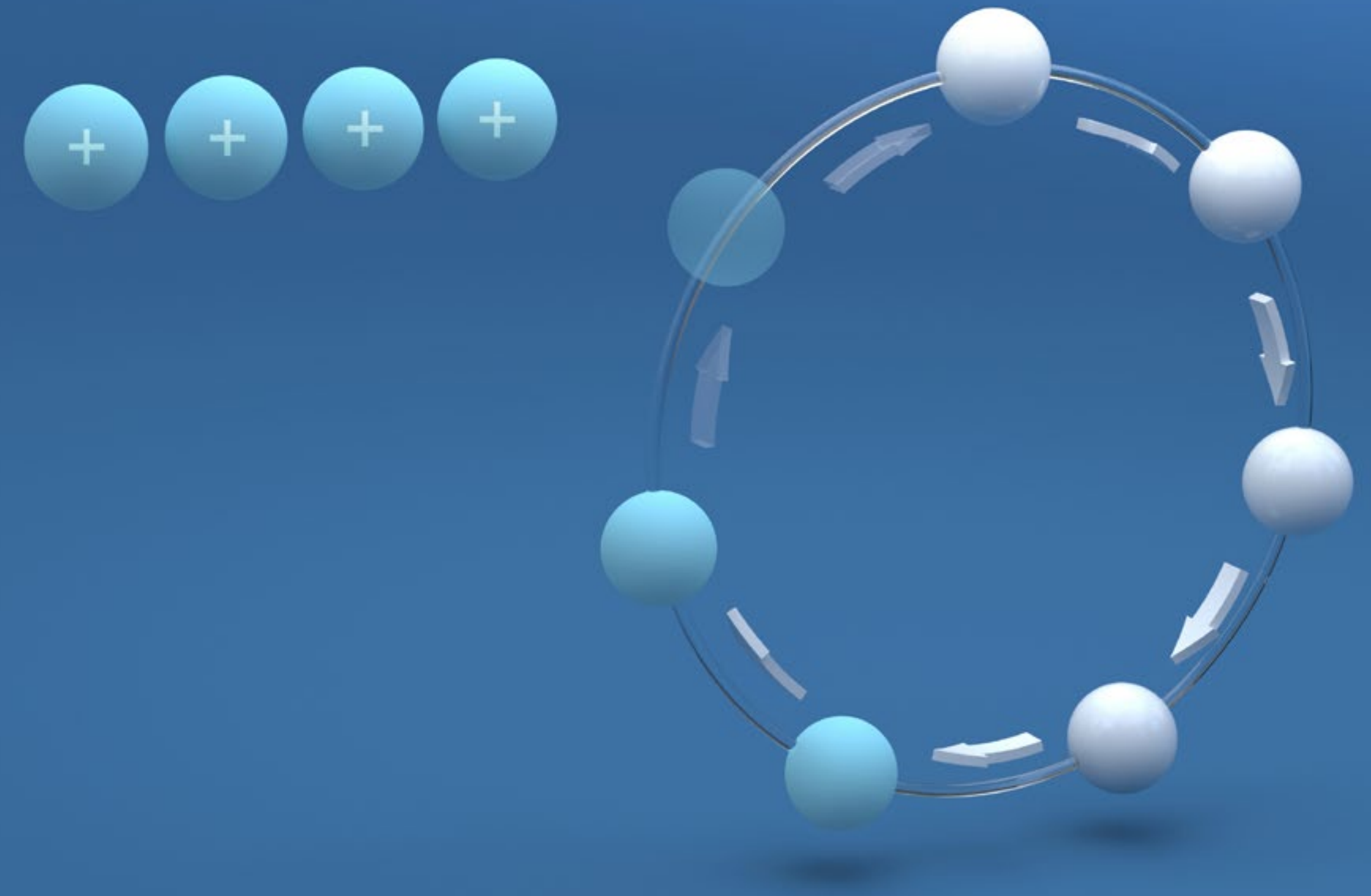


e-Facts:

# VECTOPOWER: VECTONUM Embedded PLC and VECTOSTUDIO IDE

We drive new energy for a greener future



# / Internal PLC VE and development system VS

## Introduction

VE:

### Internal PLC **VECTONUM** Embedded

- All VECTOPOWER inverters VP600 and VECTOPOWER DC/DC VP5000 have an integrated PLC.
- The integrated PLC is part of our own real-time operating system VECTONUM Embedded.
- The integrated PLC is mainly used for added-value functions.
- The PLC can be used as well by our customers, our partners, and our engineers to realize dedicated functions for the various applications.

VS:

### Integrated Development Environment **VECTOSTUDIO**

- To implement software functions as VE-modules to run them on the integrated PLC, we offer a comfortable Integrated Development System IDE: VECTOSTUDIO.
- You can use VECTOSTUDIO to develop functional software, integrate it on the devices and do the steps of commissioning.
- For this our tools VEConfig and ANALYSER are integrated. You can find a description of VEConfig and ANALYSER in separate e-Facts.

# / Content

I

## INTEGRATED PLC “VE”

Strengths, main functions  
and your benefits

II

## INTEGRATED PLC “VE”

Functions and  
available modules

III

## VECTOSTUDIO “VS”

Strengths and your  
main benefits

IV

## VECTOSTUDIO “VS”

Main functions  
and versions



# INTEGRATED PLC “VE”

Strengths, main functions  
and your benefits

## / VE PLC

### Main strengths, functions and benefits

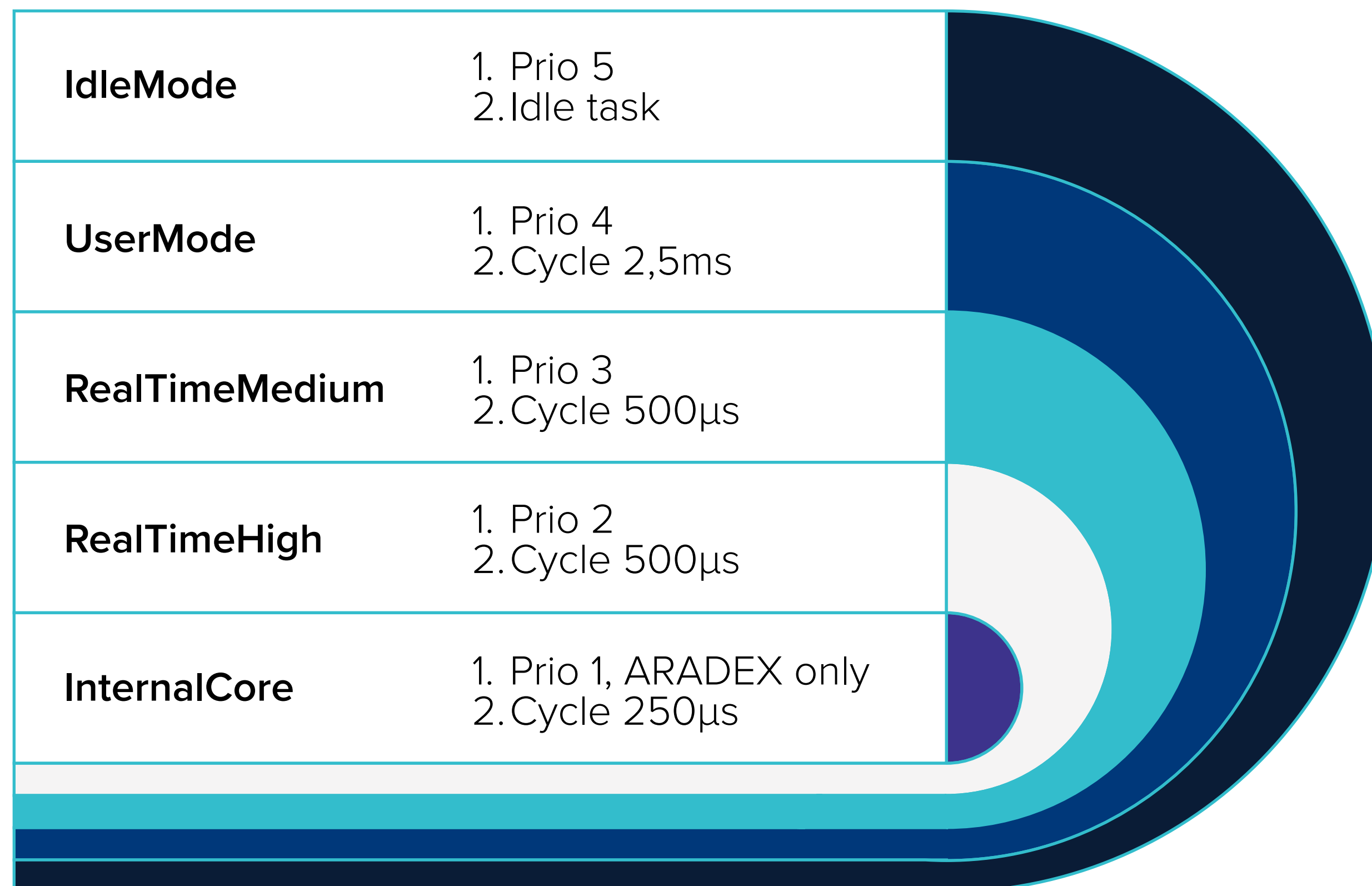
- Integrated floating point unit.
- 4 task-levels of different priorities available.
- 500µs cycle time of the real-time level tasks.
- The PLC cycle time is fully synchronized to the internal FPGA-clock which operates the closed-loop-control of the VP devices. This avoids unwanted beat frequencies in using sensor and other analogue signals.
- By developing your own functions, you can implement and protect your functional IP for your application.

INTEGRATED  
VE PLC FUNCTION  
IN VP600



## / VE PLC

### Main strengths, functions and benefits



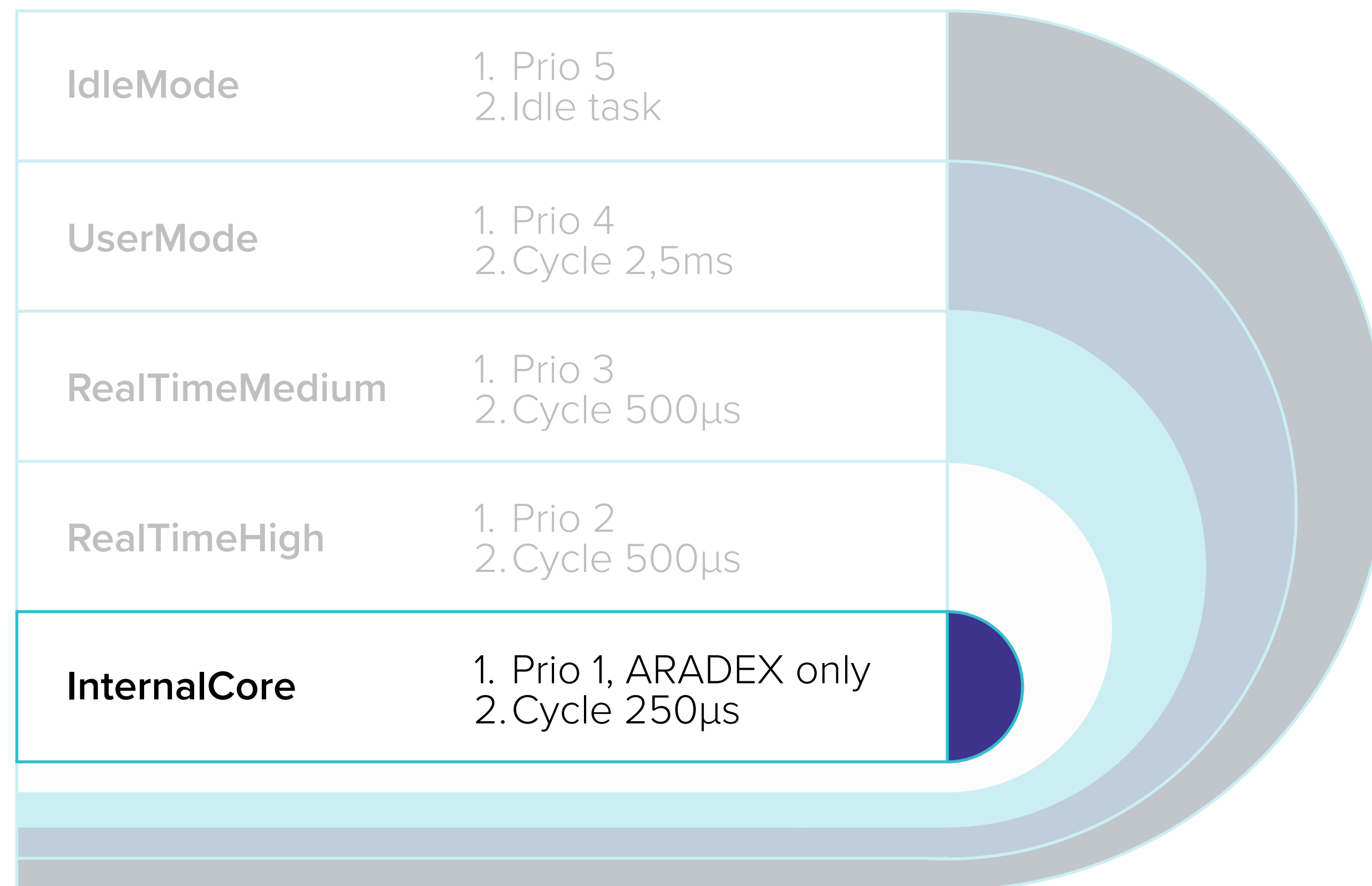
#### Overview

Timing is important. The VE PLC provides several pre-defined real-time and non-real-time tasks which you can use to accomplish your tasks.



## / VE PLC

### Main strengths, functions and benefits

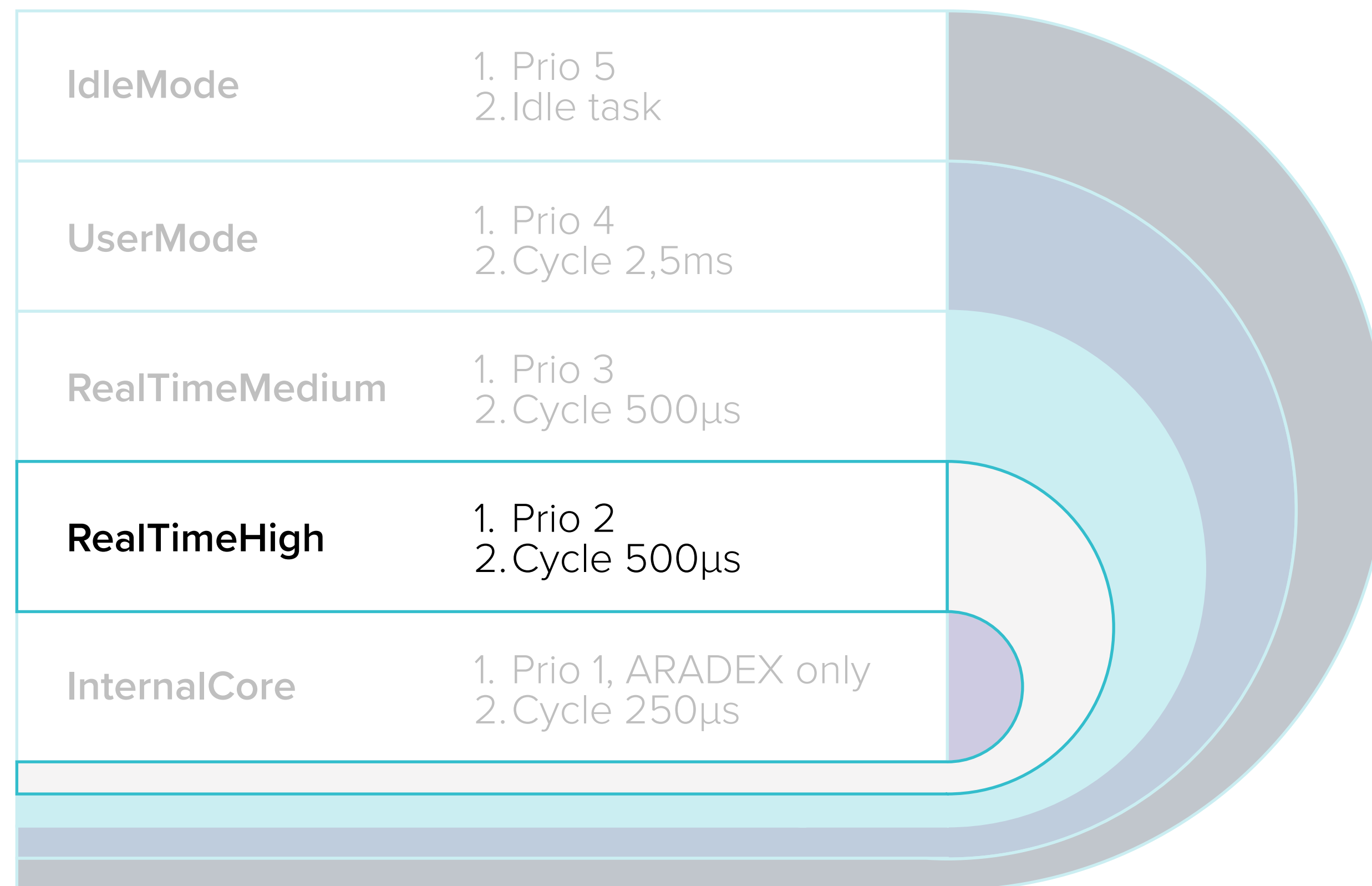


#### Internal Core:

1. Only be used by ARADEx
2. Prio-Level 1, cycle 250µs
3. Cannot be interrupted by other tasks
4. Updates all internal variables and I/O

## / VE PLC

### Main strengths, functions and benefits



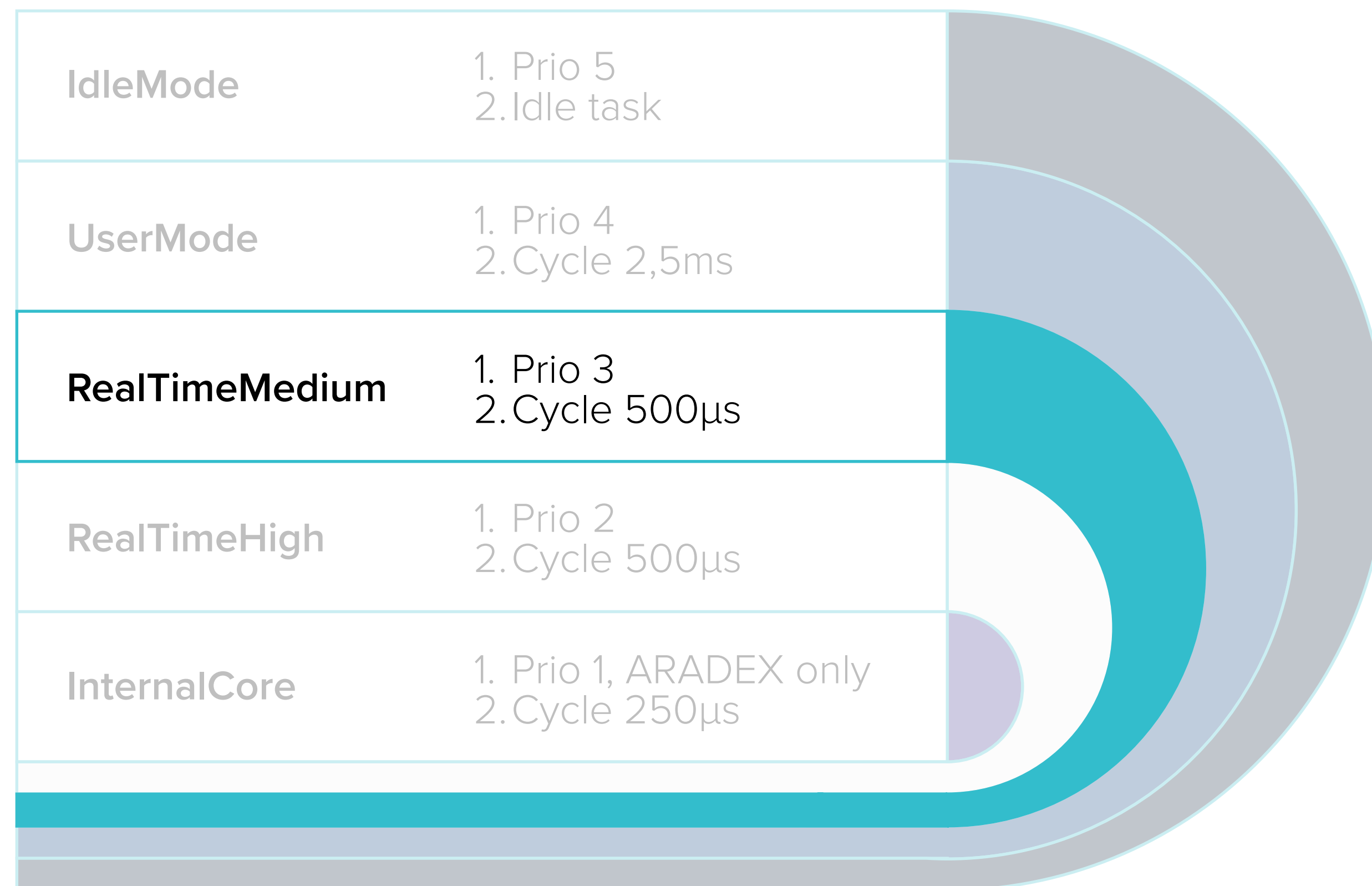
#### **RealTimeHigh:**

1. Used by ARADEX and customers
2. Prio-Level 2, cycle 500μs
3. Cannot be interrupted by tasks of levels 3 ... 5
4. Specifically made for high-speed control



## / VE PLC

### Main strengths, functions and benefits

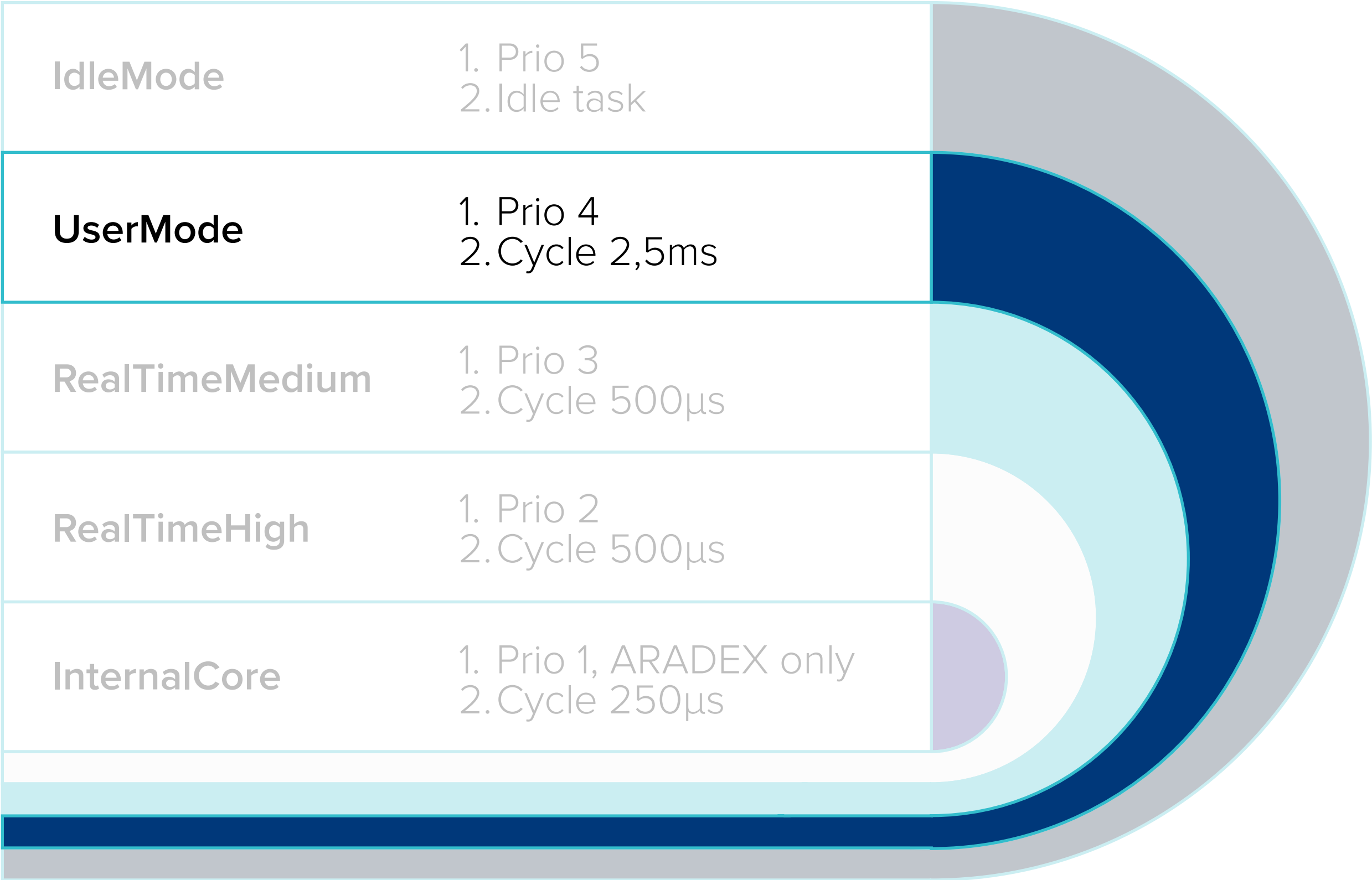


#### RealTimeMedium:

1. Used by ARADDEX and customers
2. Prio-Level 3, cycle 500µs
3. Cannot be interrupted by tasks of levels 4 ... 5
4. Especially made for real-time functions below the level of direct control
5. For example, can be used for real-time CAN communication

# / VE PLC

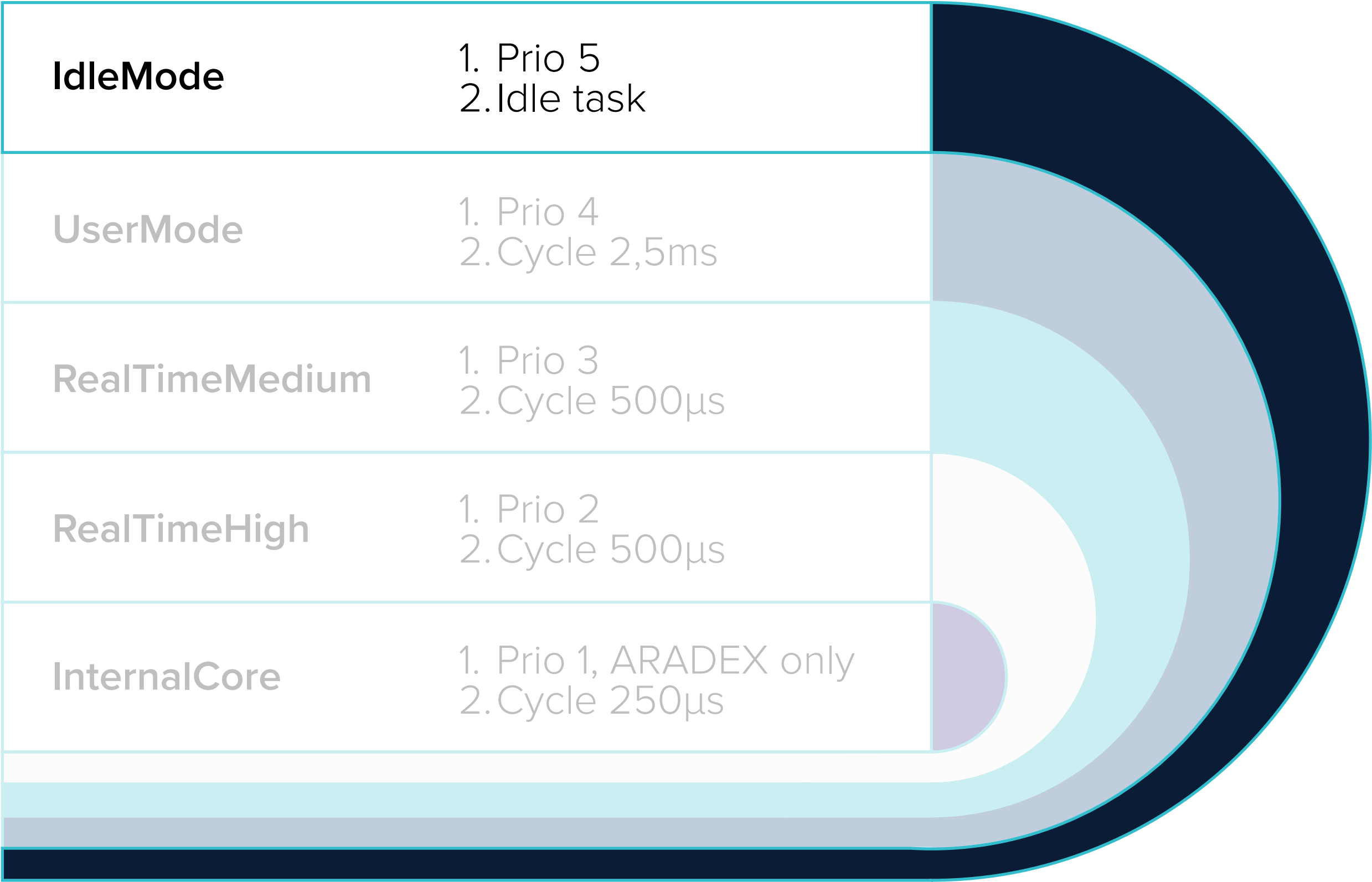
## Main strengths, functions and benefits



- UserMode:**
- 1. Used by ARADEX and customers
  - 2. Prio-Level 4, cycle 2,5ms
  - 3. Cannot be interrupted by tasks of level 5
  - 4. Especially made for functions which are not necessarily real-time but with fast enough reaction time
  - 5. For example, to modify control strategy of complex functions

# / VE PLC

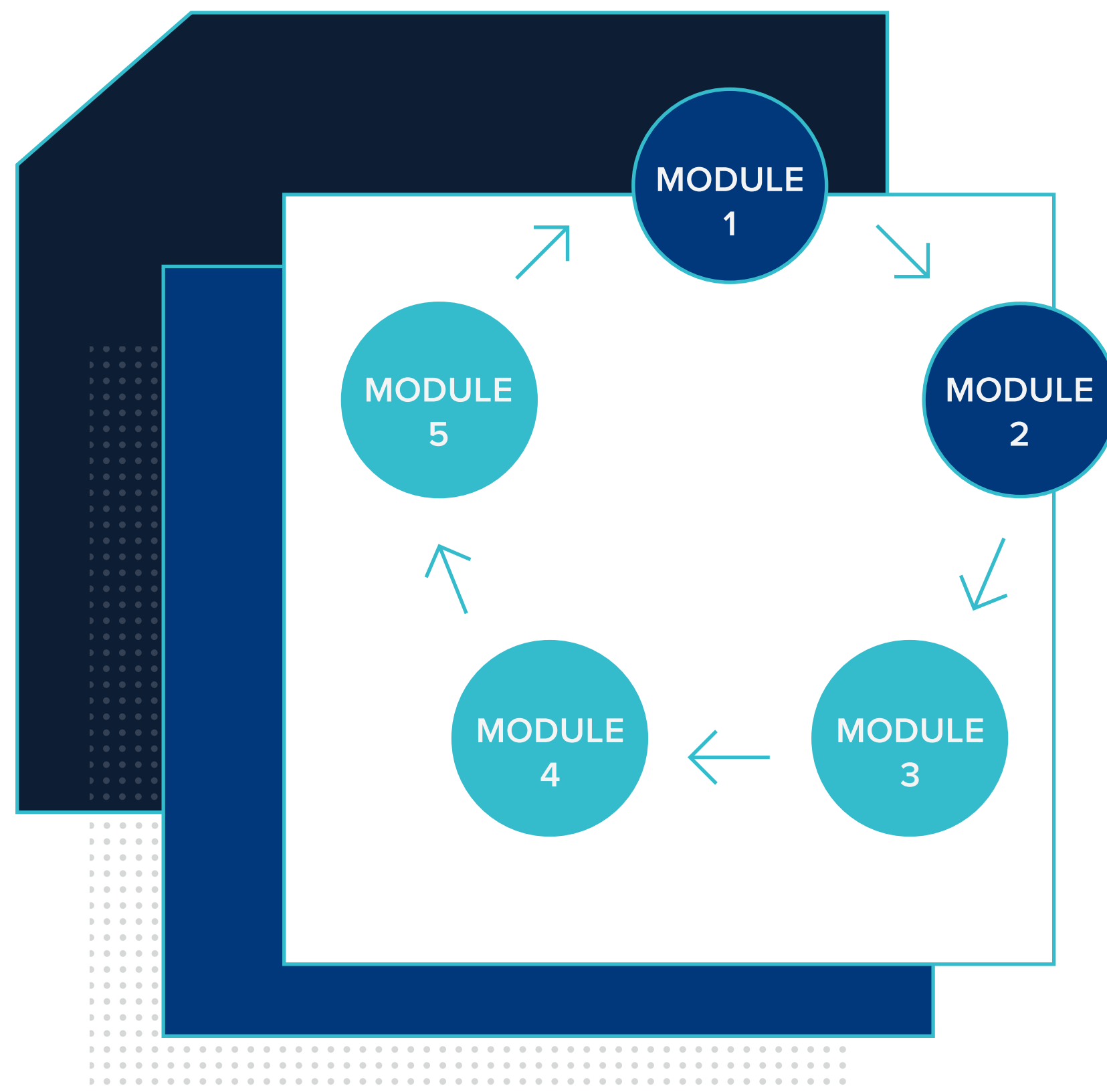
## Main strengths, functions and benefits



- IdleMode:**
- 1. Used by ARADEX and customers
  - 2. Prio-Level 5, runs in idle times; typical reaction time about 10ms
  - 3. Especially made for high-level functions like data collection and analysis

## / VE PLC

### Main strengths, functions and benefits



#### Example: 5 Modules in Level RealTimeHigh

1. All are processed in the defined sequence
2. Cycle time for all together: 500µs
3. Module 2 can use data from Module 1 in same cycle, Module 3 can use data from Module 2....
4. You can combine modules (=functions)  
**made by ARADDEX** with **your own functions**
5. Up to 10 tasks possible; the offset time per new task is about 1 µs inside the 500 µs cycle

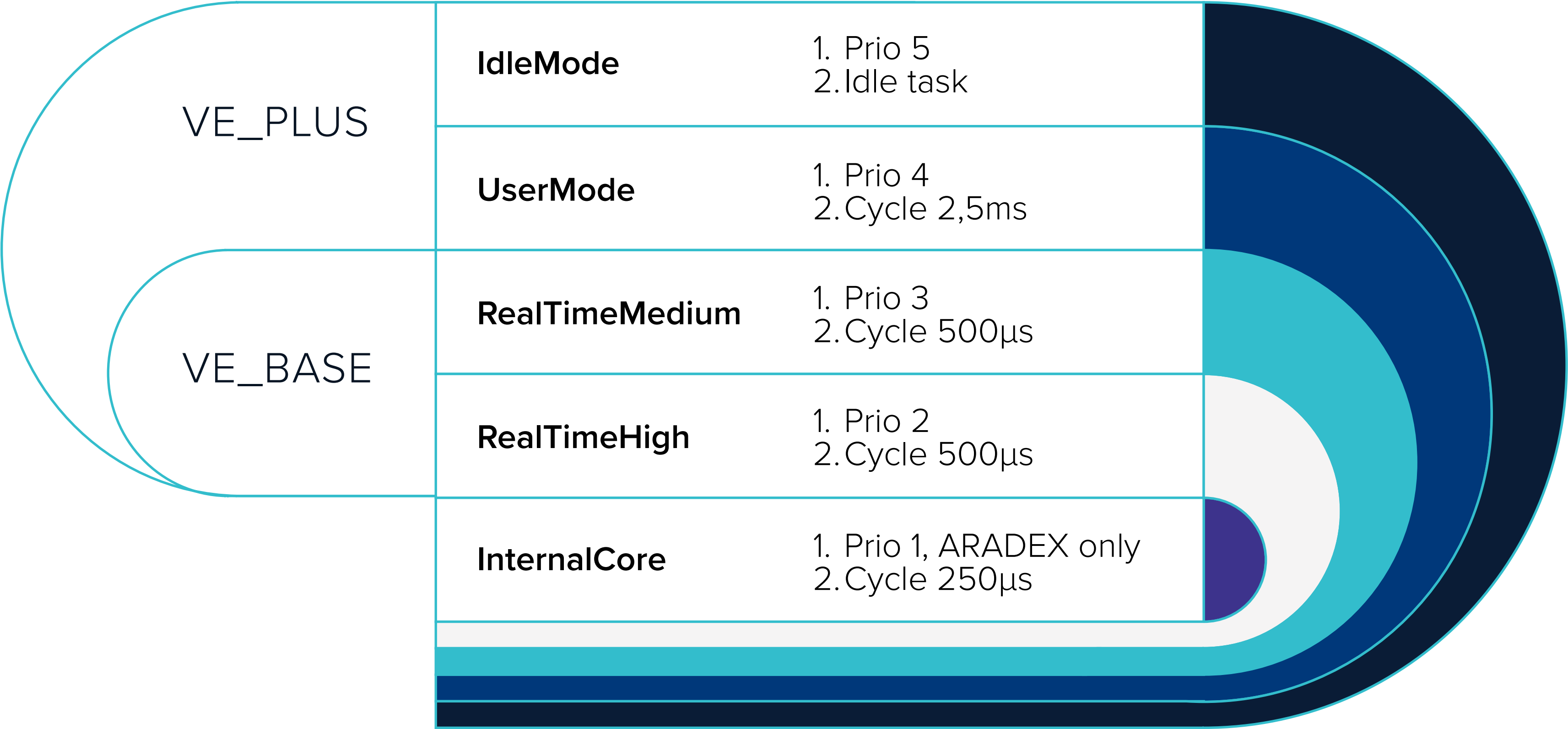


# INTEGRATED PLC “VE”

Functions and  
available modules

# / VE PLC

## Versions and functions



And a steadily growing portfolio of ARADDEX-made function modules available to be added



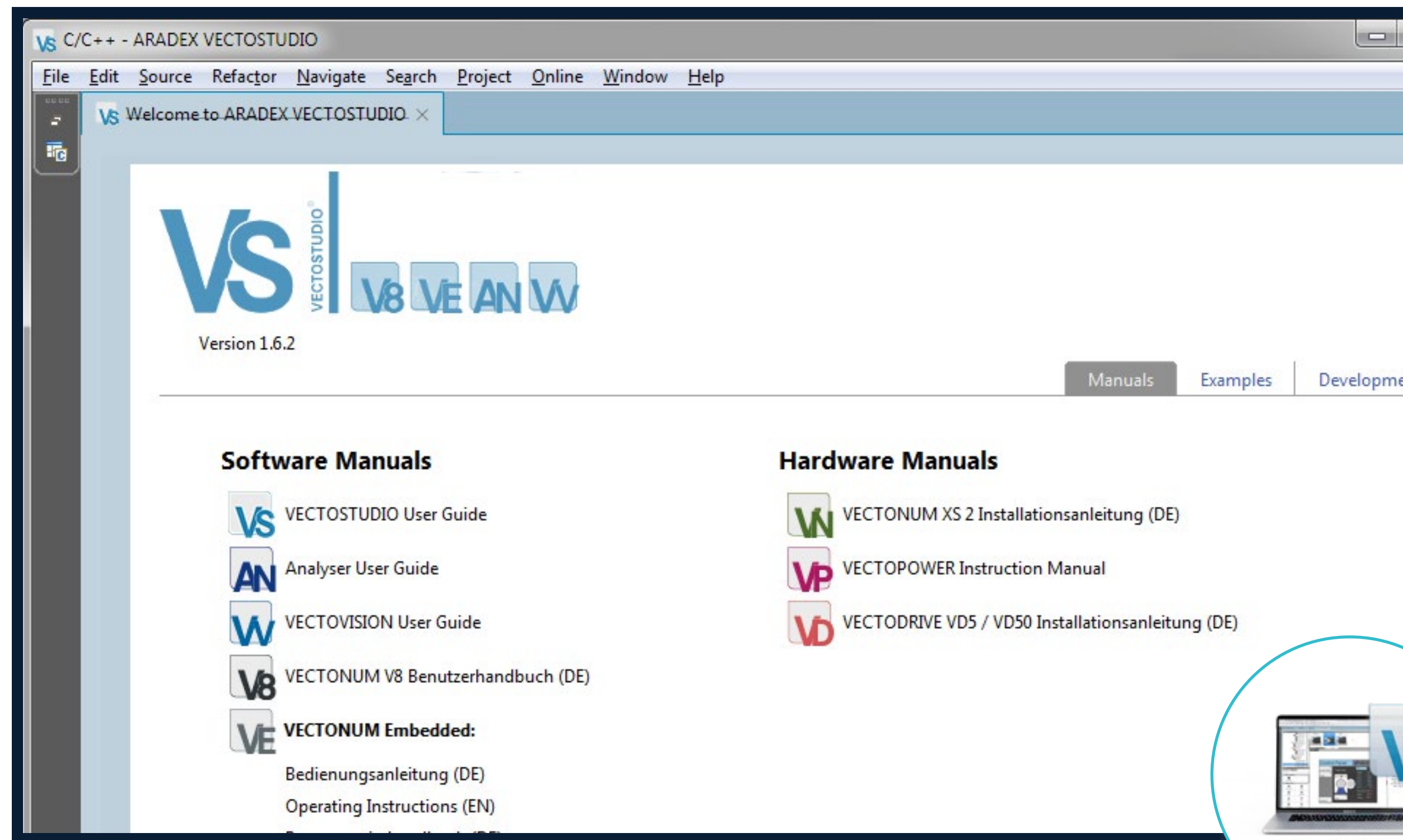


# VECTOSTUDIO “VS”

Strengths and your  
main benefits

# / VECTOSTUDIO

## Main strengths and benefits

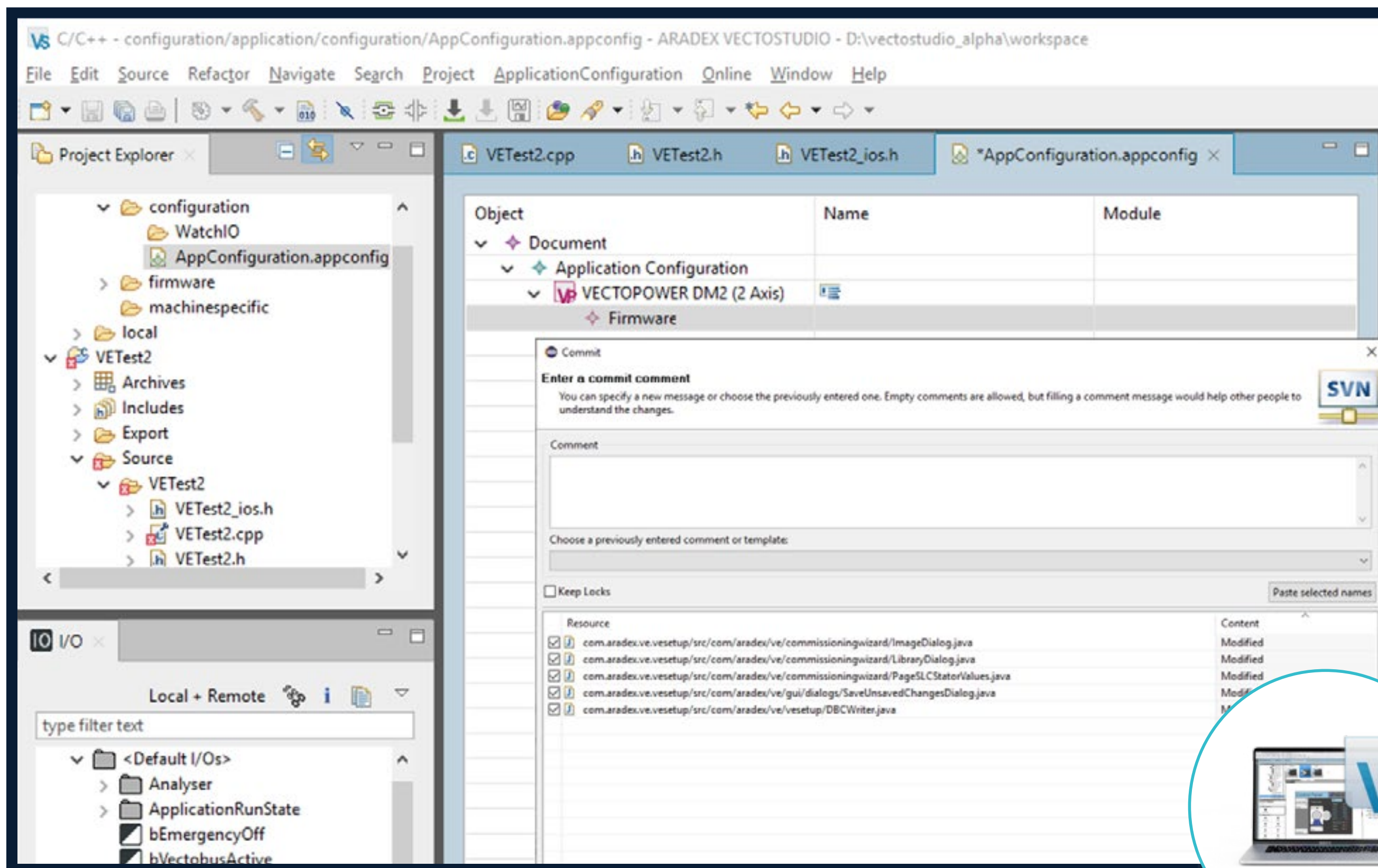


### Perfectly adapted

VECTOSTUDIO is optimally tailored to the VECTOPOWER VP600 inverters and VP5000 DC/DC converters as well as to their fields of application.

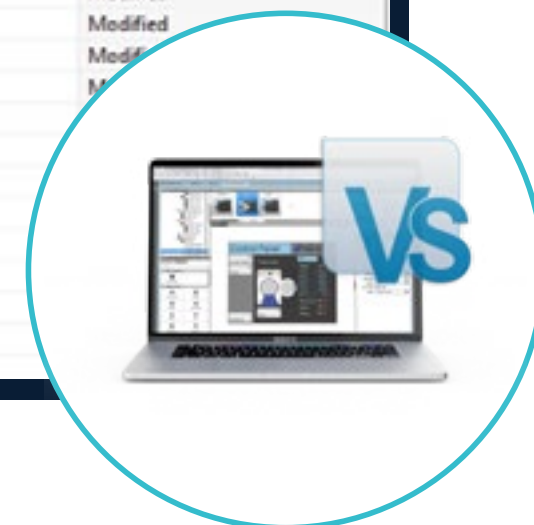
# / VECTOSTUDIO

## Main strengths and benefits



### IntegratedDevelopmentSystem

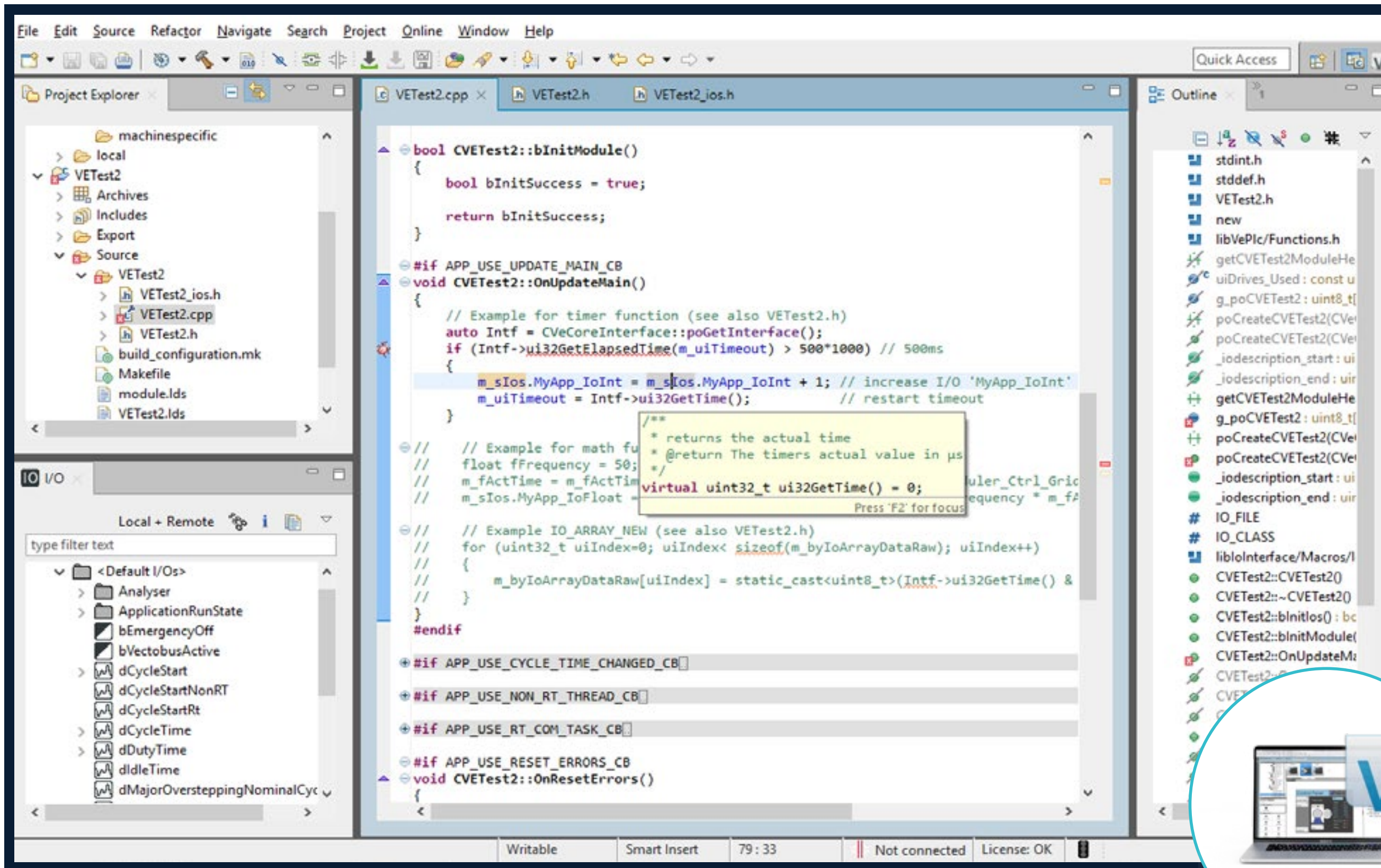
- Contains all required tools. For example: VEConfig and ANALYSER are integrated
- High-Level editor with navigation, refactoring...
- Effective project management GIT and subversion
- Easy to install in WINDOWS without administrative rights
- Possible to encrypt and decrypt source codes for safe transfer





**/ VECTOSTUDIO**

## Main strengths and benefits



## Your choice: C++ or IEC61131-3

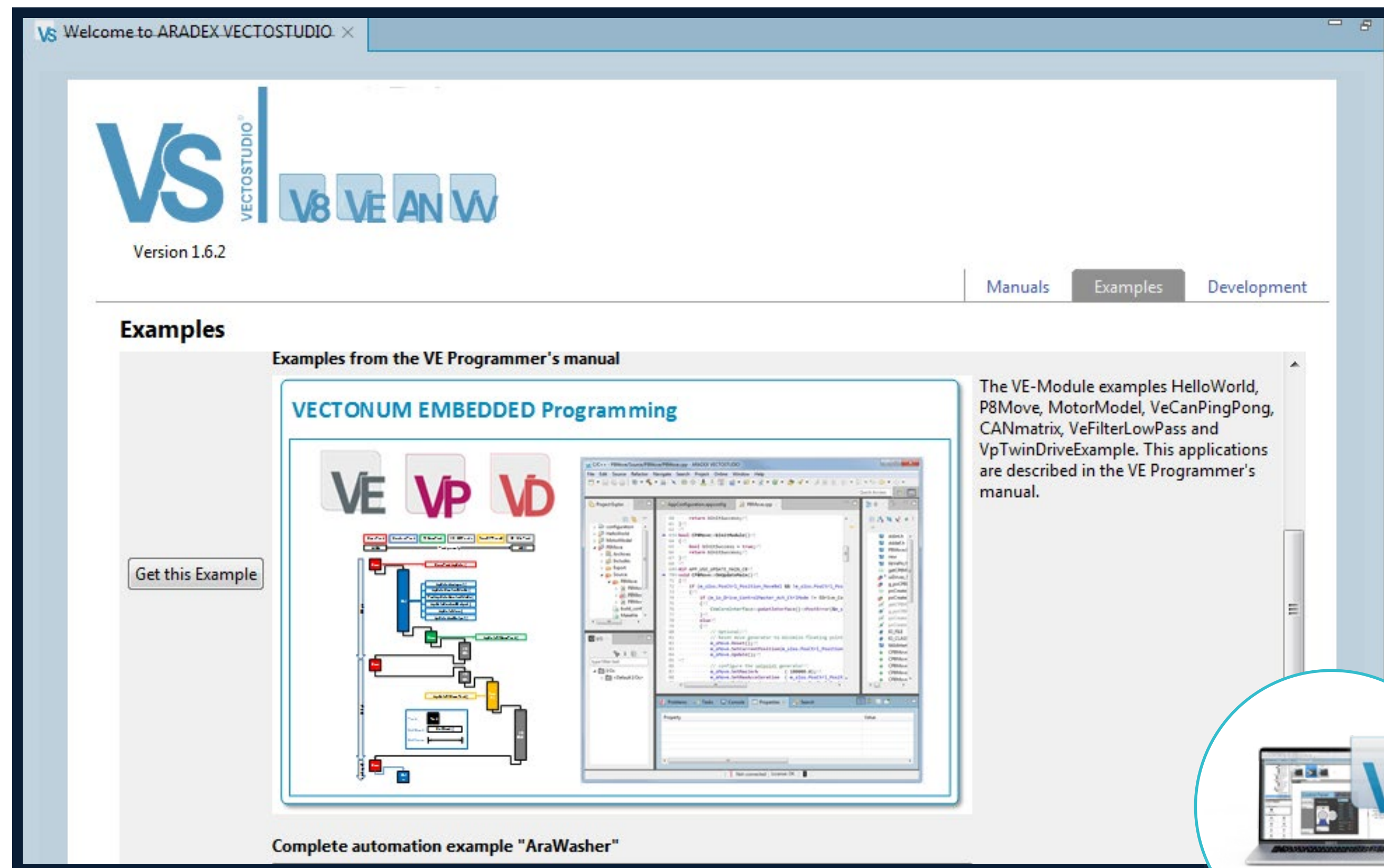
- You can use C++
- Or IEC61131-3
- You can even combine them





# / VECTOSTUDIO

## Main strengths and benefits



### Short development time

- Best practice examples and documentation flatten your entry
- Library of functions and modules integrated

### Option: combined development

- Your and our team create specification of a basic version
- ARADDEX team realize basic version
- You get source codes, including training on the real project
- Your teams implements the project
- We can support on an hourly basis

## IV

# VECTOSTUDIO “VS”

Main functions  
and versions



# / VECTOSTUDIO

## Versions and functions

Function	Lite	Professional
Connect/disconnect; restore backup	X	X
Read/write I/O and log view	X	X
Edit configuration	X	X
Edit, compile and download modules		X
Device operations (start, stop, restart)		X
Save analyzer		X
VEConfig XL integrated		X
Examples as source code	X	X
GIT and subversion		X
Encrypt/ decrypt		X

How to get it?  
Contact us!

# / Challenge us

## Review of your application

**Challenge us with your application, your demands and your ideas!**

- + Our engineers can work out or support the project planning for your application.
- + You receive the result as an electronic document: cornerstones of your project regarding electrification or hybridization including dimensioning done by our experienced project engineers.
- + We offer trainings and trial licences for VECTOSTUDIO.
- + Contact our sales team for more information.



Thanks for your attention!

**Optimized usability  
and performance  
for the best e-mobility**



📍 Ziegelwaldstr. 3, D-73547 Lorch, Germany

✉ Sales@aradex.com | Vertrieb@aradex.com

☎ +49 / (0)7172 / 9181-0