How to record the data (I)

- Traceability nc_functions FOR:
  - 1. Switching [Starting/Stopping] Data Collection Tasks
  - 2. Could also be used for Close Loop Tasks ?????

![Diagram](image)
Draft ARM for traceability nc_functions.

(ABS) nc_function

generic traceability functions (BLOCK I)

switching (on/off) functions (BLOCK II)

model for close-loop Synchronous functions (BLOCK III)
Traceability nc_functions. BLOCK I.
Generic, single data functions

(ABS) nc_function

- get_time
- log_tool_data
- log_machine_data
- log_coolant_type
- time_measure
Traceability nc_functions. BLOCK II.
Machining_Parameters:
- 1. Speeds: Cutting Speed, Spindle Speed and FeedRate Speed.
- 2. Depth of Cut
- 3. Coolant Pressures, Level and Temperatures.
- 4. Positions (relative/absolute):
  - 4.1 - Interpolated Positions by the CNC
  - 4.2 - Positions as given by the encoders
  - 4.3 – Axis 3D Displacements (tolerances)
- 5. Motor Currents or Powers (by Axis/Spindle/channel)
- 6. % of Drive Loads.
- 7. Machine Forces and Torques

Tool Monitoring:
- 8. Tool Tip Temperature (Cutting Operation Temperature)

Workpiece:
- 10. Surface Finish (Roughness)
Traceability nc_functions. BLOCK II.
Alternative Definition Samples

(ABS) nc_function

get_axial_depth_of_cut

Positions S[0:?]

Bounded_curve

Get_cutting_speed

Positions S[0:?]

Bounded_curve
Traceability nc_functions. BLOCK II.
Alternative Definition Samples + Data place holder

(ABS) nc_function

- **get_axial_depth_of_cut**
  - Measured_values S[0:?]
  - Measuring_times S[0:?]
  - Positions S[0:?]
  - REAL
  - Time_Measure
  - Bounded_curve

- **Get_cutting_speed**
  - Measured_values S[0:?]
  - Measuring_times S[0:?]
  - Positions S[0:?]
  - Speed_Measure
  - Time_Measure
  - Bounded_curve
Traceability nc_functions. BLOCK III.

(ABS) nc_function

start_synchronized_action

INTEGER

its_id

stop_synchronized_action

(ABS) nc_function

its_mode_scope

mode

its_frequency

frequency

its_condition

boolean_expression

its_actions L[0:?]

(DER) nc_function

Set_alarm/warning

Write_custom_event

Log_sensor/variable_value
How to record the data (I)

- In Ap-238, 2 possible entry points:
  1. In the executable Structure as nc_functions
  2. As machining_functions of workingstep operations