TASCA Target Wheel Control

Motor Control System
Introduction

• What is the meaning of TASCAa and what it is?
  
  Trans-Actinide Separator and Chemistry Apparatus
  A recoil separator with maximized transmission for transactinides from hot fusion reactions with actinide targets, for chemical investigations of elements 104...116; nuclear structure and nuclear reaction investigations of the most n-rich nuclides.

• Which are the principal components and how do the experiment works?

  It consists of dipoles and quadrupole magnets, gas pressures and differential pumping, a heavy ion beam and irradiation related aspects like the target wheel, control system and communication systems for data acquisition, automated chemistry set-ups and control of the modules.
Introduction
• How did the Target wheel look like?

![Banana-shaped Window and Target-backing Foil](image)

**ARTESIA**
GSI Target Wheel

For experiments at X1 with 25% duty cycle and 5 ms pulse length

2000 rpm:
120° → 10 ms
Sequence: 1-3-2-1-...
Principal System Requirements:

- The beam operation in UNILAC take place with pulse signal of 20ms (50Hz) cycle time and with 25% duty cycle. It means 5ms for the beam pulse. The motor for the wheel should be total synchronized with the beam operation and with an accuracy of +/- 200μs.
- The motor should start and stop movement with a soft incremental linear function.
- The control system should be able to adjust the beam signal to the middle of the target frame.
- The system must to give off the information about the position of the target during the experiment, which frame is radiated at the moment.
- The motor and the system should be able to work with different kinds of wheels. With other dimensions and number of frames.
- Additional requirements.
Target Wheel control

System Components:

• AM3053-0G31 Servomotor (Beckhoff)

• AX5106-0000 Servo drive (Beckhoff)

• AX2090-MD50-0012 Motor choke (Beckhoff)
• C6920-0000 Industrial PC (Beckhoff)

• EtherCAT coupler (EK 1100) input and output terminals (EL2002, EL 1252) (Beckhoff)

• Encoder and Motor cable (Beckhoff)
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Software components:
- TwinCAT System
- TwinCAT System Manager
Target Wheel control

Motor configuration:
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NC configuration:

[Image of NC configuration screen]

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Target Wheel control

- TwinCAT PLC control