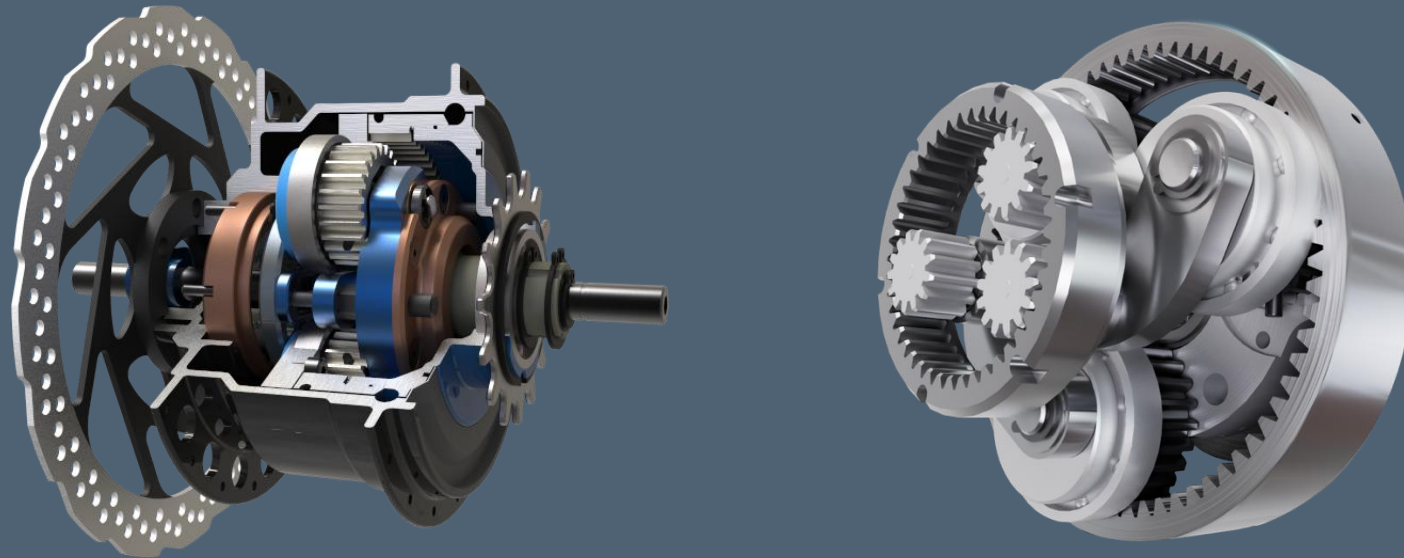




**Varionova**



High Level Roadmap – 2025 Q4



# VARIONOVA DEVELOPS INNOVATIVE TRANSMISSION SYSTEMS

**WHAT**

**WE DO**



**Varionova**

# WE HAVE INTRODUCED:

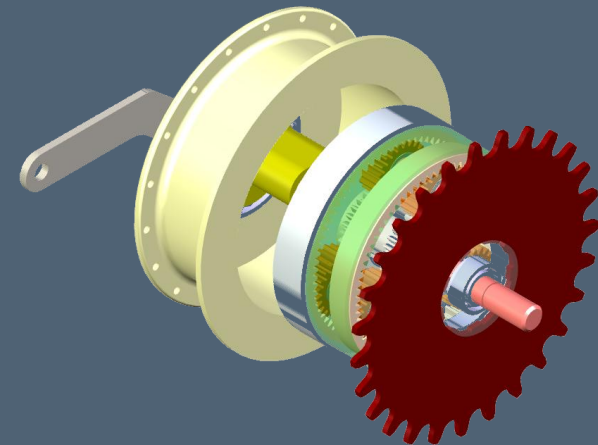
WHAT

WE DO

THE FIRST  
GEAR-BASED  
CVT



THE FIRST  
SELF-SHIFTING  
EPICYCLIC



# AND THEY HAVE BEEN NOTICED!

WHAT  
WE DO

The collage features several key pieces of content:

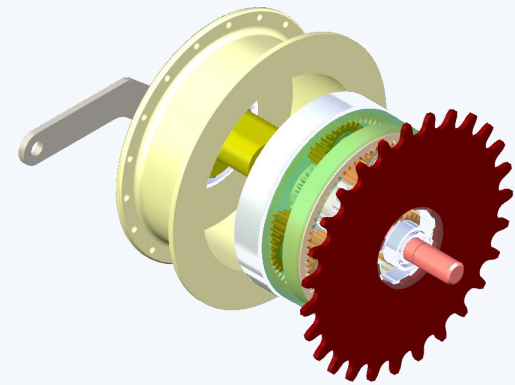
- New Atlas Article:** "World's first geared CVT: A 'holy grail' transmission in prototype form" by Lee Stan, dated December 15, 2024. It includes a detailed cutaway image of the transmission.
- YouTube Channel:** "driving 4 answers" (@d4a) with 1.29 million subscribers. A video titled "This is the World's First Geared CVT and it Will Blow Your Mind - Ratio Zero..." is highlighted with a yellow circle, showing 2.1M views.
- LinkedIn Post:** A post from Kunal S., Associate Consultant - Engine..., titled "Revolutionary Breakthrough in Transmission Technology" and "Italian company Pininfarina has just unveiled a...".
- Hackaday Article:** "BEHOLD A GEARED, CONTINUOUSLY VARIABLE TRANSMISSION" by Donald Papp, dated January 5, 2025. It features a photo of a person holding the transmission component.
- Reddit Post:** "The World's First Geared CVT Features A Ratio Zero Transmission (It Works Without A Clutch!)" by u/MechaSelfEngineering.
- YouTube Channel:** "Tech Planet" (@tech\_planet) with 435,000 subscribers. A video titled "The Holy Grail" is featured.
- Other Snippets:** A "RatioZero" logo with a gear diagram, a "Honda's New V3 Electric Supercar Engine Explained" video thumbnail, and a "Tech Planet" video thumbnail.

# OUR PRODUCT LINEUP IS BUILT ON THESE TWO CORE TECHNOLOGIES

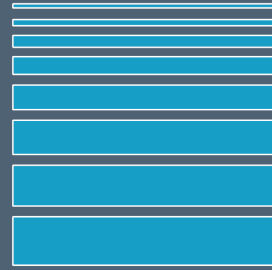
**WHAT  
WE DO**



**RatioZero  
(CVT)**



**Crown Drive  
(N speed)**



**Varionova**

# THE RATIOZERO FAMILY



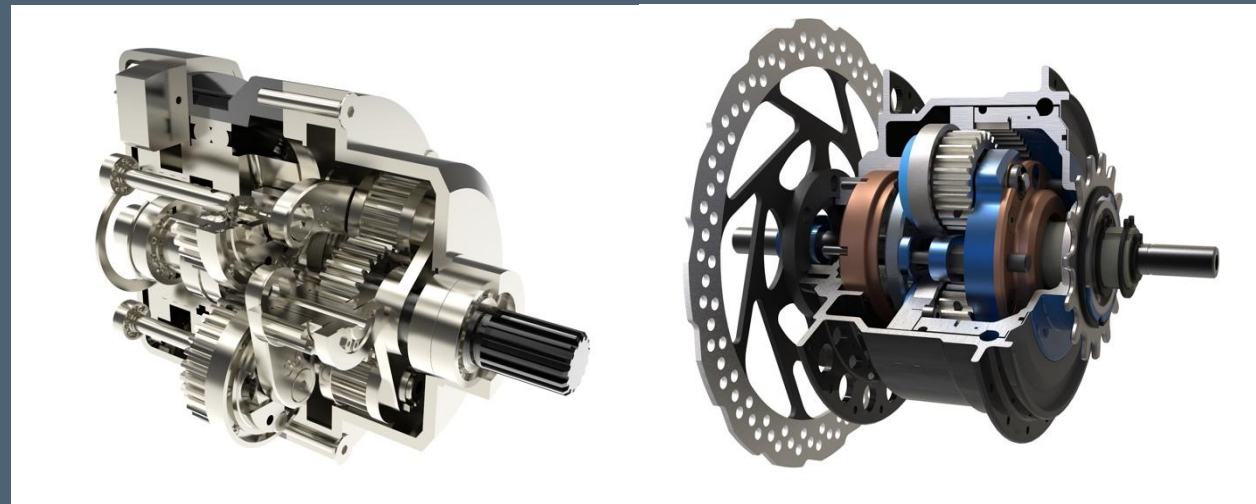


## RatioZero (CVT)

Based on the  
«split rotation»  
principle

## RatioZero

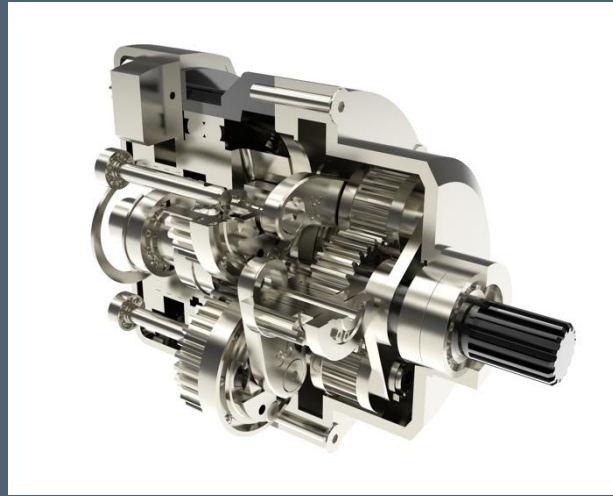
- Only gear-based CVT in the market (soon to be)
- An exclusive technology with a deserved hi-tech image
- High efficiency (target  $> 0.9$ , tbc) and high range (5:1 or more)
- Easy automation and control
- General applicability (mobility, robotics, tractors...)
- Replaces either existing CVTs or fixed-speed transmissions
- Shape-based torque transfer  $\rightarrow$  no inherent torque limits
- Not friction-based principle  $\rightarrow$  low wear, low heat, long life
- No special components, tooling, materials, tolerances
- Only gears, rods, one-way clutches  $\rightarrow$  high volumes possible





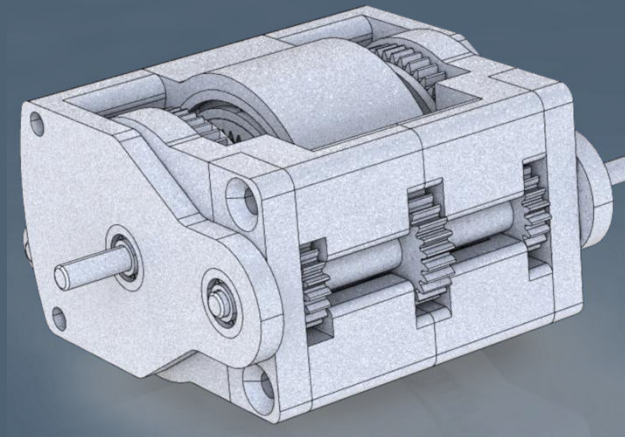
## RatioZero (CVT)

Based on the  
«split rotation»  
principle



## RatioZero Gen.1

- WO2017093965A1 WIPO (PCT)
- Uses gears and rods / split+cranking
- Can be made Constant Velocity (elliptical gears – patent pending)
- Range: up to 6:1
- E-bike, ATVs, Energy



## RatioZero Gen.2

- Patent Pending
- Uses only gears / no cranking
- Higher speed & torque
- Non CV, but minimal ratio oscillation
- Range: up to 6:1
- Simpler, sturdier
- Automotive, robotics, Heavy Duty



# RatioZero (CVT)

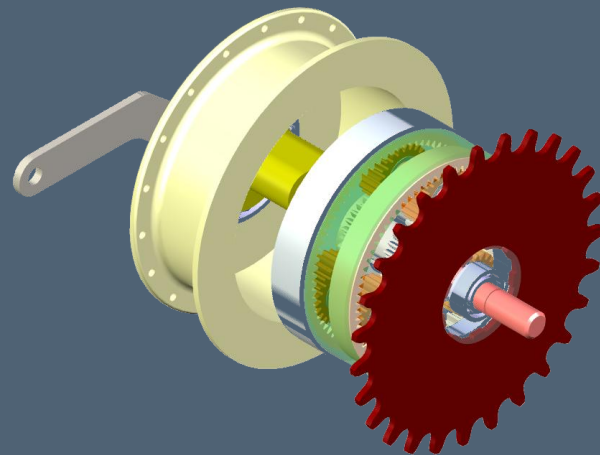
**We tick  
all the boxes!**

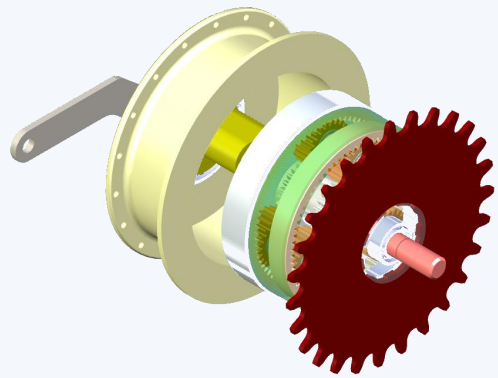
TECHNICAL WISH LIST	EPICYCLIC GEARBOX	SEQUENTIAL GEARBOX	BELT CVT	TOROIDAL / EPICYCLIC	HYDROSTATIC	CASSETTE TYPE	RATIOZERO
High efficiency (>0.9)	✓	✓				✓	✓
High torque	✓	✓		✓	✓		✓
Stepless			✓	✓	✓		✓
Smooth feeling			✓	✓	✓		✓
IVT allowed (zero speed)				✓	✓		✓
Compact	✓	✓	✓			✓	✓
Clean (boxed)	✓	✓	✓	✓	✓		✓
Low noise	✓ (possible)	✓ (possible)	✓ (intrinsic)	✓ (intrinsic)	✓ (intrinsic)	✓ (possible)	✓
Low maintenance	✓	✓		✓	✓		✓
High durability	✓	✓			✓		✓
Easy automation & control			✓	✓	✓	✓	✓
Competitive cost			✓			✓	✓



**Varionova**

# THE CROWN DRIVE FAMILY



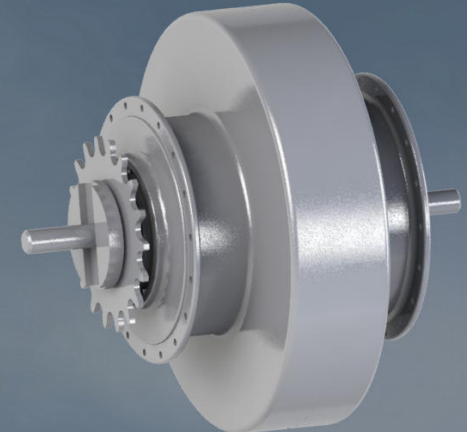
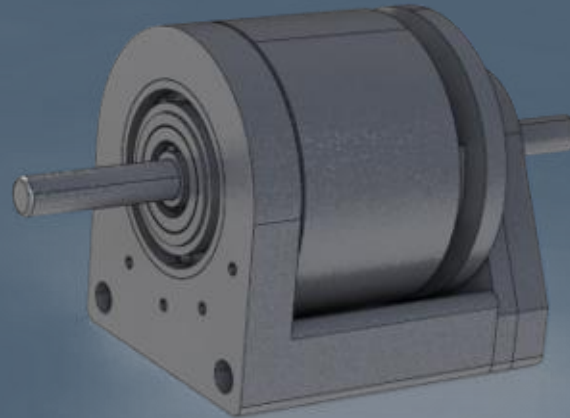


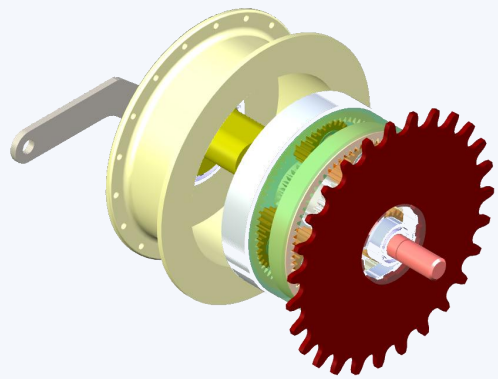
## Crown Drive (N speed)

Based on the  
«torque treshold»  
principle

## Crown Drive

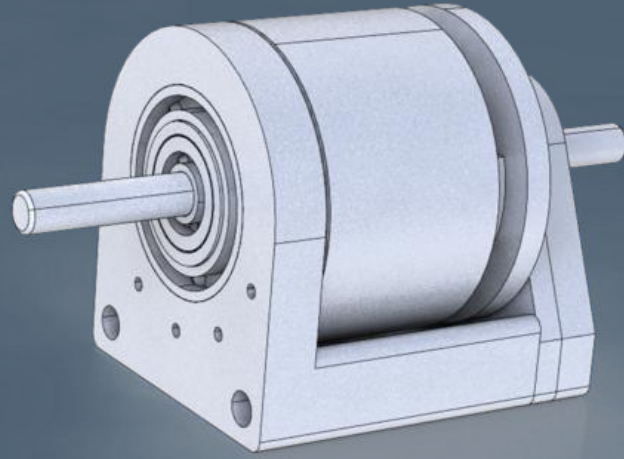
- Fixed-speed transmission based on a modified epicyclic drive
- High efficiency ( $> 0.9$ ) and good range (1:1 to 4:1)
- Automatic gear selection  $\rightarrow$  no electronic control needed
- Steps can be defined and transitions made smooth  $\rightarrow$  "quasi-CVT"
- General applicability (mobility, robotics, tractors...)
- "Just enough" solution: simplified functions, highest efficiency
- Extremely compact layout, down to 20 mm diameter
- Contactless selection principle  $\rightarrow$  low wear, low noise
- Bi-directional (same function in both rotation directions)
- Few and simple components  $\rightarrow$  high value for money





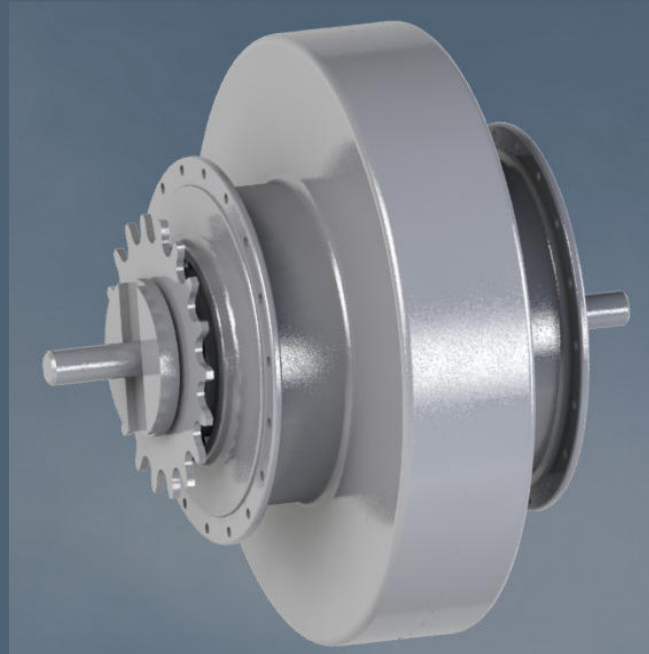
## Crown Drive (N speed)

Based on the  
«torque treshold»  
principle



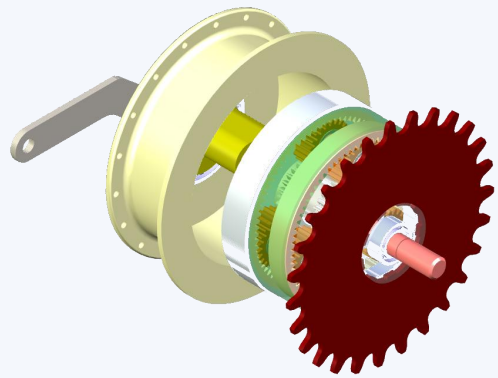
## Crown Drive 2-speed

- Patent Pending
- Single-stage
- Range: up to 2:1
- Automatic gear selection, no contact, no wear
- Bike, E-bike, Robotics, EVs



## Crown Drive N-speed

- Patent Pending
- Multi-stage
- Range: up to 5:1
- Automatic gear selection, no contact, no wear
- Bike, E-bike, Robotics



## Crown Drive (N speed)

The  
«Just Enough»  
solution

TECHNICAL WISH LIST	EPICYCLIC GEARBOX	SEQUENTIAL GEARBOX	BELT CVT	TOROIDAL / EPICYCLIC	HYDROSTATIC	CASSETTE TYPE	CROWN DRIVE
High efficiency (>0.9)	✓	✓				✓	✓
High torque	✓	✓		✓	✓		✓
Stepless			✓	✓	✓		
Smooth feeling			✓	✓	✓		✓ (possible)
IVT allowed (zero speed)				✓	✓		
Compact	✓	✓	✓			✓	✓
Clean (boxed)	✓	✓	✓	✓	✓		✓
Low noise	✓ (possible)	✓ (possible)	✓ (intrinsic)	✓ (intrinsic)	✓ (intrinsic)	✓ (possible)	✓
Low maintenance	✓	✓		✓	✓		✓
High durability	✓	✓			✓		✓
Easy automation & control			✓	✓	✓	✓	✓
Competitive cost			✓			✓	✓



Varionova

# THE APPLICATION RANGE



# Our technology is application-driven

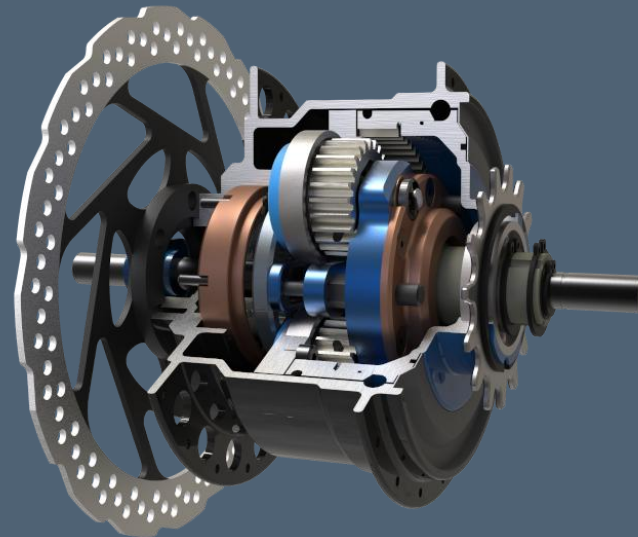
Each application implies a dedicated project  
(customer specifications & co-design)

## USE CASES



OUR SOLUTIONS DO NOT AIM  
TO REPLACE EXISTING TRANSMISSIONS  
ONE-TO-ONE, BUT TO ADD NEW CREATIVITY  
**AND GENERATE NEW POSSIBILITIES**  
IN MECHANICAL SYSTEMS,  
BY OFFERING UNPRECEDENTED  
FUNCTIONS OR PERFORMANCE

# USE CASES





**Varionova**

# THE DEVELOPMENT PROCESS





**WHAT**

**AT THIS STAGE WE ARE BASICALLY  
AN ENGINEERING COMPANY  
WITH LIMITED PRODUCTION CAPACITY**

**WE DO**

**WE FOCUS ON DEVELOPING  
EXTENSIVE KNOW-HOW  
AROUND OUR FIRST-OF-THEIR-KIND  
TECHNOLOGIES AND  
DEPLOYING THEM ACCORDING  
TO THE CUSTOMER'S NEEDS**

# RESEARCH IS OUR EVERYDAY JOB

INTERNAL R&D & PARTNERSHIP WITH TECHNICAL UNIVERSITIES

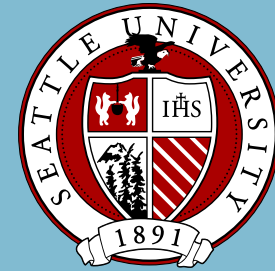
R&D

WORK



**POLITECNICO  
MILANO 1863**

Milan - ITALY



Seattle - USA



San Diego - USA



Fullerton - USA

# OUR DEVELOPMENT PROCESS

## JOINT-DEVELOPMENT WITH AN INDUSTRIAL PARTNER

- **Customer use case**  
Joint discussion to understand the customer's needs
- **Analysis of the specifications / boundary conditions**  
Internal study of the requirements, comparison of solutions
- **Technical proposal**  
Discussion of possible solutions for the customer's use case
- **Prototype development**  
Functional prototype manufactured to the customer specifications
- **Test and validation**  
Joint testing activity, feedback and adjustments
- **Project freeze**  
Stabilization of the main features of the transmission

WE  
DEVELOP

VARIONOVA  
«V» Model



# OUR DEVELOPMENT PROCESS

## JOINT-DEVELOPMENT WITH AN INDUSTRIAL PARTNER

- **Technical Requirements Document**

Complete 3D CAD Package

- **Functional Prototype**

Delivered for integration testing and validation

- **Comprehensive Test Reports**

Validation, performance & durability, compliance verification

- **Manufacturing Documentation**

Production drawings and assembly instructions (.pdf or .dxf)

- **Supply Chain Package**

Complete BOM with supply advisory on strategic components

- **Training & Knowledge Transfer**

Comprehensive on-site training & manufacturing process review

VARIONOVA  
«V» Model



WE

DELI  
VER

# INTERNATIONAL TEAM – 6 FOUNDERS

## THE TEAM



**Alexander Hohenegger**

CEO

A long-time inventor, entrepreneur, and technology scout, he started the open-innovation business that has now become Varionova. Leads the strategy and coordinates the activity of the team.



**Edyson Pavilcu**

Chief Technology Officer

A serial innovator with several patents to his credit, has conceived the RatioZero system and still leads its development with skills both in the mechanical and system control fields.



**Christian Cavaciuti**

Product Manager

A Ph.D. in Applied Mechanics and MBA, with 20+ years of tech communications experience, has been involved in the RatioZero project since the beginning, with a focus on CRM.



**Guglielmo Giacalone Amorelli**

Project Manager

A mechanical and Systems Engineer with 10 years experience in Formula 1, turned successful startupper: our expert in high-tech, high performance transmissions.



**Christoph Kempermann**

Industrial Business Development

A management professional with 30+ years of wide-ranging experience in the transmissions industry, with a scientific background and a strong sense for customer benefits.



**Anton Luu**

Business Angel

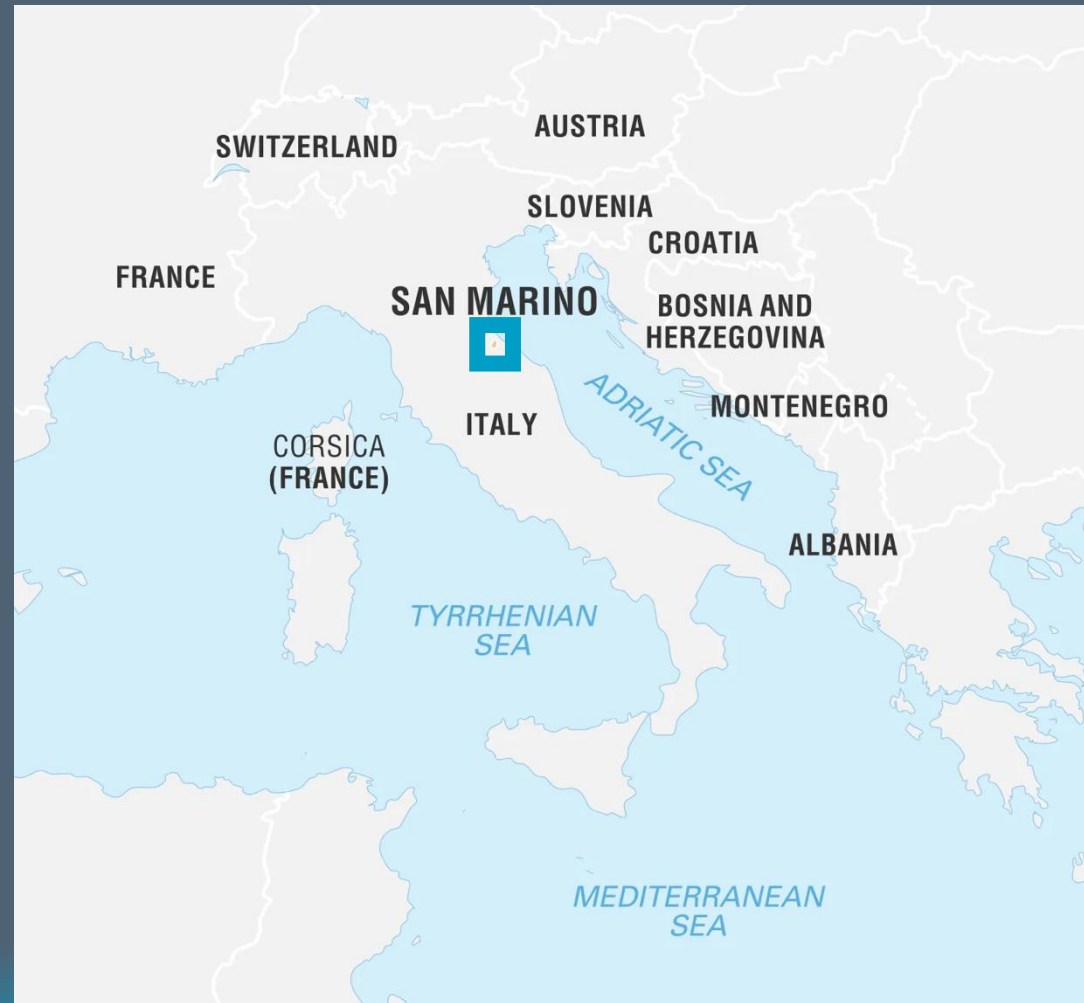
A researcher and business angel with expertise spanning biology, IT, and enterprise strategy. Our main investor and advisor on financial and competitive matters.



# WE ARE BASED IN SAN MARINO, AN INDEPENDENT STATE INSIDE ITALY

WHERE

WE ARE





8<sup>th</sup> Largest  
Global Economy



Europe's 2<sup>nd</sup> Largest  
Manufacturing Economy



~USD 162 Billion  
Global FDI

### THE ITALIAN ECOSYSTEM

#### Lombardy



Italy's largest regional economy and a Finance & Automotive manufacturing powerhouse.

#### Emilia Romagna



Known as the "Motor Valley" and global centre for automotive, packaging and mechatronics.

#### Piedmont



Advanced Manufacturing & Technology hub with a strong design & engineering talent base.

#### Abruzzo



Mechatronics & Auto supply chains anchored around global OEMs alongside a growing Renewable Energy & Cleantech sector

#### Tuscany



Heritage-rich region evolving into a hub for life sciences, luxury goods & shipbuilding.

#### Apulia



Leading region for wind, solar, and hydrogen projects and logistics gateways into the Mediterranean

#### Campania



Major aerospace cluster with advanced engineering and composites. Famous for its logistics hubs.

#### Basilicata



Energy and automotive gateway with the largest onshore oil fields & energy infrastructure.

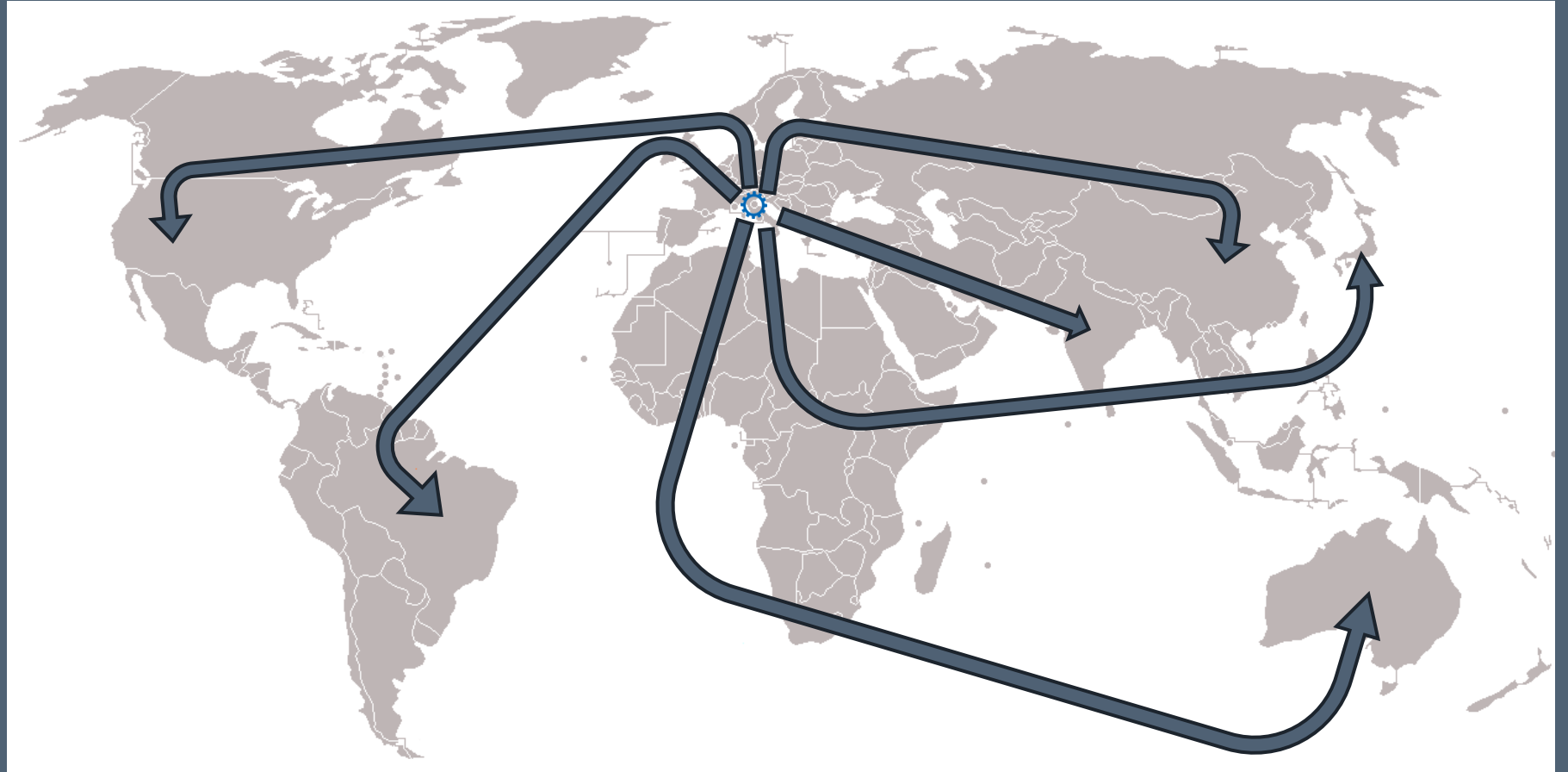
# WHERE

# WE ARE

# WE ARE AT THE HEART OF THE ITALIAN «ADVANCED MECHANICS» CLUSTER

**WE ARE LOOKING FOR INDUSTRIAL PARTNERS  
IN ANY SECTOR – WORLDWIDE**

**THE  
GOAL**



**WE ARE LOOKING FOR INDUSTRIAL PARTNERS  
IN ANY SECTOR – WORLDWIDE**

**WE ARE  
OPEN**

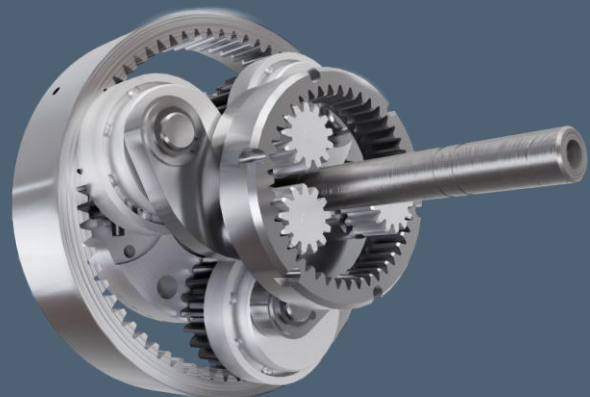


**COMPETENT, INTERNATIONAL TEAM  
HIGHEST-EFFICIENCY CVT IN THE WORLD  
EASY INTEGRATION, EASY CONTROL**



**Varionova**

**THANK  
YOU!**



Find us on [www.varionova.tech](http://www.varionova.tech)