



E-REON ENGAGES ANSYS IN RF-ENERGY PRODUCT DEVELOPMENT

"A journey of a thousand miles begins with a single step."
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Preface

- In RF and Microwave Engineering, power components and systems hold a unique position. The main reason for this comes from the design restrictions of a device that is operating in frequencies where its physical and electrical dimensions are comparable.
- For High Power Applications in industrial and military markets, tubes (both vacuum and electrode ones) were providing the High Power Amplification for almost one century now. In the 60s the technology of vacuum tubes (magnetrons) found application in the commercial market (in microwave cooking) and till today it is the only RF energy source used in this kind of application due to its low cost and efficiency.
- Over the last decade, semiconductor processes and technologies were improved dramatically, and as a consequence, the idea of the REPLACEMENT of magnetron's with RF TRANSISTORS gains more attention from the Appliances Manufacturers.

Scope

A potential new market for **Solid State RF Power Devices** appears on the horizon.

The generation of RF Power Amplifiers for commercial applications

Introducing a device so far strictly correlated with Telecom Infrastructure, Broadcast and Defense/Aerospace applications into the commercial market and in addition changing the mindset of RF power system developers towards a direction that is contradictory with their norms of working is considered more than a challenge.

RF ENERGY ALLIANCE



□ A non-profit technical association comprised of companies dedicated to realising solid-state RF energy's true potential as a clean, highly efficient and controllable heat and power source.

Contributor Members



SOMETHING NEW IS GOING TO HAPPEN

 E-REON is a RFPA SOLUTION PROVIDER, that understands BOTH:

- **Semiconductor Technology** and
- **Appliances Manufacturer Requirements**

APPLIANCES
MANUFACTURER



 E-REON
RFPA SOLUTION PROVIDER

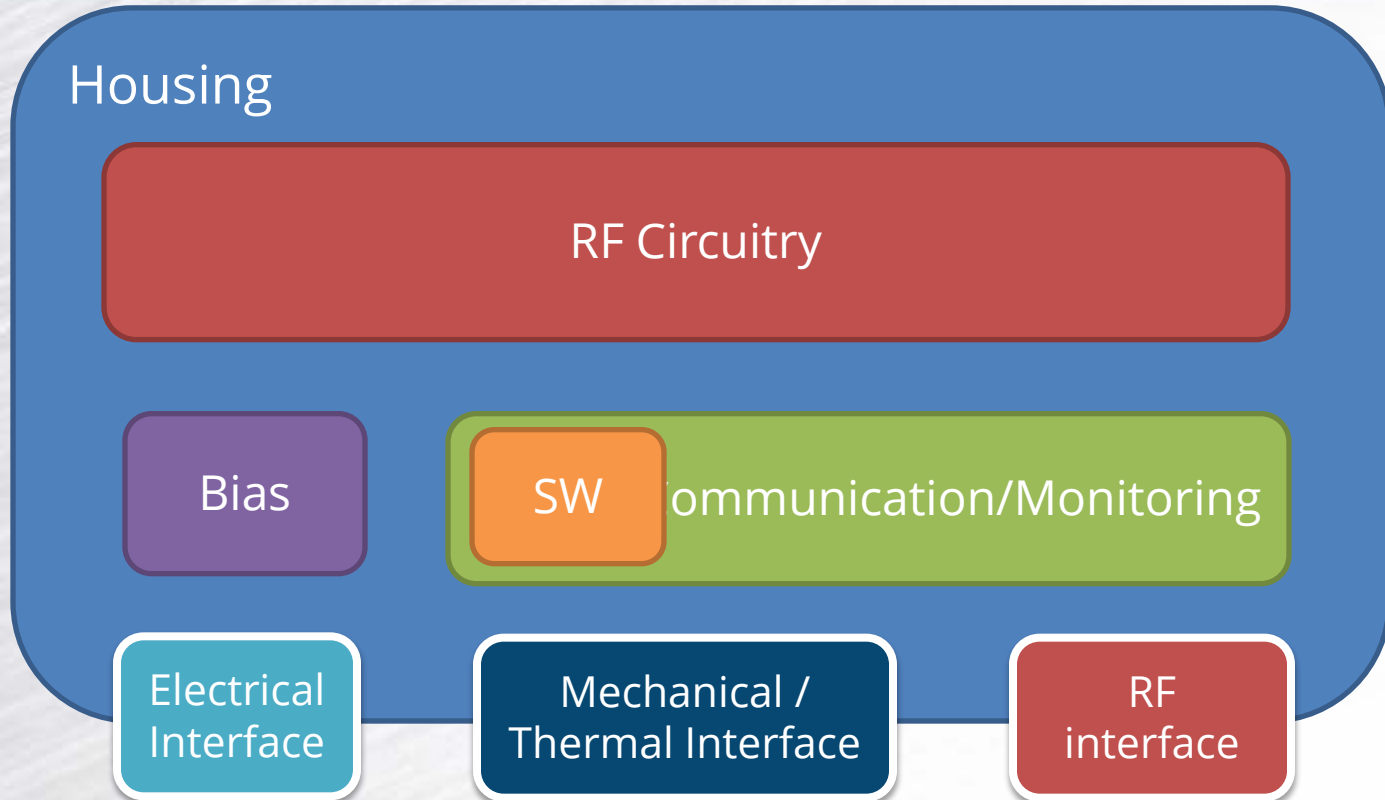


SEMICONDUCTOR
TECHNOLOGY
PROVIDER

Key Subjects of this Presentation

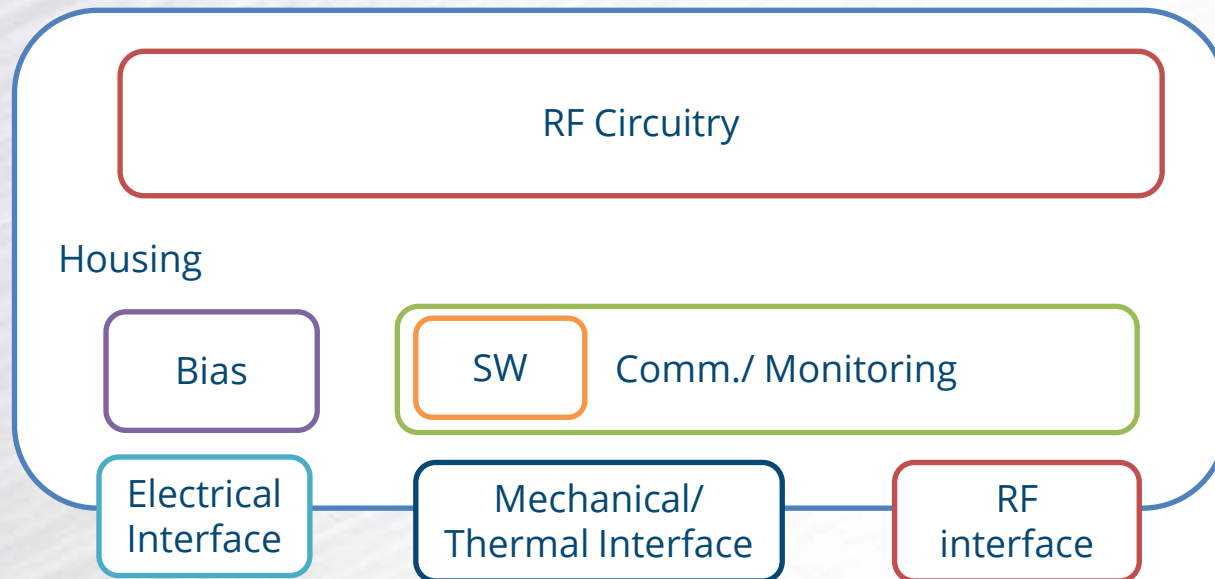
- In this short presentation we will try to outline all the difficulties and obstacles that the development of power systems for RF-Energy applications entails.
- We will explain why the Multiphysics capabilities of Ansys Software make it ideal for RF-Energy applications .

RFPA Building Blocks



Operation Environment of a RFPA

- Interfaces in D/A, Industrial are following basically the same principles.
- In Commercial applications, some major differences are:
 - Non 50 Ohm loading
 - Limited Cooling Capability
 - Customization of RF Interfaces (connectors etc.)



Challenges

- As seen till now:
 - A RFPA for the Commercial Market requires a radically different development approach, compared to Defense/Aerospace and Industrial markets.
 - The RFPA cannot be considered as a “Drop-In” part during its integration into the system (appliance).
 - New technologies should be developed in order to meet the requirement goals of this market segment.

E-REON's Strategic Planning

- **Vision**

- Establish the first company in the Market to provide Hardware Solutions and Integration Services in the area of RF Energy for Commercial and Industrial applications.

- **Mission**

- Develop technology that will promote the usage of solid state power devices and replace current RF Energy sources.

- **Strategy**

- Conquer the market by capitalizing the technological advances gained over the past years, and create the proper synergies to strengthen our position and reputation.



E-REON's Strategic Planning

Goals

- Undertake non core activities from Technology Providers, System Integrators.
- Enhance communication between Component Manufacturers and System Integrators
- Develop products and processes for Mega volume production
- Participate in all phases of product development to maximize experience and value
- Work towards the concept of developing an RFPA that will be a “commodity” in the future

Capabilities Needed for Success

- **Development** of RF and Microwave Components, Modules and Systems (Active and Passive)
- **Design Support Services**
 - ECAD, MCAD, System Design
- **Product Development Support Services**
 - ECAM, ECAE, MCAM, MCAE (In-House)
- **Analysis Services**
 - 3D EM, Signal Integrity, Electrothermal Studies (Fatigue, Thermal Management, Heatsink Design, CFD Studies)
- **Manufacturing Services**
- **Logistics Services**
- **Qualification Services**
- **Project Management Services**

Why Ansys

The ANSYS logo is displayed in white and gold text on a black rectangular background.

- It is the industry leading software that enables our engineers to simulate the interaction among electromagnetics, fluid flow and heat transfer.
 - Advanced electromagnetic simulators
 - Design automation features enable us to import designs from popular layout tools and perform coupled full circuit simulations.
 - Can perform power and signal integrity analysis to minimize crosstalk and evaluate our board's power integrity.
 - Ansys Fluent is the most powerful CFD software, giving the ability to our design team go further and faster

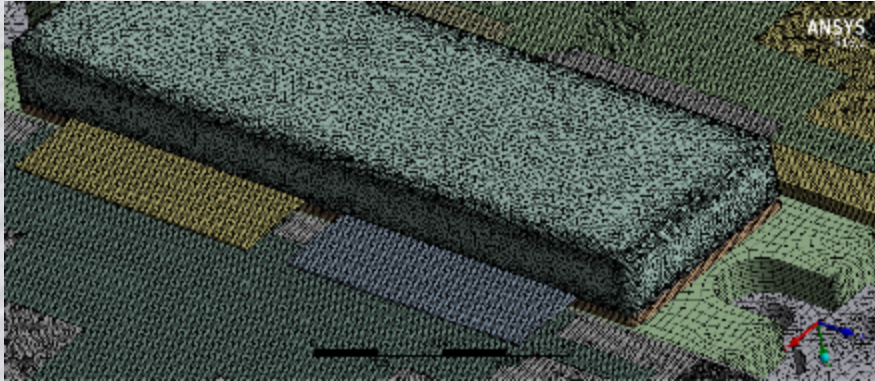
Why Ansys

The ANSYS logo is displayed in a black rectangular box. The word "ANSYS" is written in a bold, sans-serif font. The letters "AN" are white, and "SYS" are yellow. A small registered trademark symbol (®) is located to the upper right of the "S".

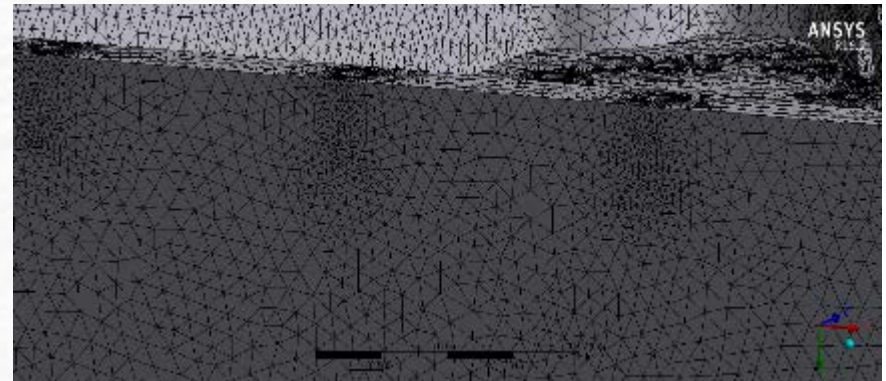
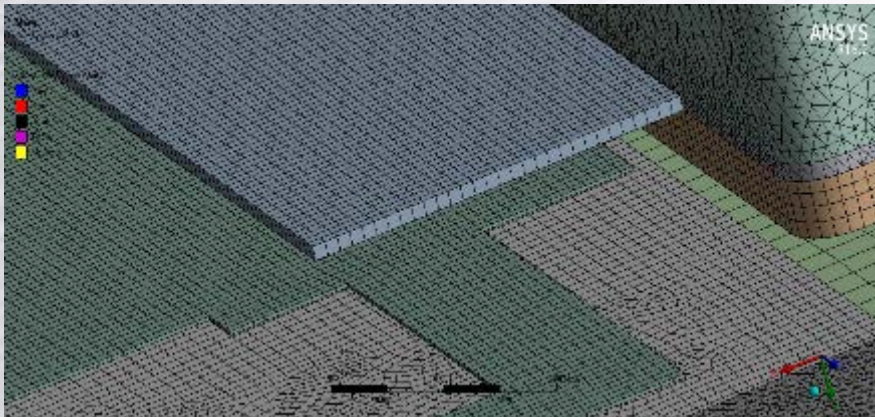
- Broadest and deepest multiphysics capabilities available today, so we can consider the effects of multiple physics on a single component or coupled system.
 - Proven solver technology.
 - Tools for geometry preparation and CAD translators.
 - Advanced meshing capabilities
 - HPC delivers fast accurate results
 - Superior customer support

Ansys For RF-ENERGY

➤ COMPUTATIONAL FLUID DYNAMICS STUDIES

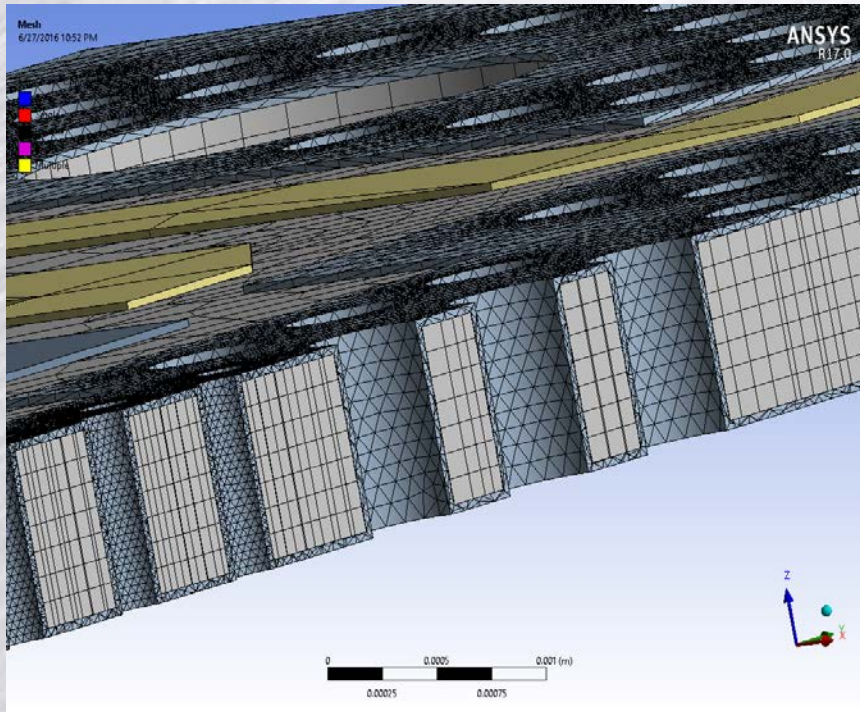


- Exact Models
- Verification And Validation
- Flow Characteristics

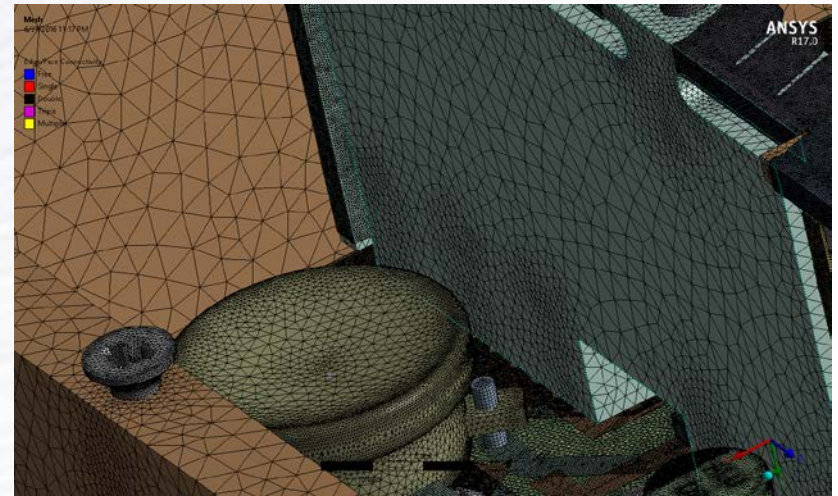


Ansys For RF-ENERGY

➤ Advanced Meshing Technics



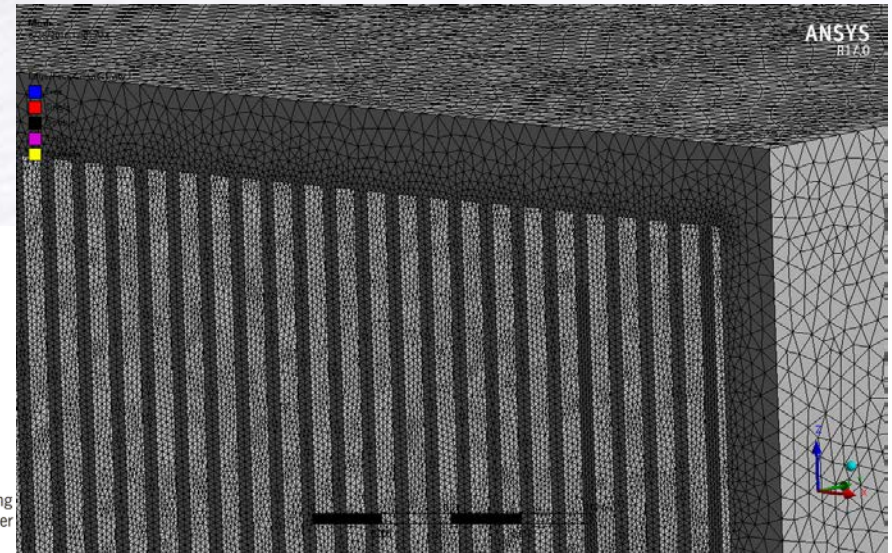
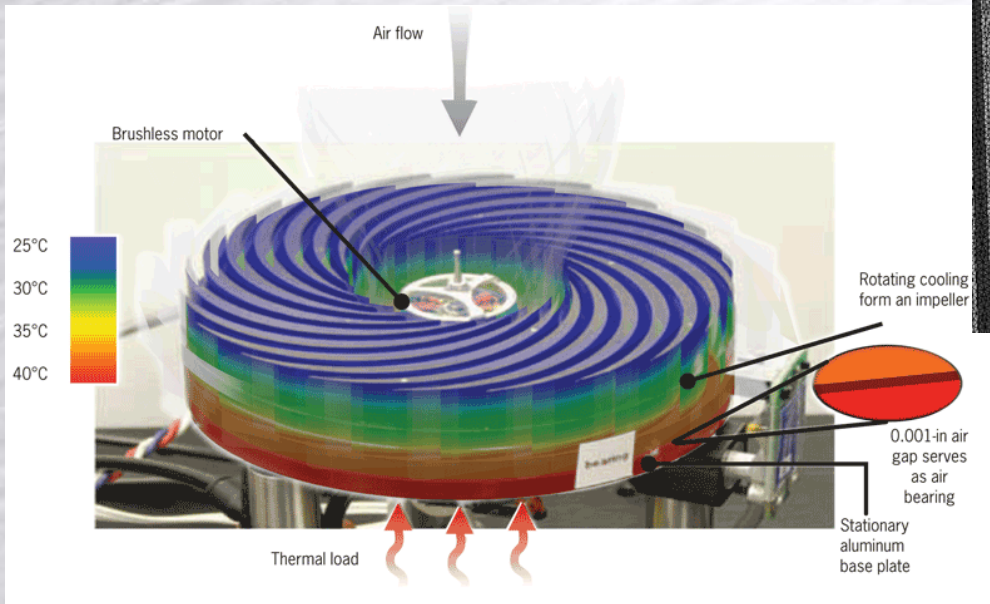
Allow for the thermal vias



Variety of meshing strategies

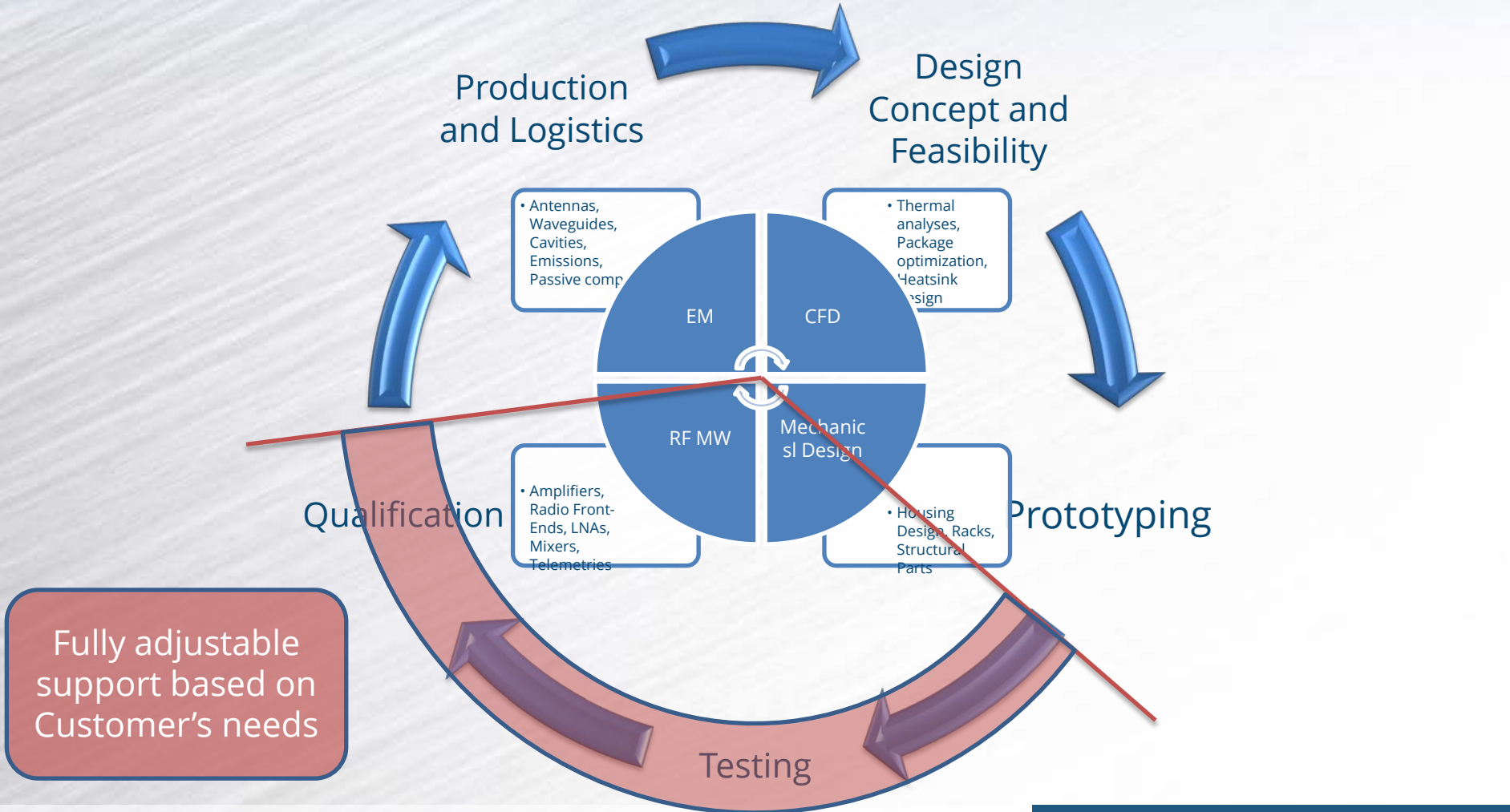
Anslys For RF-ENERGY

- Advanced Cooling Methods
- Sandia Cooler



Optimize heatsinks

E-REON at a Glance



Open Discussion

SOMETHING NEW IS GOING TO HAPPEN



THE POWER IN RADIO ELECTRONICS

22/05/16

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