Analog Processing Units

anabrid

Buisness Summary

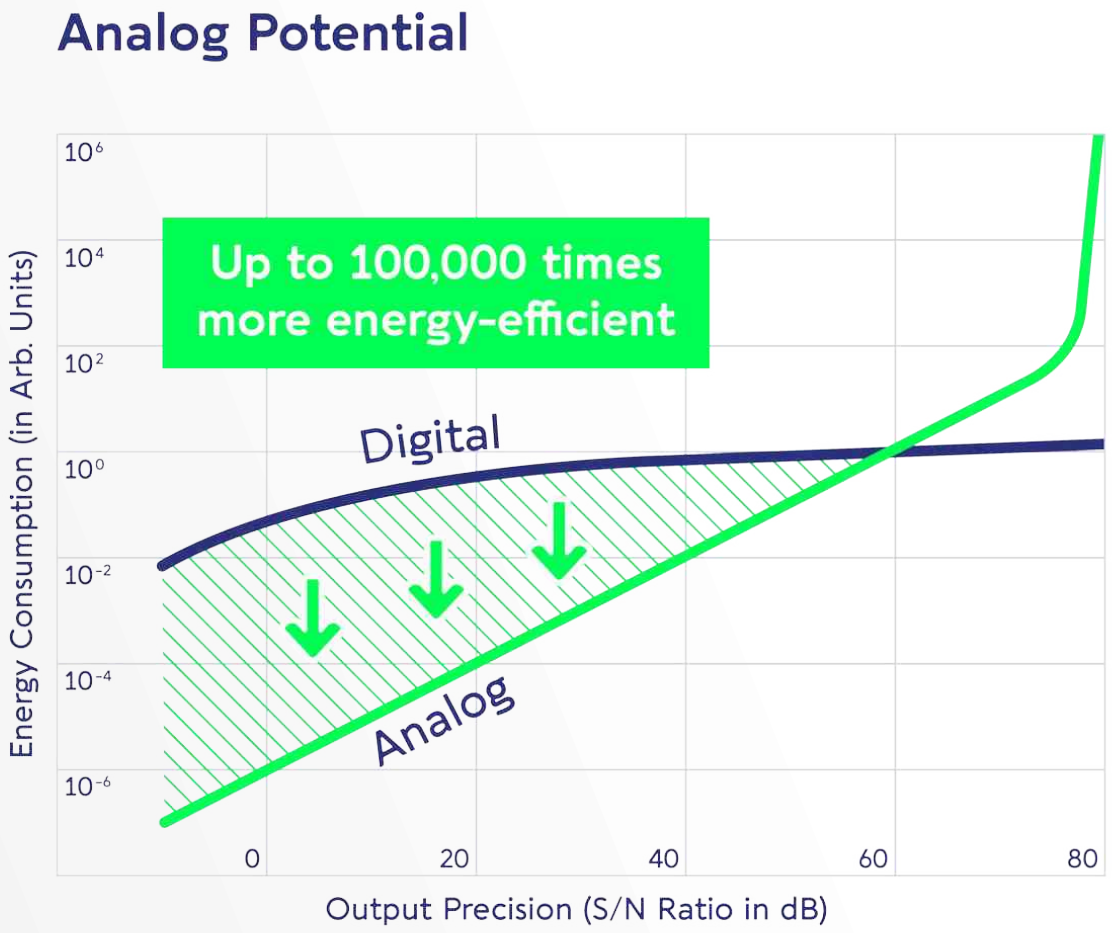
Anabrid is the German deep-tech startup developing future general purpose analog computers (G-PAC) as an alternative to quantum computers.

Problem

Digital will come to a hard stop

Digital manycore architectures and high-performance clusters allow for progress. But the energy price for this is extreme. It is foreseeable that the energy for necessary performance improvement cannot be raised.

Quantum computing will not solve this problem either, as it is even more energy intensive. Only analag computing enables up to 100.000 times more energy-efficient computing.

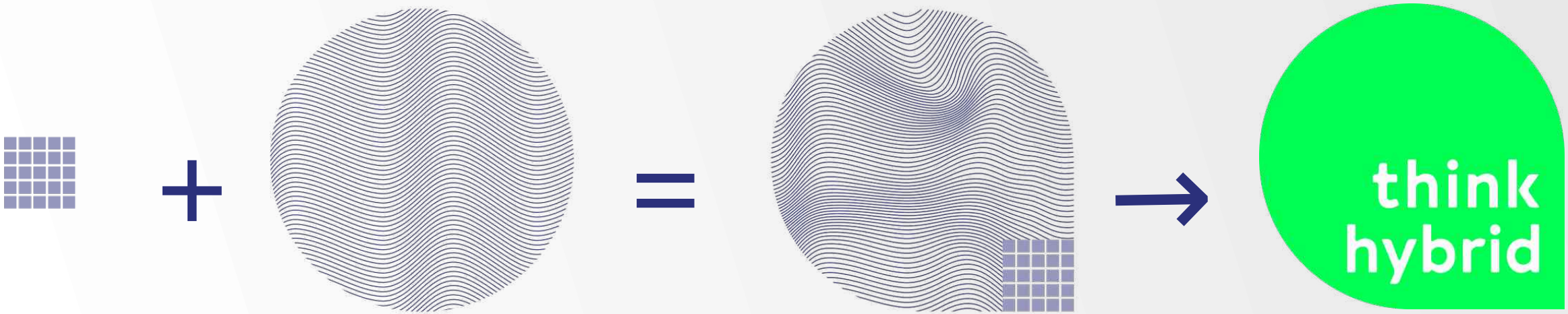


Solution

A Reconfigurable Analog Computer On-a-chip

anabrid is the developer of the latest generation of superfast und energy efficient hybrid analog computers using intrinsic analog advantages of parallel data processing instead of sequential algorithms.

By hybridising both technologies, we transform the powerful but inflexible analog computer into soft ware defined electronics. This results in superior but affordable performance where all computational elements compute continously and simultaneously.



Solution

Hybrid Computers for the Future

analog vs digital:

1,000 x faster

10,000 x less CO_2

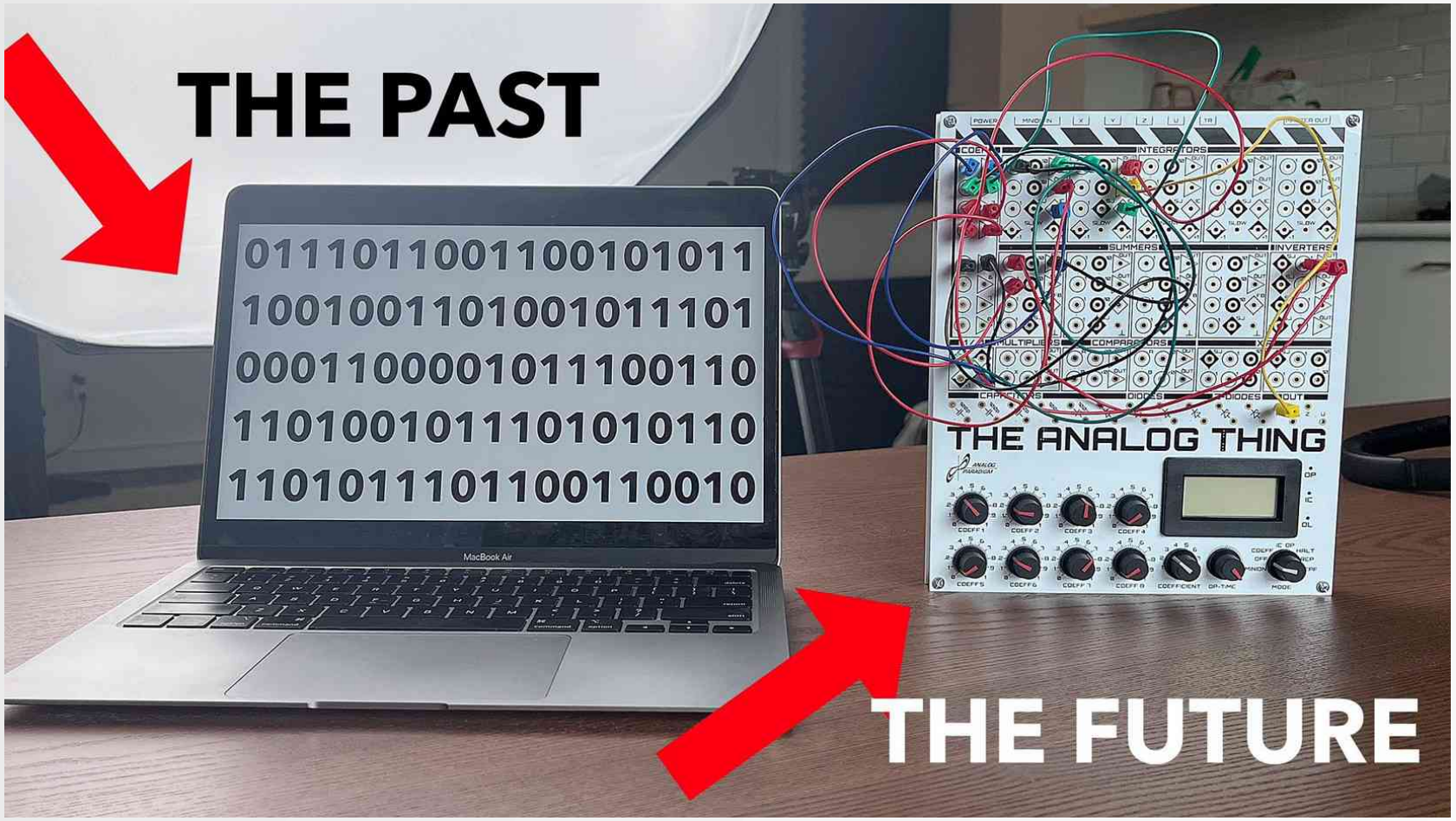
The next generation of computers must enable resilient (offline-first) real-time calculations to meet energy and performance demands at a competitive price.

The digital front end and the open source software library allows, for the first time in high performance analog computing, fast and straight forward implementation of any application that will benefit from (First) a runtime gain of at leat 1,000 while (Second) requiring 10,000 times less energy.

Third, analog computing provides a vast advantage in cyber attack resilience. This is because analog circuits only serve the purpose they were designed for and are difficult and different to manipulate then digital processors.

Solution

Analog gains traction



In recent years, analog computing gained traction as a future technology. This picture shows a still frame from a Youtube video from the Veritasium science channel that got more then 10 Million views. It compares a traditional Macbook with an anabrid product (THE ANALOG THING).

Source: veritasium.com

Team

Decades in Science and Consulting

Founded in 2020, anabrid is based on groundbreaking research in contemporary analog computing.

Dr. Sven Köppel

Quantum Physicist

Prof. Dr. Bernd Ulmann

Specialist for future computing paradigms

Prof. Dr.-Ing. Dirk Killat

Specialist for mixed signal microelectronics

Dipl.-Ing. Lars Heimann

CEO and Business manager

4 Founders

5 Software and Application Engineers

5 Electronic Engineers

4 Business development

Dipl.-Ing. Lars Heimann

CEO and Buisness manager

Value Proposition

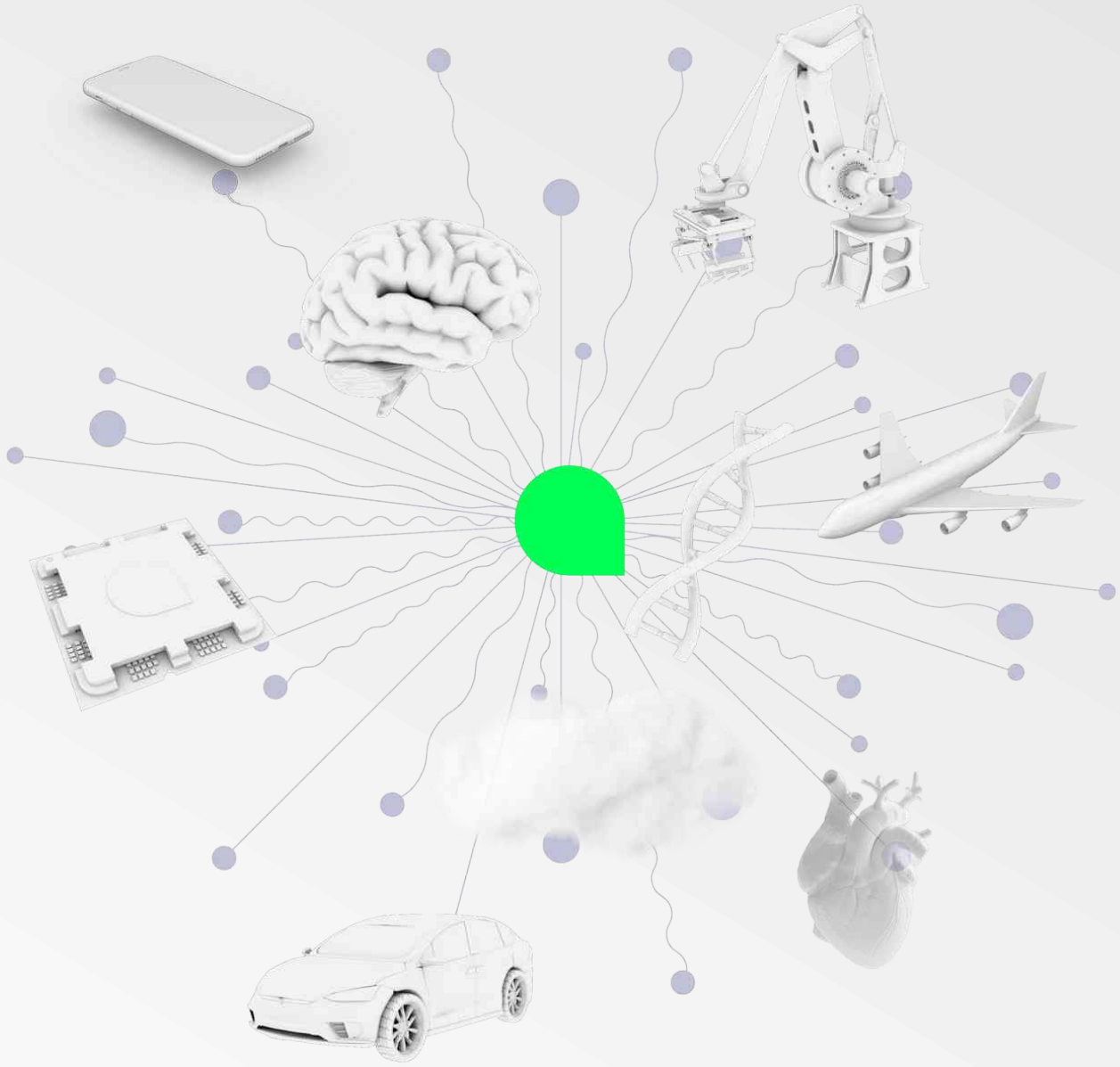
Analog computing beats other technologies by speed, energy and matureness. For many applications such as AI, there are no real alternatives.

Value Proposition

The next NVIDIA: AI Traning with Analog Processing Units

Machine learning, training and interfering of large AI systems is incredibly expensive with contemporary digital systems such as NVIDIA Tensor Processing Cards. Neuromorphic computers can help: Analog systems from anabrid are faster and more energy efficient. In contrast to competitors, we do not set on Flash cells or in-Memory computing. Instead, we are CMOS compatible and can be embedded into any existing digital processor in the world.

This makes analog circuits the perfect technology for demanding integrated systems for prediction and control, in automotive, aviation, robotics, medicine and much more.



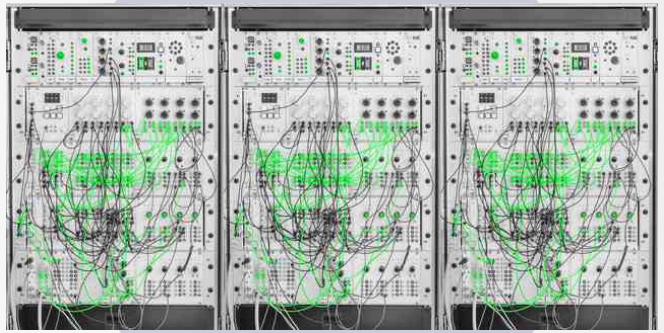
Key products & clients

Anabrid is already selling discrete computers world-wide and now enters the semiconductor market.

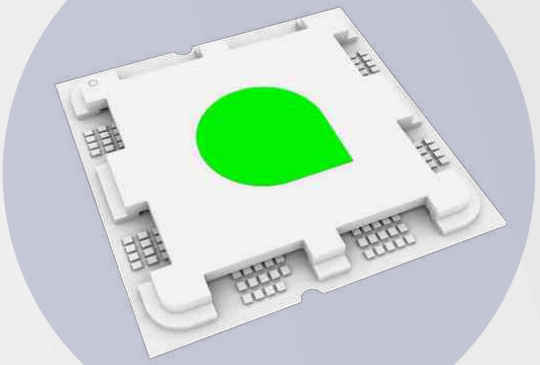
Roadmap

From discrete to integrated chip.

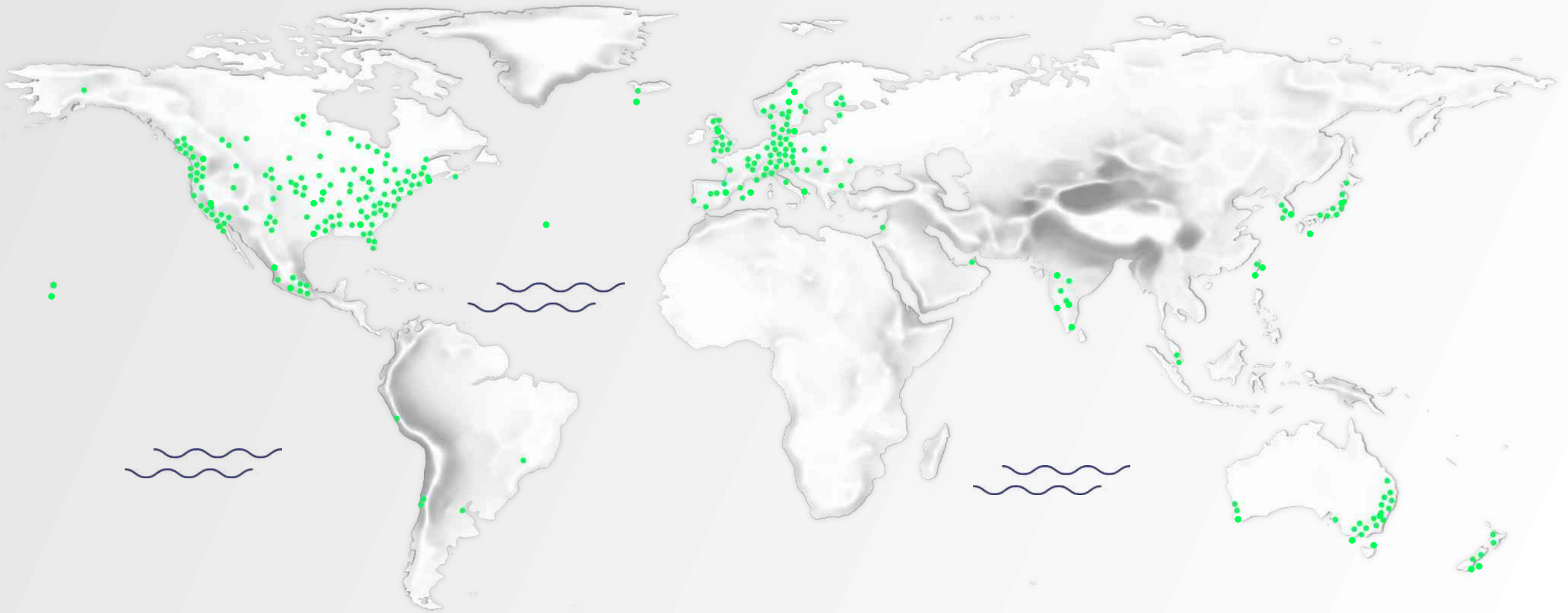
Prototype „The Analog Thing“: Sold >1000 units in 2022 on shop.anabrid.com.



Professional-grade de-facto quantum computer in development and ready in 2024.



anabrid now enters the semiconductor stage.



Internationalisation: We already sell world wide

Current & Targeted

Key clients

Anabrid has sold computers to more then 1,000 customers world wide in 2022. Most of our clients were B2C and B2G.

Currently, our biggest customer is the German agency for aviation and space flight (DLR) within a call for future Quantum Computers.

Our future clients will be chip manufacturers and industries buying CMOS IP at foundry marketplaces. The long term goal of anabrid is to sell IP instead of hardware (see slide „roadmap“).

Financing & Projections

The bootstrapped startup closes 2022 with >2MEUR in sales with a CAGR >25%.

Value

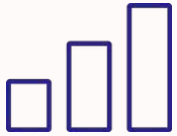
Company key figures

Intellectual Property Rights

anabrid currently **holds 3 patents in addition to 2 patents pending** that will enhance the enterprise value based on the price paid for the transfer of IP by €20M.

Enterprise Value

The total **enterprise value based on revenues and market capital is €40M** as of now. This results from earnings before taxes, interests and depreciation and amortization (EBITDA) and standard industry multiples (2x).



Revenue and CAGR

anabrid estimates a growing CAGR of 25% over the next 5 years. **The revenue for 2022 amounts to €2M**, which anabrid expects to surpass in 2023 by at least 25% of this years revenue.

Locations and Team

anabrid is located in Germany with offices in Berlin, Frankfurt and Ulm. At Ulm, we are part of the **Quantum Innovation Center** of the DLR German Aerospace Center. The company has 15 employees as of now and plans to grow to a team of 30 in 2024.

Funding

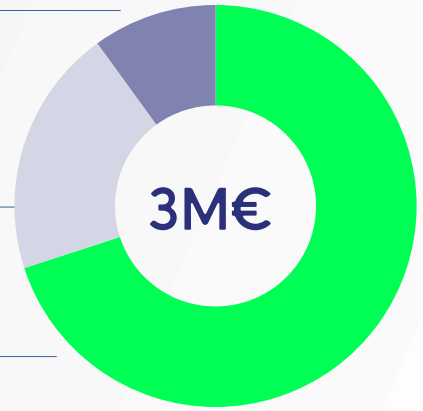
Company and chip financing

We currently raise 3M€ in order to produce a novel 65nm CMOS analog processor ready to be deployed world wide.

10%
manufacturing
costs

20%
tooling
licenses

70%
staff costs



Pre-Seed

Anabrid GmbH was boostrapped (clean cap table) until 2023. We ramped up a buisness with selling discrete computers (=no own chips yet). However, this is not profitable enough at short timescales for building own microchips.

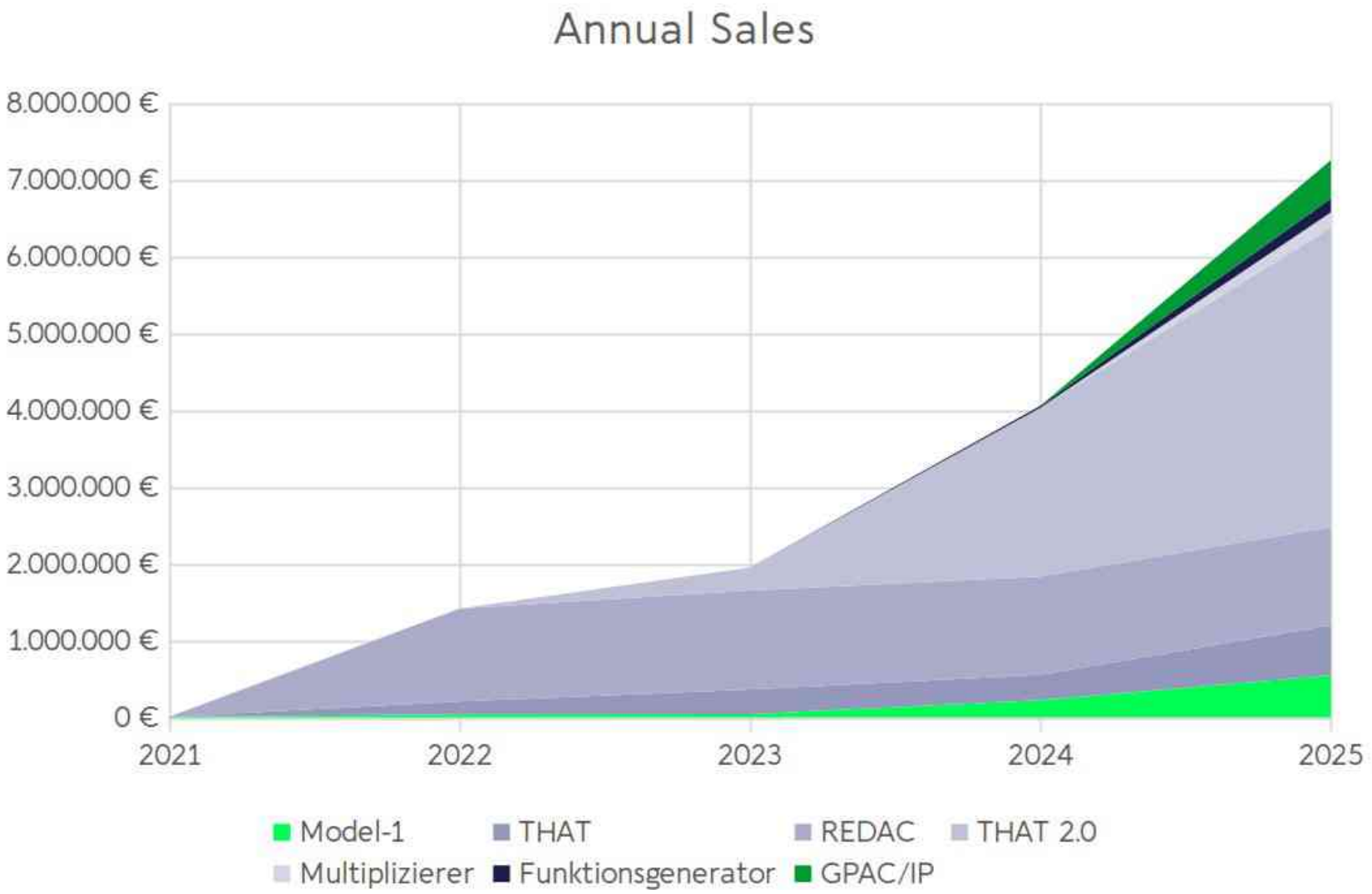
Seed

In October 2023, we won a private buisness angel with a 600k€ seed invest.

Series A

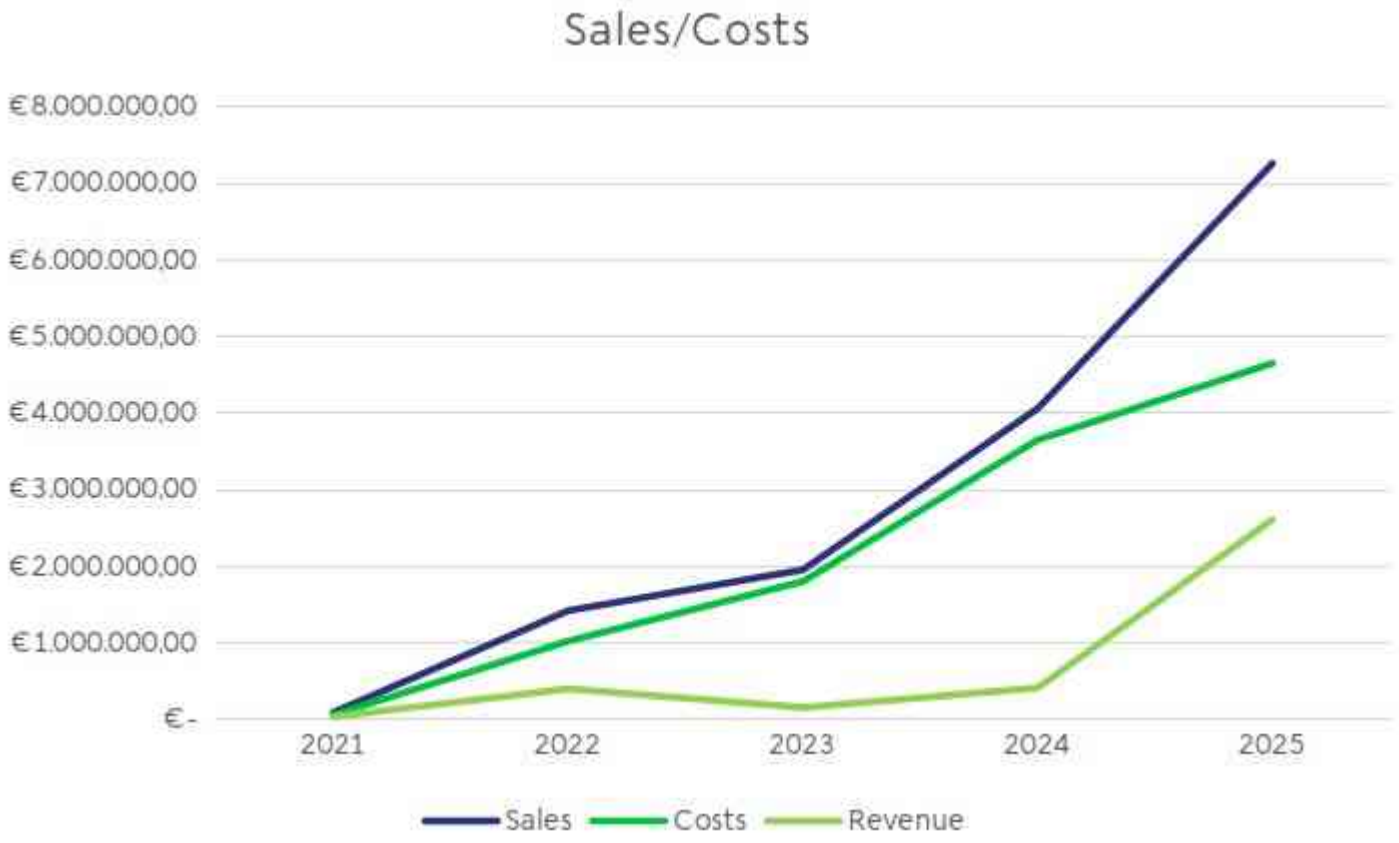
We will run a 3M€ series A invest end of 2023.

Revenue Projections



We currently gain most sales with the REDAC computer (Reconfigurable Discrete Analog Computer). Within the next years, the successor of THE ANALOG THING (THAT 2.0) will dominate our sales.

Revenue Projections



Given that we are currently in an active phase of product development, the profit margin is thin and will broaden only within a few years.

Profits are directly reinvested within the next years for future company growth.

Timeline

roadmap

0

The analog computer on-a-chip is a two year R&D venture that ends in a product.

1

With discrete analog computers already selling, we have unique launch conditions worldwide.

2

Chip design, prototyping and software development takes another six months.

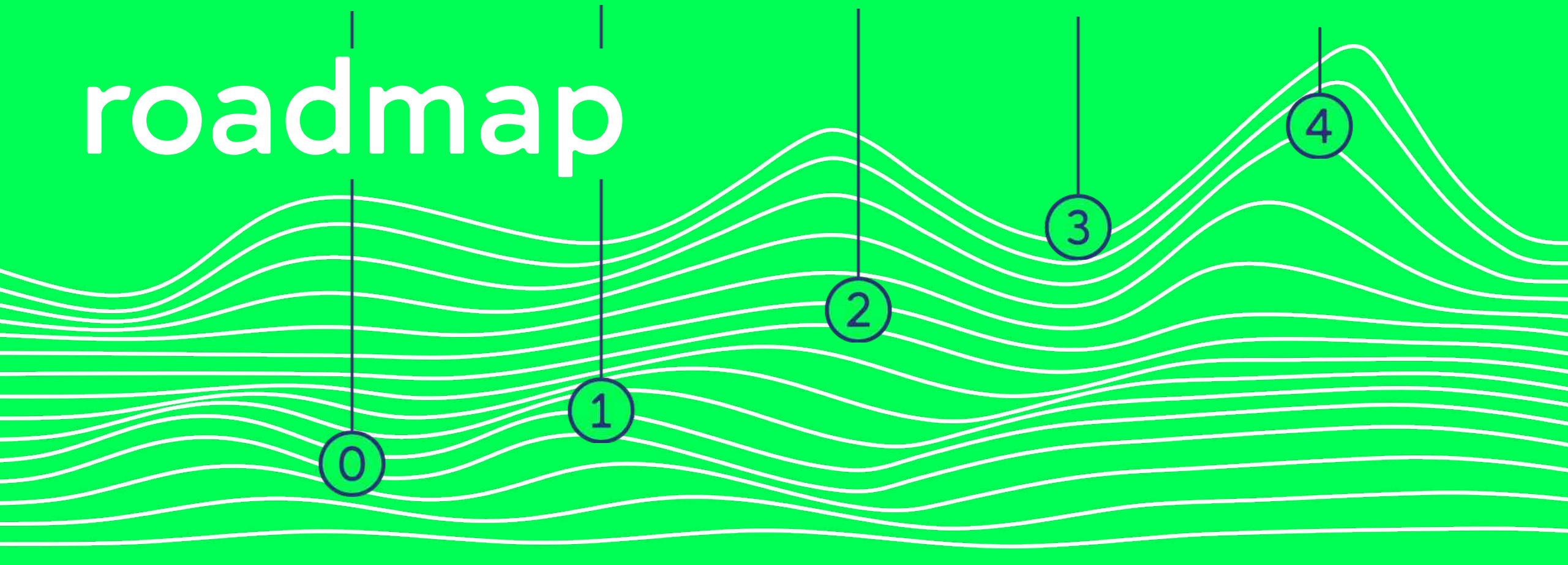
3

Chip testing and fabrication is scheduled for month 12 – 18 after start.

4

The finished chip is ready for product development after month 18.

The long term goal is to license IP (ARM model) and develop customer based special application chips to conquer.

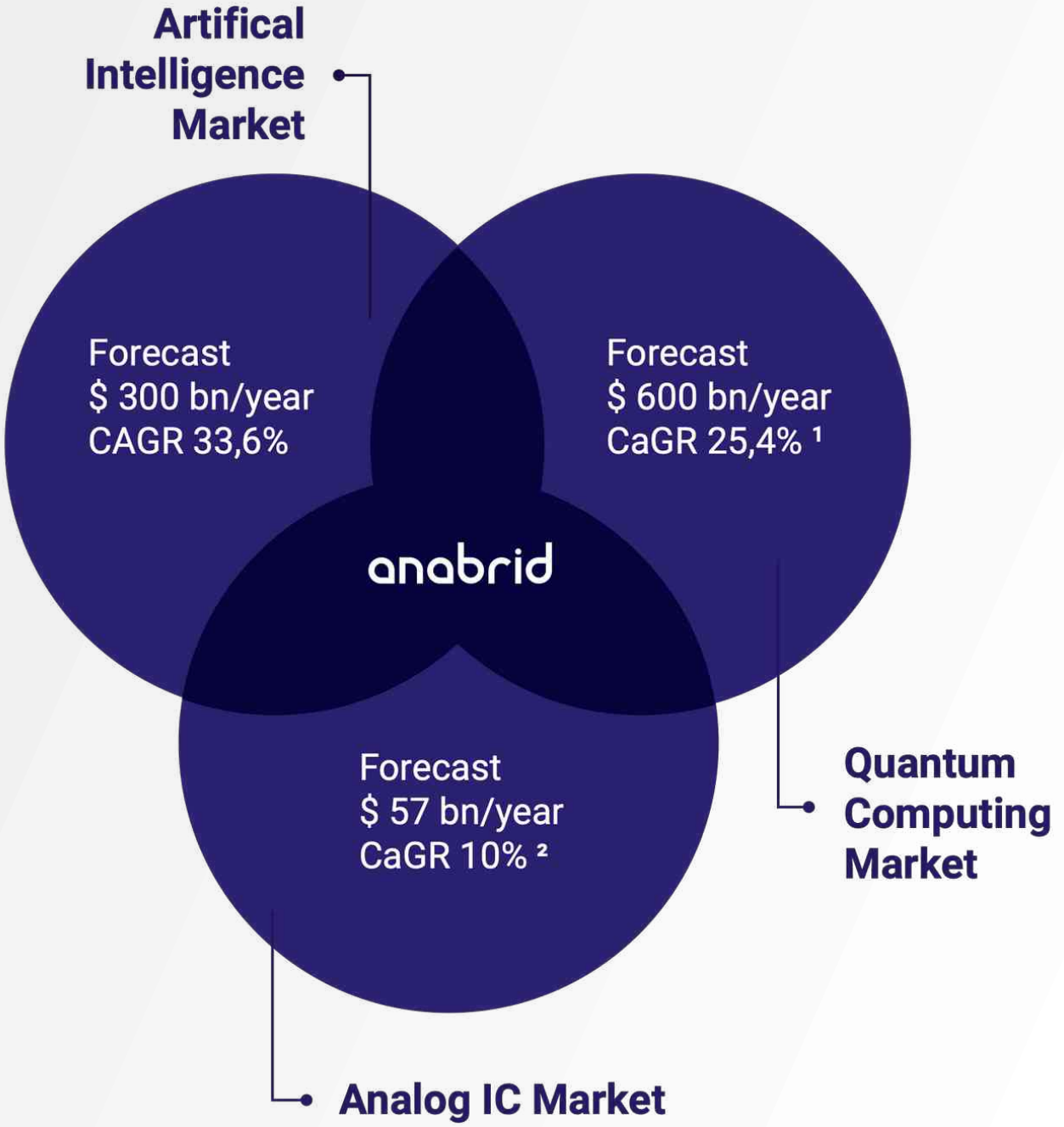


Market & Competition

Our technology opens a new market at the intersection of existing ones.

Market overview

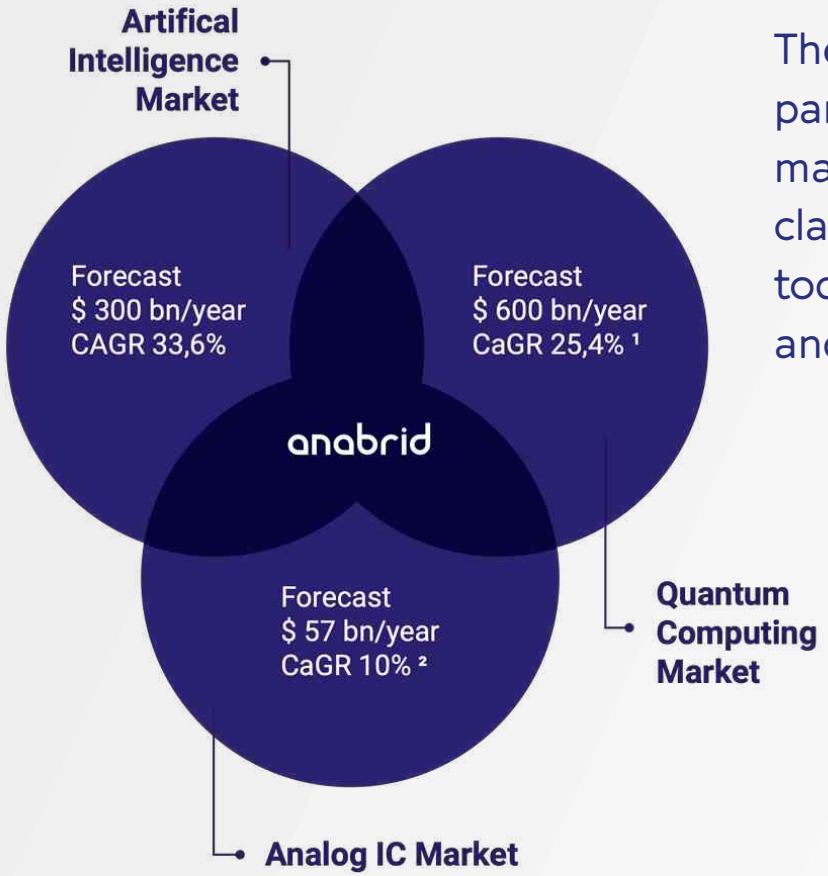
We will disrupt AI, QC and IC markets



Competitive Landscape

Artificial Intelligence Market

There is concurrency in Analog AI, such as with *MythicAI, Semron or Aspinity*. They are all limited to traditional deep learning approaches while we are the only one capable of doing nonlinear analog computing CMOS.



Quantum Computing Market

The QC industry has the problem that particular approaches have long time to markets. In constrast, quantum inspired classical computing can already deliver today at a mature technology standard and very competetive hardware prices.

Analog IC Market

Big IC and MCU manufacturers do not recognize the value of software-defined, reconfigurable analog electronics (FPAAs) yet. Existing products, as for instance from NXP, do not scale and are not embedded in the right applications.

Risk

The technology works, the only risk are successful sales.

The Analog Computer on-a-chip comes with little to no risk

Engineering risks have already been solved and it is purely a venture to finance the microchips and create lead customers in order to bring the break-even within short time.

We would like to mitigate this risk by finding a lighthouse account (big customer from industry) who is willing to sign a reasonably sized contract with sufficient upfront payment already during the development of the microchip products.

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