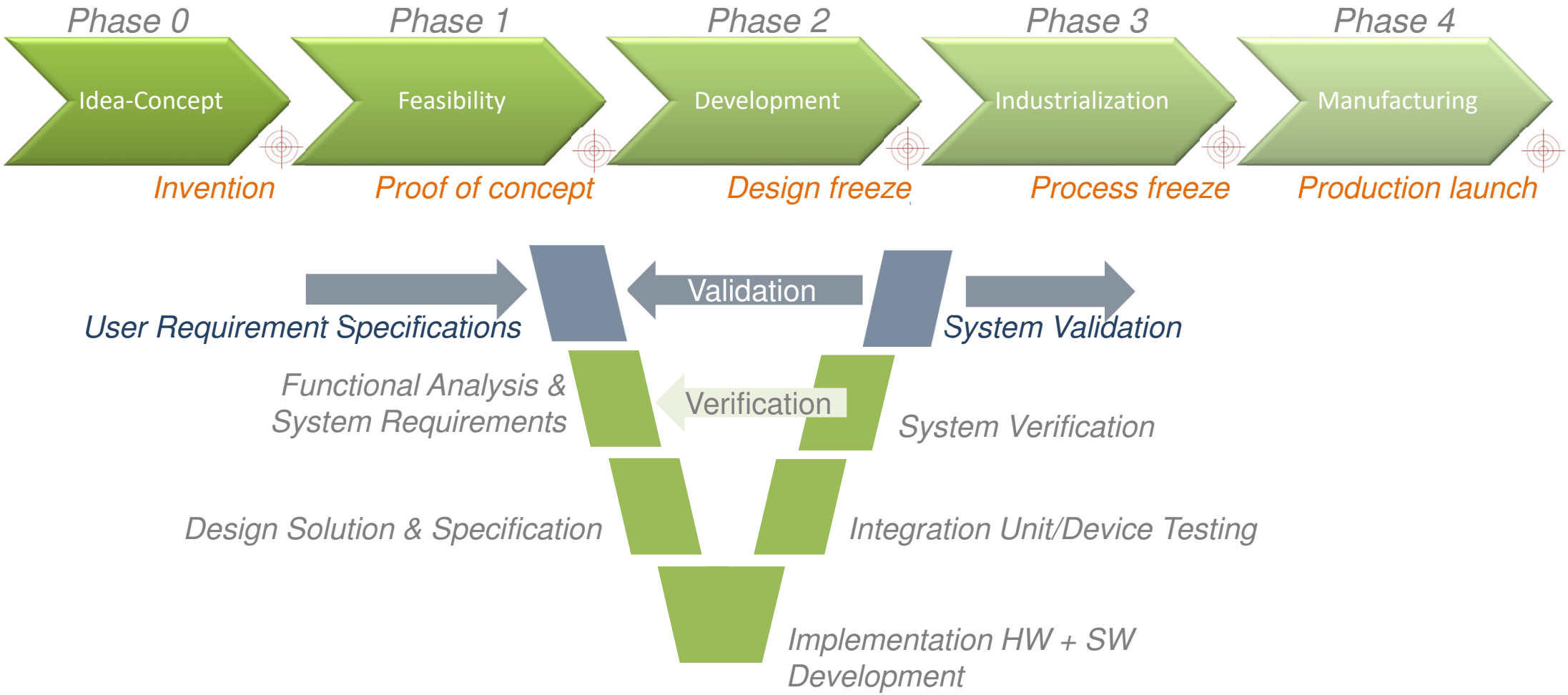
# THE IDEAL PATH
# FOR ELECTRONIC BOARD DEVELOPMENTS



# THE IDEAL PATH
# FOR ELECTRONIC BOARD DEVELOPMENTS



# 2. WORK HARD ON SPECIFICATIONS

- Make breadboards/proof of concept specific to critical technical technological functions
- Set the different levels of design inputs, namely User Requirement Spec, Functional Spec, Design Spec.
- Integrate manufacturing constraints at the time of miniaturization and product integration
- Do not miniaturize too quickly until the critical functions are debugged

*Compliance monitoring of single use injector*

- *Detection of the skin contact*
- *Precise measurement of the doze injected*

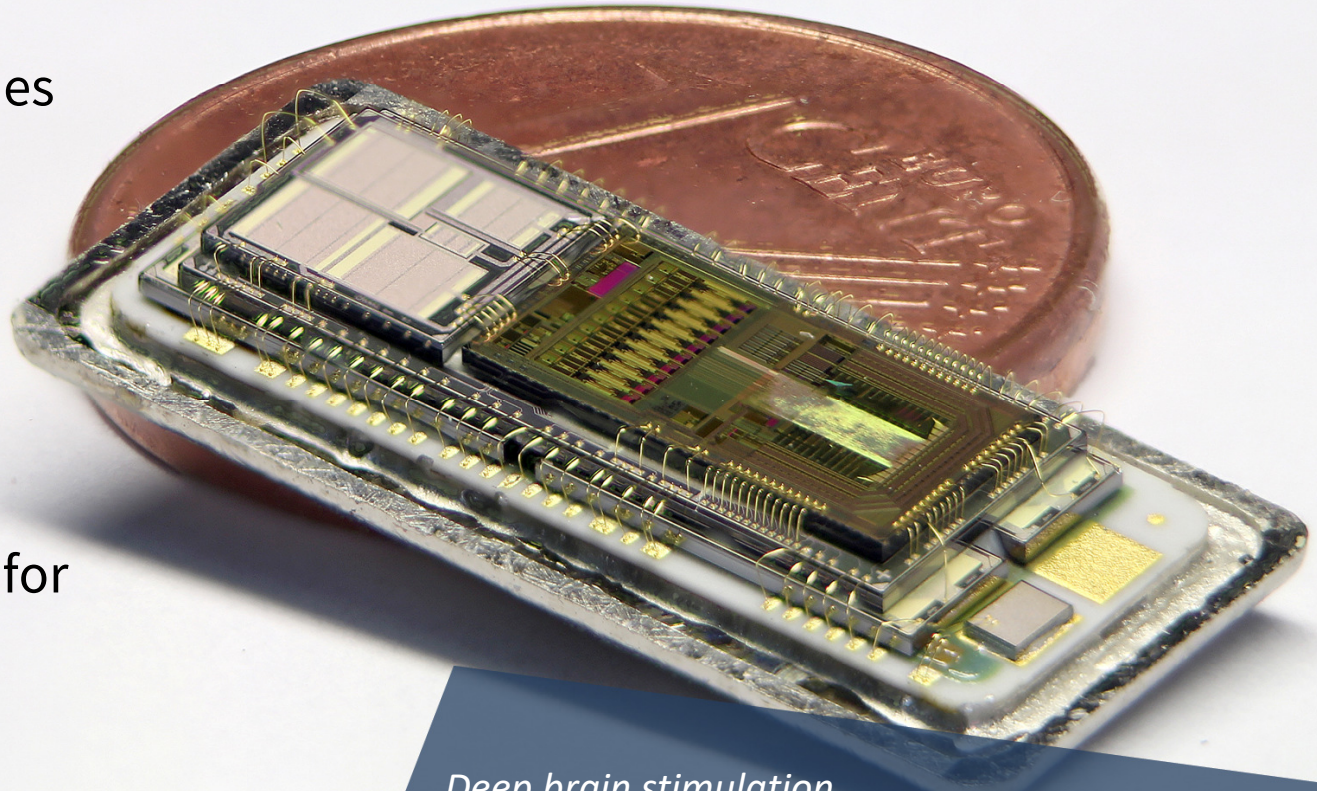
# 3. AVOID OVER TOLERANCES

- Tolerances should be only as tight as needed to ensure functionality of the product
- Direct correlation between tight component tolerances and costs
  - ✓ Similar to mechanical parts
- If your electronic design can tolerate 5% or 10% resistors, do not specify 1%
- A good Electronic Contract Manufacturer will build according to its customer's requirements to meet the tolerances of their finished product

*Implantable Glucometer*
- *Energy and data via RF induction*
- *Lifetime 3 to 6 months*

# 4. AVOID MIXED ASSEMBLY TECHNOLOGY

- Don’t mix different technologies
  - ✓ SMT and thru-hole components
- Always look to minimize hand component placement and other secondary manual operations
- Use mixed technology mainly for undeniable advantages
  - ✓ Miniaturization
  - ✓ To avoid circuit board copy



*Deep brain stimulation*

- *Can be connected to 40 channels*
- *13 components including 8 dies*
- *4 level of stack (CoC, FCoC…)*

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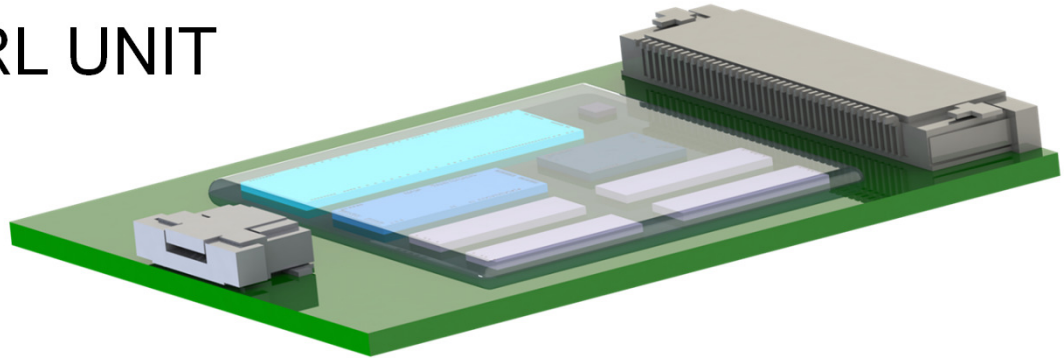
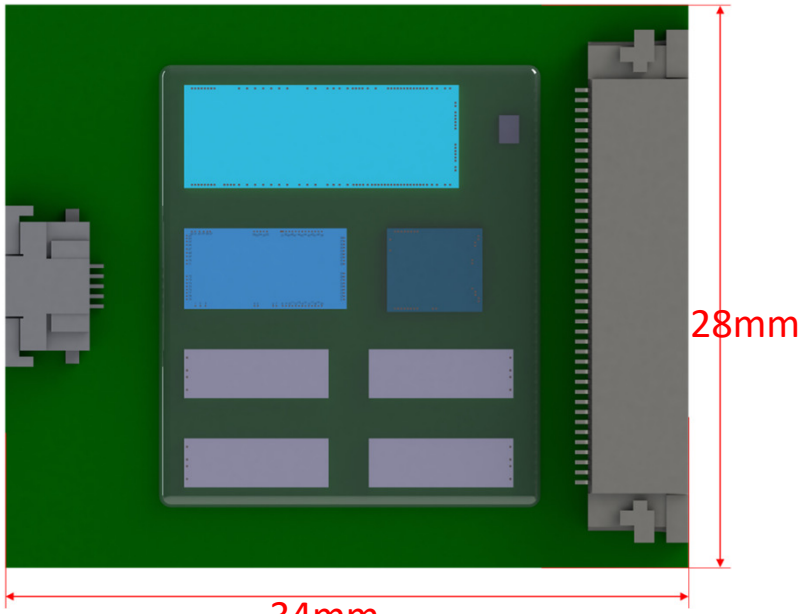
# CASE STUDY
# DEEP BRAIN STIMULATION CTRL UNIT



## Standard approach :

- ✓ Use flat rigid substrate
- ✓ Use standard bonding and connection process (connectors)
- ✓ Use Glob top or dam & fill technologies
- ✓ Realize electrical test with standard technology
- ✓ Put everything into Titanium package

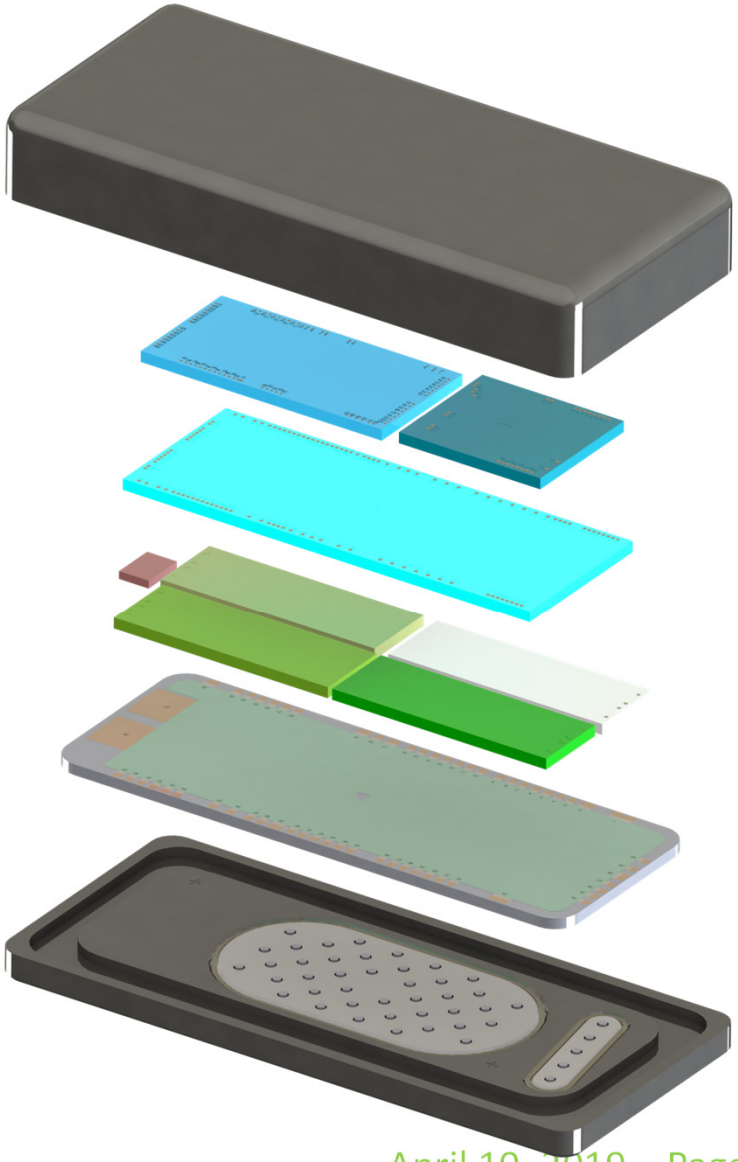



## Obtained result:

- ✓ 34mm*28mm surface needed = 952mm$^2$
- ✓ 4.35 mm thick = 4'141mm$^3$

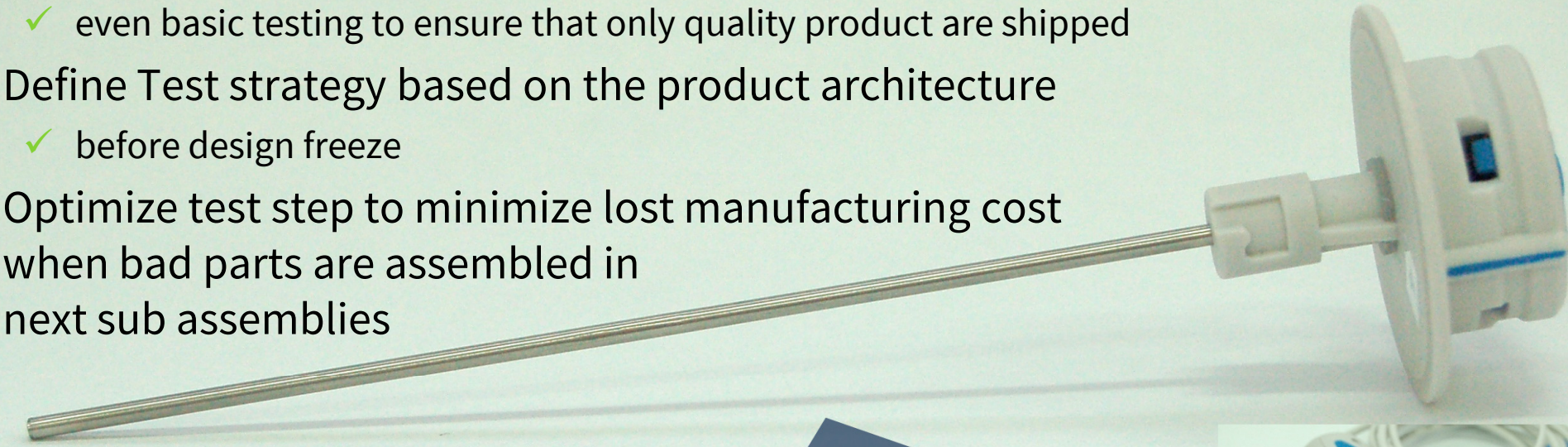
# TECHNOLOGIES & PROCESSES
# HIGH DENSITY 3D STACKING-DIES

- Electrical test
- Ti casing with no globtop (laser welding)
- Wire bounding on 4 different levels
- Main ASIC
- Memory with specific underfill process
- ASIC with layer
- Using different epoxy glues
- ASIC with integrated capacity
- Ceramic with filter layers (glued flip chip)
- Case in Ti with feedthrough ceramic



# 5. ELECTRICAL TESTING

- All devices should be electrically tested at the location of build
  - ✓ even basic testing to ensure that only quality product are shipped
- Define Test strategy based on the product architecture
  - ✓ before design freeze
- Optimize test step to minimize lost manufacturing cost when bad parts are assembled in next sub assemblies



- Electrical test can be based on
  - ✓ electrical test with bed of needles, optical test with AOI, X-ray, flying prob…
- Functional test at sub assembly level

*Disposable arthroscope*

- *Camera CMOS of 1 mm$^2$ on the tip*
- *LED on the re-usable part*
- *Soft recognition if disposable part already used*

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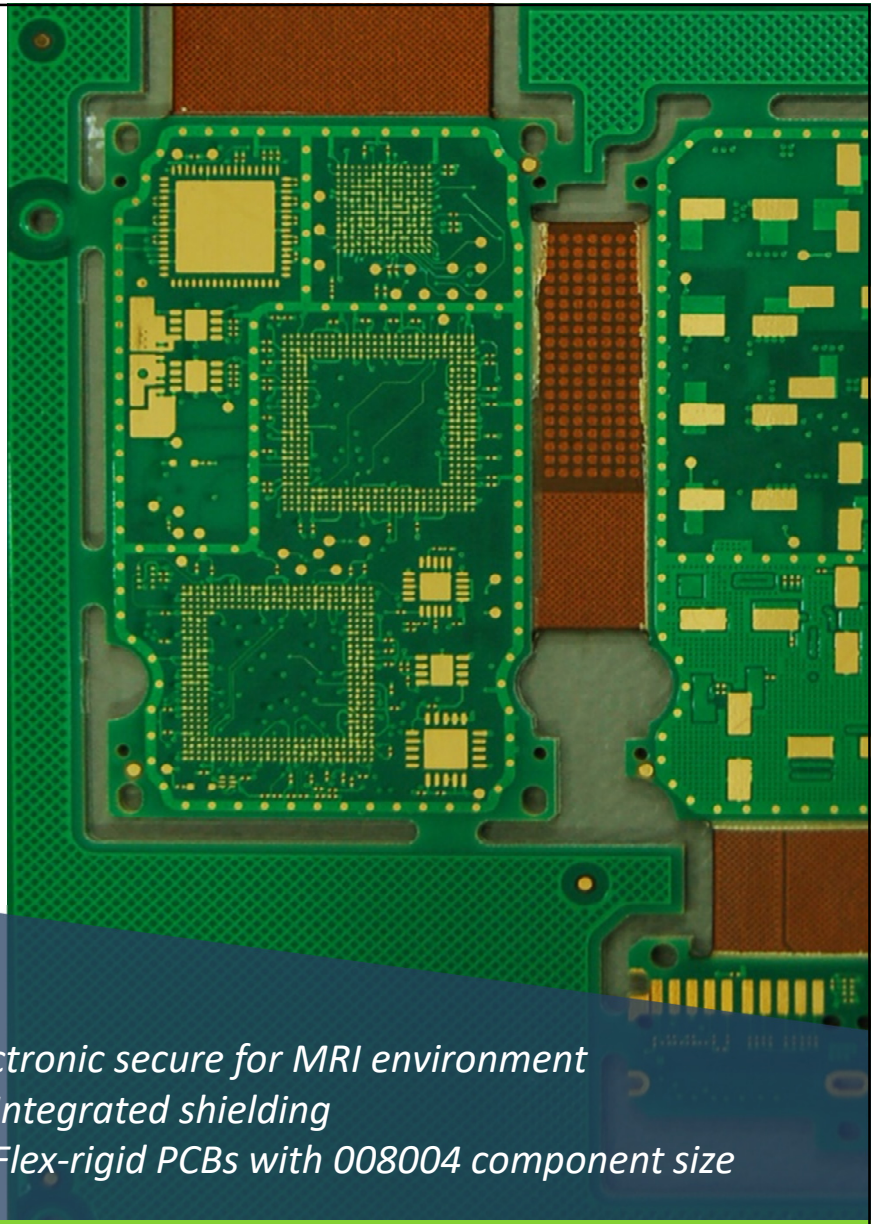
# 6. ELECTRONIC COMPONENT PLACEMENT

- Follow IPC standard for conception and manufacturing
- Make strict correlation between design and manufacturing process
- Verify product quality with qualified tooling
  - ✓ Tooling are designed accordingly
  - ✓ Theoretical verification based on 2D Drawings
  - ✓ Functional verification with real parts
  - ✓ Functional validation with operators in manufacturing
  - ✓ Make few iterations if necessary



*Electronic secure for MRI environment*
- *Integrated shielding*
- *Flex-rigid PCBs with 008004 component size*

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# 7. COMPONENT SOURCING

- Components should be chosen with multiple alternatives available
  - ✓ allowing for competitive sourcing
  - ✓ elimination of minimum order quantities
  - ✓ improve lead time
  - ✓ allowing for substitution of available components without requiring significant additional testing or approvals
- Proactive obsolescence management
  - ✓ before design freeze


*Ultrasound treatment robot*

- *For diagnostic and treatment*
- *More than 1000 different components*

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# 8. DESIGN REVIEW BY AN EXTERNAL SPECIALIST

- Helps to avoid mistakes before design freeze
- Gives a valuable input from a specialist
- Integrates also the manufacturing constraints
- Includes the testing functions during manufacturing steps

*Smart contact lense*

- *Pressure monitoring during 24h*
- *Energy and data transfer through RF induction*

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Need more information ?
Contact Mr. Patrick von Meiss
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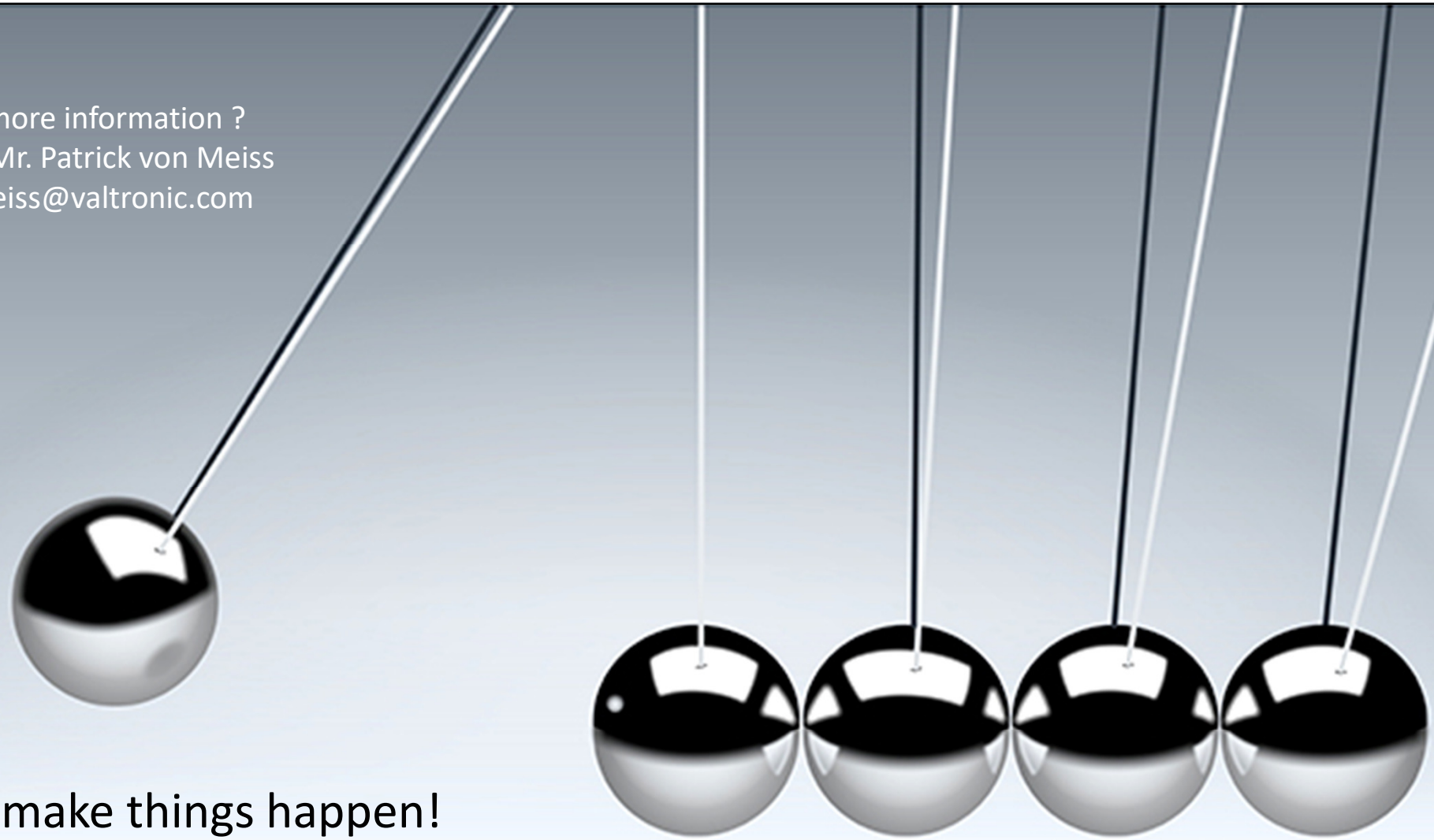

Let’s make things happen!

Together we can achieve much more

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