



The logo for NIDays Engineer Next is centered on a blue gradient background. It features the text "NIDays" in white, enclosed within a white rectangular border. To the right of this, the words "ENGINEER" and "NEXT" are stacked vertically in a large, bold, white sans-serif font. A yellow graphic element, consisting of three parallel lines forming a stylized arrow or chevron shape, is positioned between the two words. The background is decorated with several diagonal stripes: a wide green stripe, an orange stripe, and a red stripe on the left side; and several blue stripes of varying shades on the right side.

NIDays **ENGINEER**
NEXT



Synchronous and independent motion of two platforms

Stabilus Romania

Daniel Nema

Madalin Sbanca

Content

- Company presentation
- Presence in Romania
- NI in Stabilus
- Servodrives master slave control from LabView
 - Actual master-slave usage
 - Communications types
 - Parameters configuration
 - input
 - output
 - Operating modes
 - User interface



1 Founding Stabilus
Koblenz

1. Product:
"Stabilisator"/"Stabilizer"

2 Producing the world's first
mass-industrial non
locking gas springs in
series

LIFT-O-MAT

3 Production of blocking
gas spring in series
BLOC-O-LIFT

4 Series launch of locking
gas springs for swivel
chairs

STAB-O-MAT

5 Stepless door positioning
system produced in
series
DORSTOP

6 Series production of
electromechanical dual
drive for opening and
closing
"STAB-O-FOCS" now
"POWERISE"

7 Stabilus S.A. is listed on
the Frankfurt stock
exchange (23/05/2014)



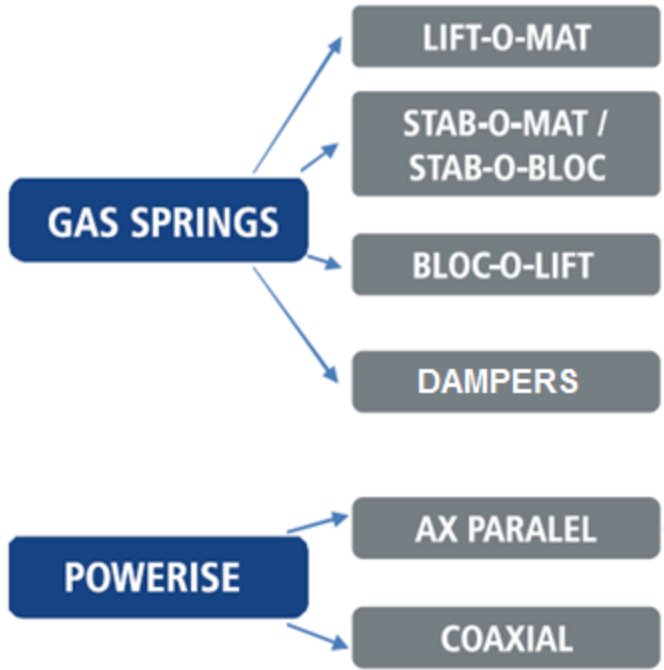
1962 1965 1970

2001 2002

2014



Total Production 1962 – 2015
2,891,860,000





- **Start of Production Swivel chair gas springs in October 2005**
- **100% Capacity Production**
 - since February 2006 Swivel chair
 - since March 2011 Powerise
 - since 2013 BOL
 - start 2016 LOM + DAEM
- **Total production**
 - 7,2 Mio units Gas Springs FY 15/16
 - 1,8 Mio units Powerise FY 15/16
- **Headcount – January 2017:**
 - over 1150 pers.



11 years of continuous growth and excellency

Equipment & Processes

... we make it possible



The Equipment and Process department

- 2010 – 3 automation engineers



- 2017 – 25 engineers on several areas



National Instruments in Stabilus

- Components Testing machines
- Final Testing machines (EOL-s)



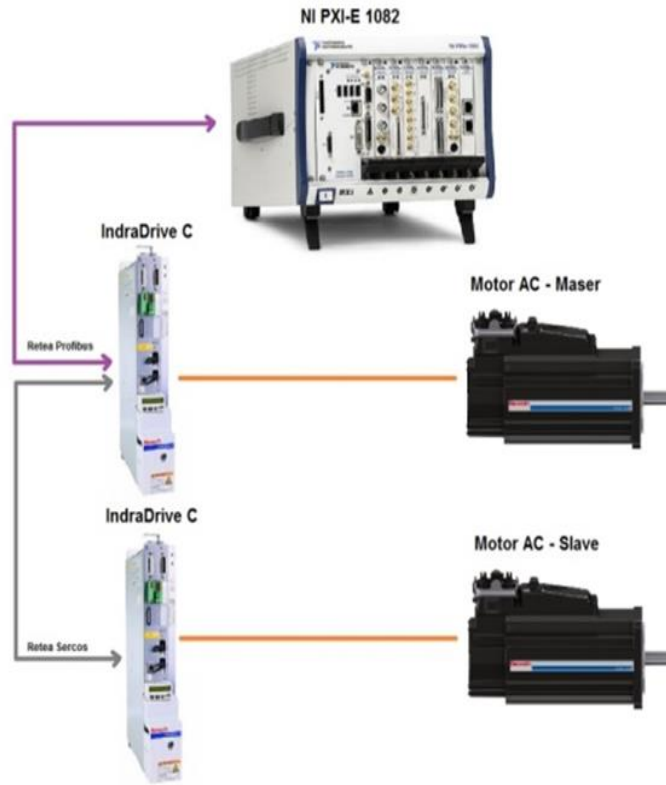


Servodrives master slave control from LabView

- Bachelor degree project of internship student
- Movements control request, of the platform in a synchronous mode.
- Using Bosch Rexroth high level controllers with external configuration.
- The chalange is to make the configuration from LabView using a PXI platform.



- Synchronous motion means a master slave control mode.
- Standard in the company, but using Siemens PLCs
- Assembly machines applications and material deforming processes
- Not feasible for testing machines which needs real time control and measurements
- From this needs came the option to use Bosch Rexroth motor controllers together with NI PXI in a special master-slave mode



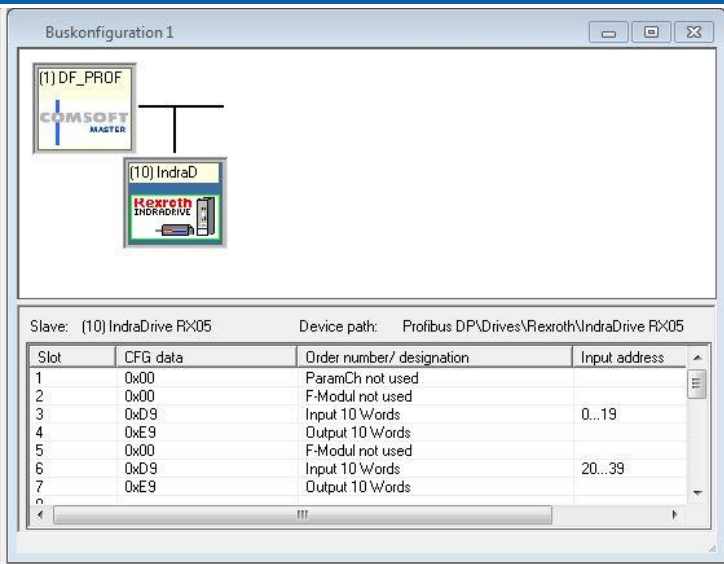
Communication types standards

Actual:

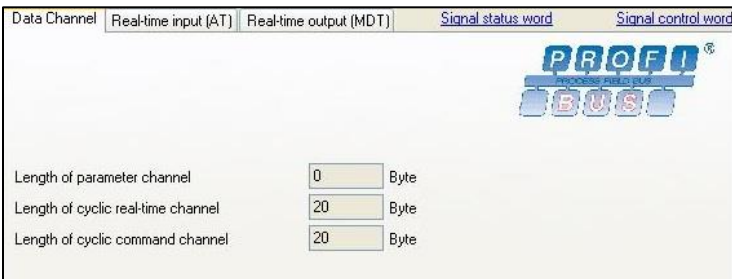
- ProfiBUS – from PLC to the master motor controller.
- Sercos – between the motors controllers

Future:

- ProfiNET – from PXI to the master motor controller.
- Sercos – between the motors controllers

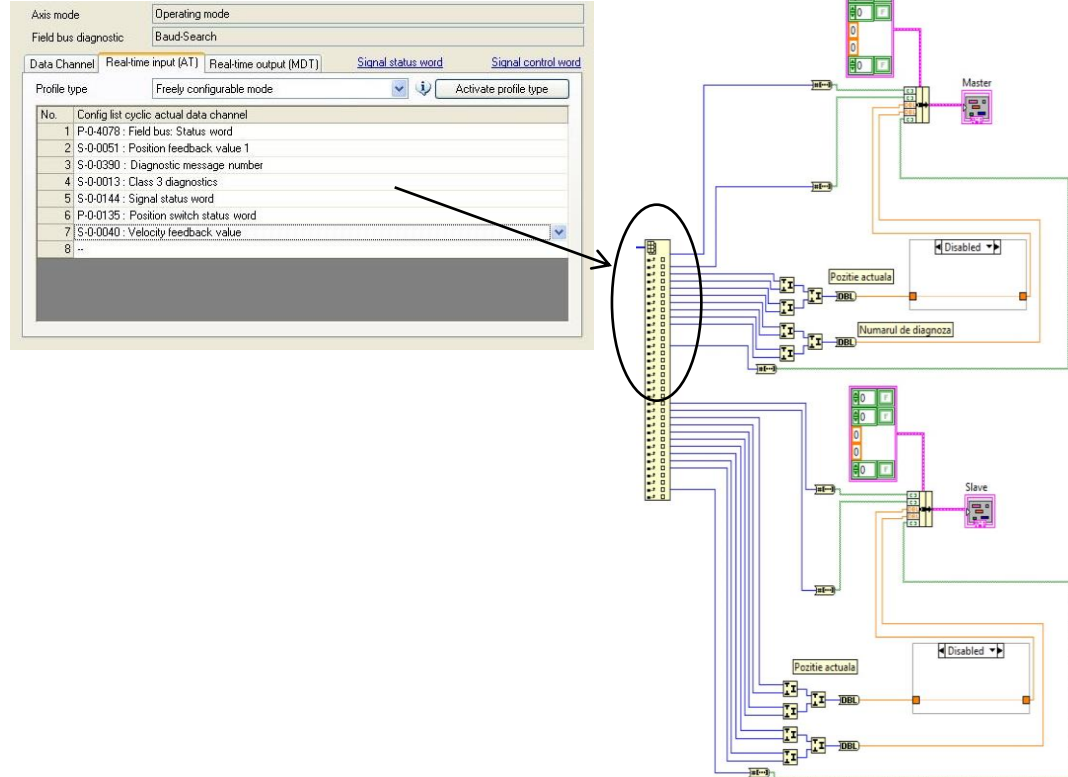


- ProfiBUS communication using Comsoft DF Profi module attached to PXI chassis and the controller of master motor
- To receive and send all the parameters that we needed, we configured a 20 bytes signal for receiving data and 20 bytes for sending data
- The communication was defined in both devices, the PXI and the Bosch Rexroth controllers



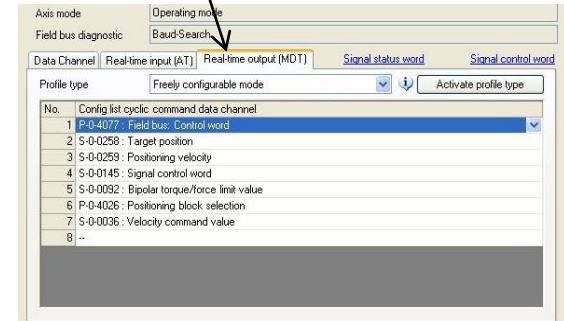
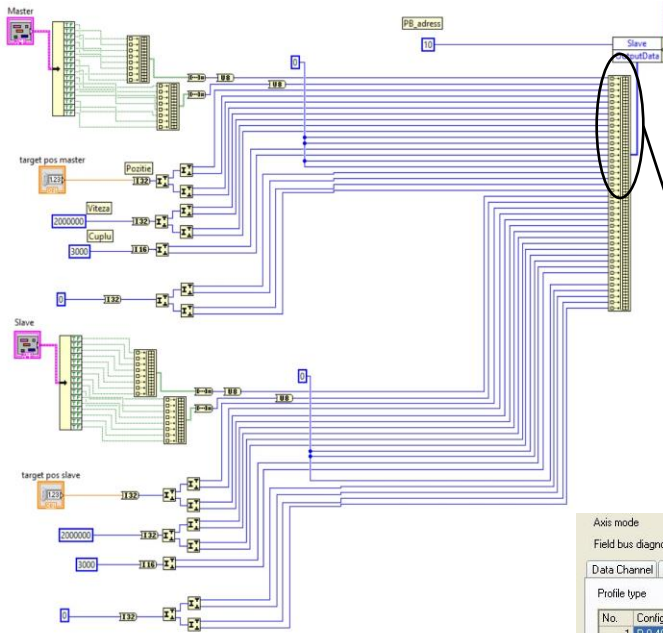
Parameters configuration

- Output parameters in the Servo definition
- Feedback option of the servo diagnose and status parameters
- Similar input parameters in the LabVIEW communication VI definition.



Parameters configuration

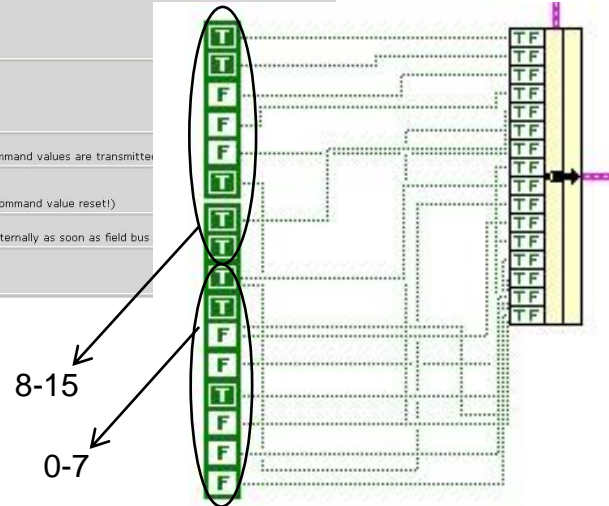
- Output PXI control parameters, which include:
 - new position
 - speeds
 - force limits
- The most important parameter:
 - control word
- Similar input parameters in the Servo controller on communication area.



See also Functional Description "Supported Profile Types"

Structure %

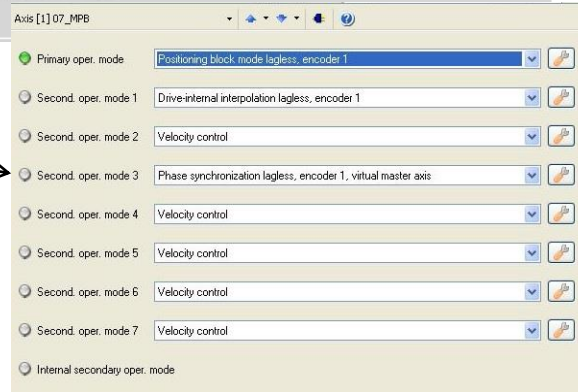
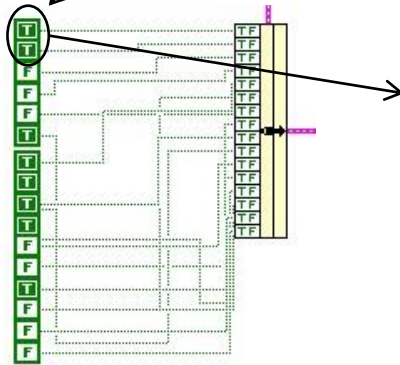
Bit	Designation/function
0	Command value acceptance Upon a change (S-0-0346, bit 0) - a positioning block is activated, or - the command position is applied.
1	Operating mode setting 0->1: Change to operating mode 1->0: Change to parameterization mode
2	Moving to zero (S-0-0149) 0->1: Start homing command "C6" 1->0: Exit homing command "C6"
3	Absolute / relative (S-0-0346, bit 3) (only effective when using "Positioning command value" (S-0-0282)) 0: "S-0-0282, Positioning command value" is processed as absolute target position in the drive 1: "S-0-0282, Positioning command value" is processed as relative travel path in the drive
4	Immediate block change (S-0-0346, bit 5) (only effective when using "S-0-0282, Positioning command value") 0: "S-0-0282, Positioning command value" is only applied after the last active target position was reached 1: "S-0-0282, Positioning command value" is applied immediately on toggling of command value acceptance
5	Clear error (S-0-0099) 0->1: Start error clearing command "C5" 1->0: Exit command "C5"
7/6	Positioning/jogging (S-0-0346 bit 2 + S-0-0346 bit 1) Positioning activated by: <input type="checkbox"/> 00: Positioning active, started by changing bit 0 Positioning aborted by: <input type="checkbox"/> 01: Infinite travel in positive direction (jog+) 10: Infinite travel in negative direction (jog-) 11: Stopping the axis (positioning stop)
9/8	Command operation mode (with SERCOS: S-0-0134, bit 8... 9) 00: Primary operation mode 01: Secondary oper. mode 1 (e.g., jogging) 10: Secondary oper. mode 2 11: Secondary oper. mode 3
12	IPOSYN Interpolator clock (only in cycl. pos. control): Toggles when new command values are transmitted
13	Drive Halt (P-0-0116, bit 13) 0-> 1: Drive start 1-> 0: Drive Halt, i.e., the drive is immediately decelerated (speed command value reset!)
14	Drive enable (P-0-0116, bit 14) Irrespective of P-0-4077, bit 14 of "P-0-0116" is automatically set internally as soon as field bus
15	Drive ON (P-0-0116, bit 15) 0->1: Drive enable 1->0: Best possible deceleration according to "P-0-0119"



Parameters configuration

- Control word
 - configuration of the bits used to control the servo drive motion type
 - available from the LabVIEW function depending on the needed status of the servo

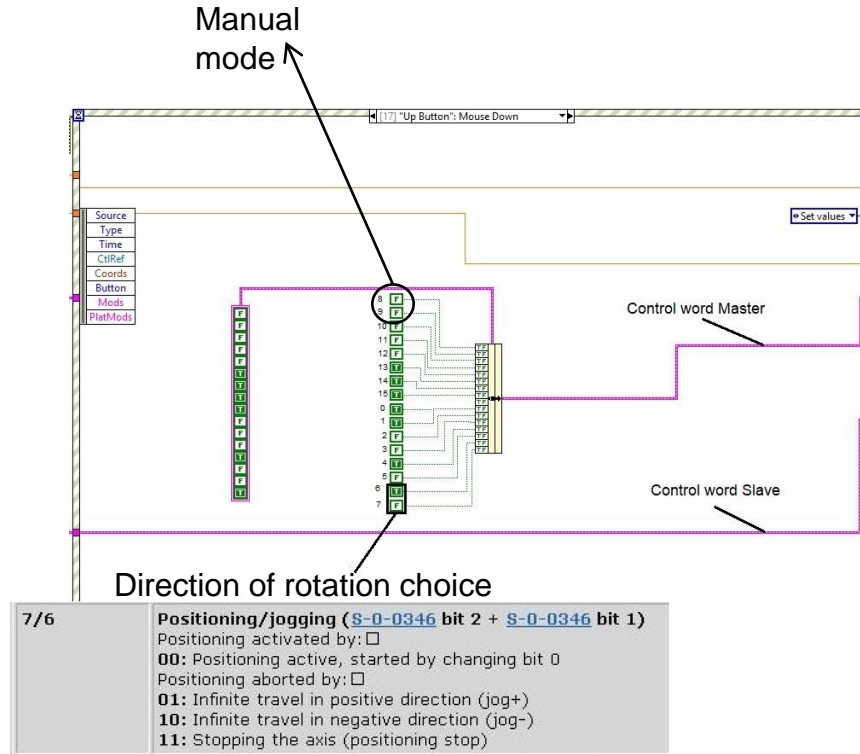
9/8 Command operation mode (with SERCOS: [S-0-0134](#), bit 8... 9)
 00: Primary operation mode
 01: Secondary oper. mode 1 (e.g., jogging)
 10: Secondary oper. mode 2
 11: Secondary oper. mode 3



- Bites 8 and 9 switch the operating modes of the servo

- We have configured the operating modes in Bosch Rexroth controller
 - Manual
 - Automatic send to position
 - Master Slave

Operating modes



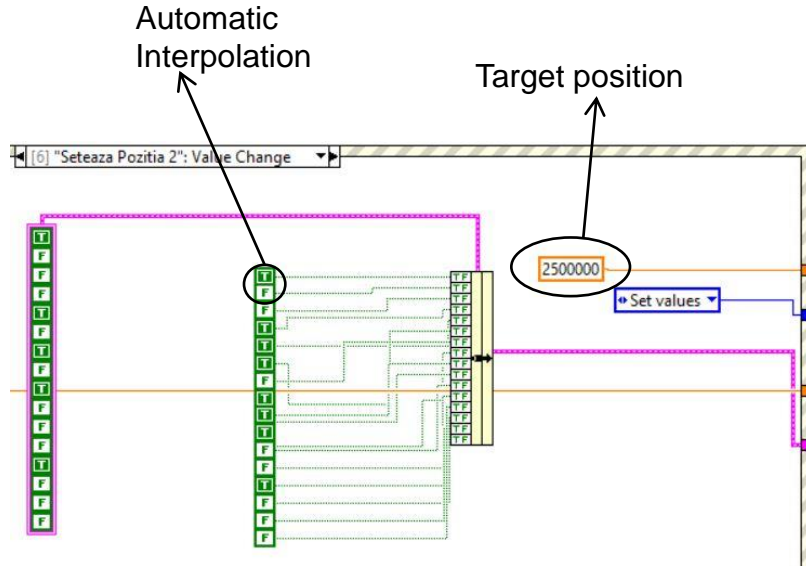
Control word – manual

- rotation direction is chosen using bit 6 and 7
- in the same time the operation mode should be “positioning mode” for manual jogging

Operating modes

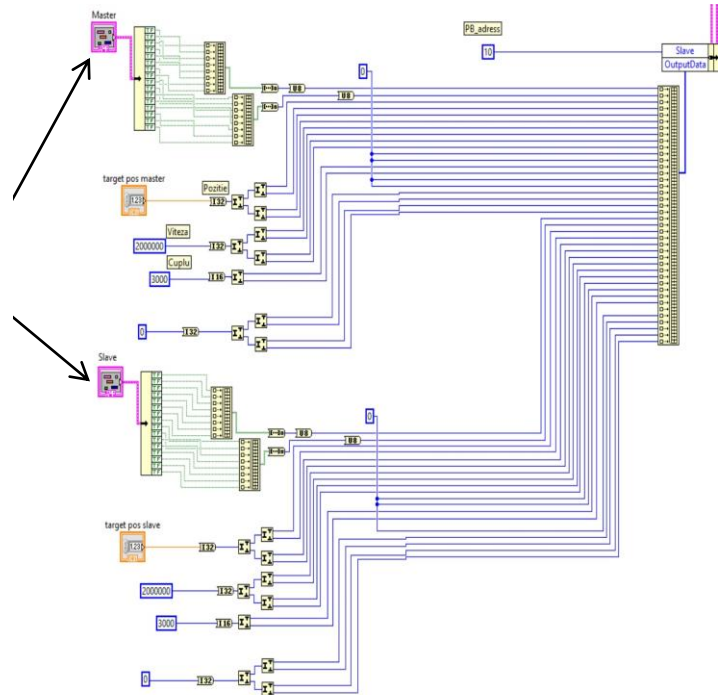
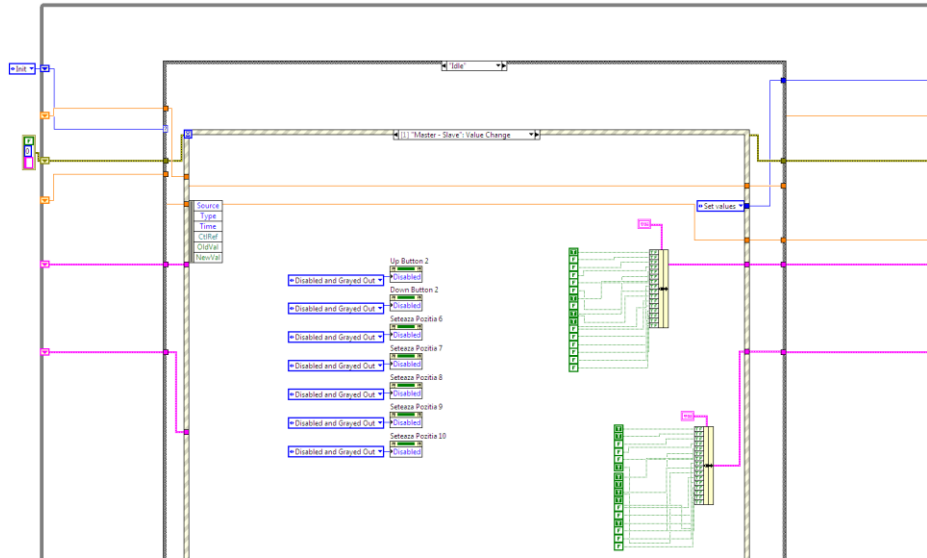
Control word – set position

- Movement to a selected position in the work range, is made with “interpolation mode” and sent the value

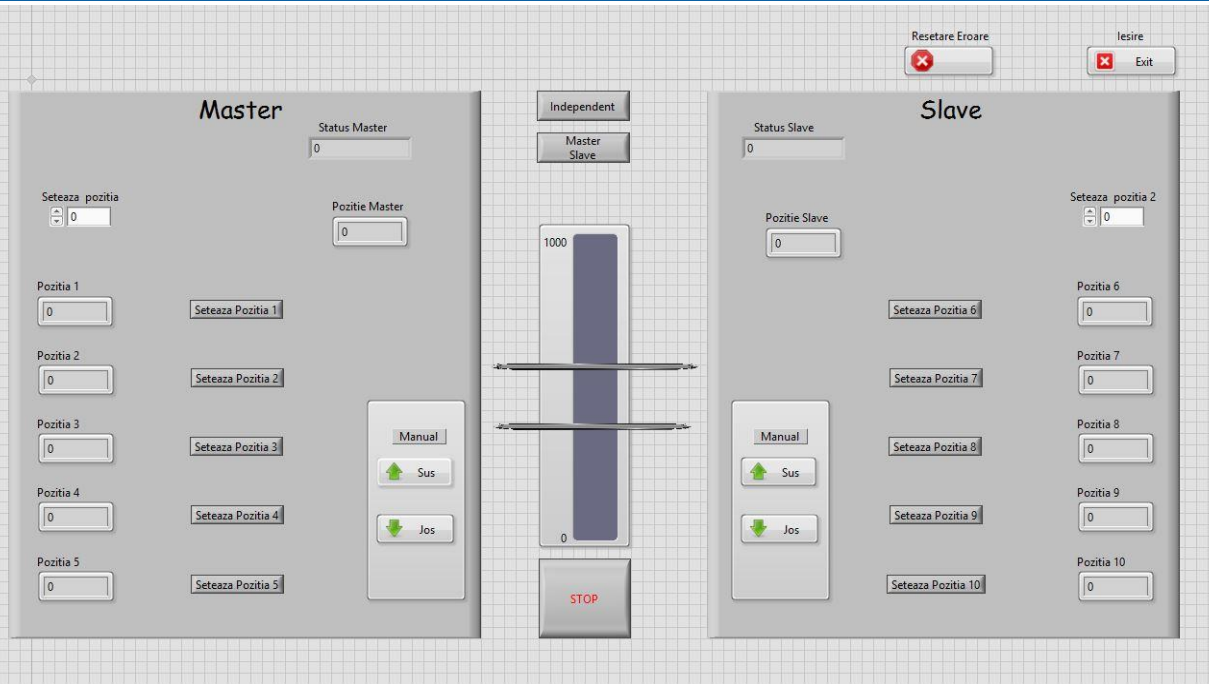


- LabVIEW program is based on a state machine structure waiting for a command from the user interface

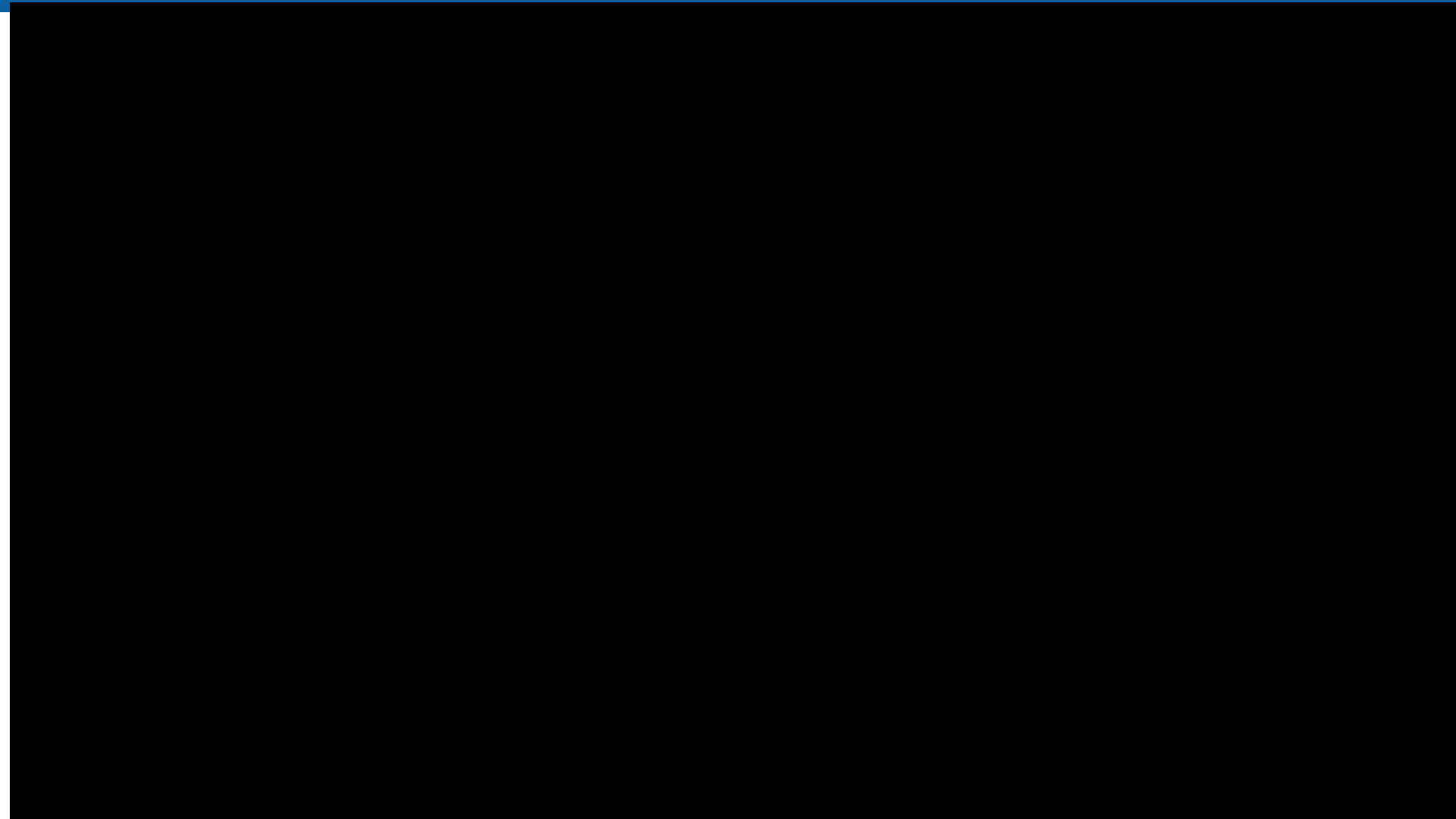
- Speed and torque are also sent from LabVIEW program




User interface



- User friendly interface
- Platforms movement simulation
- Real position feedback





Next Steps

Next steps of the project will be upgrading from ProfiBus communication to Profinet for a faster data exchange.

Thank you!

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