Meeting:	**Coordination meeting on Bumper time calibration**		
Date:	2016-03-08 10:30-11:30	**Chair:** WG	**Minutes:** WG
Participants:	Kraus, Ingrid; Krause, Udo; Mueller, Raphael; Pfeil, Regine		
Distribution:	Participants + stakeholders	**Doc-ID:**	F-EP-YR-BumperTimeCalib

A: Action, D: Decision, I: Information	Who	Due Date

1. Background

The Cryring injection bumper (YR01LBx) is an electrostatic device consisting of 4 pairs of electrodes and is required to perform multi-turn injection with ion beam from the local injector. The required high-voltage applied to the electrodes is provided by a custom-made power supply which can be switched manually between two operation modes / voltage ranges. Behind the scenes these two voltage ranges are realized by switching between two physical power supplies.
The high voltage delivered as output of the supply has a specific time structure (the voltage falls linearly from a maximum value to zero within an adjustable time, see documentation document in Sharepoint) which can be controlled by sending a 12Bit set value to the supply providing a set value range from 0-4095. One specialty of this control is, that the maximum value 4095 sets the minimum time and 0 the maximum and that the response of the supply to the set value is not linear – i.e. doubling the set value does not double the fall time. Hence, the set-value to fall-time behavior has to be measured /calibrated by SBDE and has to be considered in an appropriate way in the control system.

2. Where shall the calibration data be stored?

Two possible places of storing the calibration data were discussed:

- Hard-code the time structure in a FESA class
- Store calibration curve in LSA-DB/CDB

Decision:
The data shall be stored in the LSA-DB as polynomial calibration curves.

Assumptions & open points:

- A: The set-value to fall-time response can be modeled as polynom
- A: CDB will be the entry point for the data which will be provided by SBDE
- OP: What will be the proper Device Class in CDB to attach this data to? Power Converters? Post meeting note: WG checked in CDB which Devices Classes he can use → only “NC Magnets” were available in the selector (user dependency?)
- OP: Are the required unit types (seconds/set value) already available in CDB?

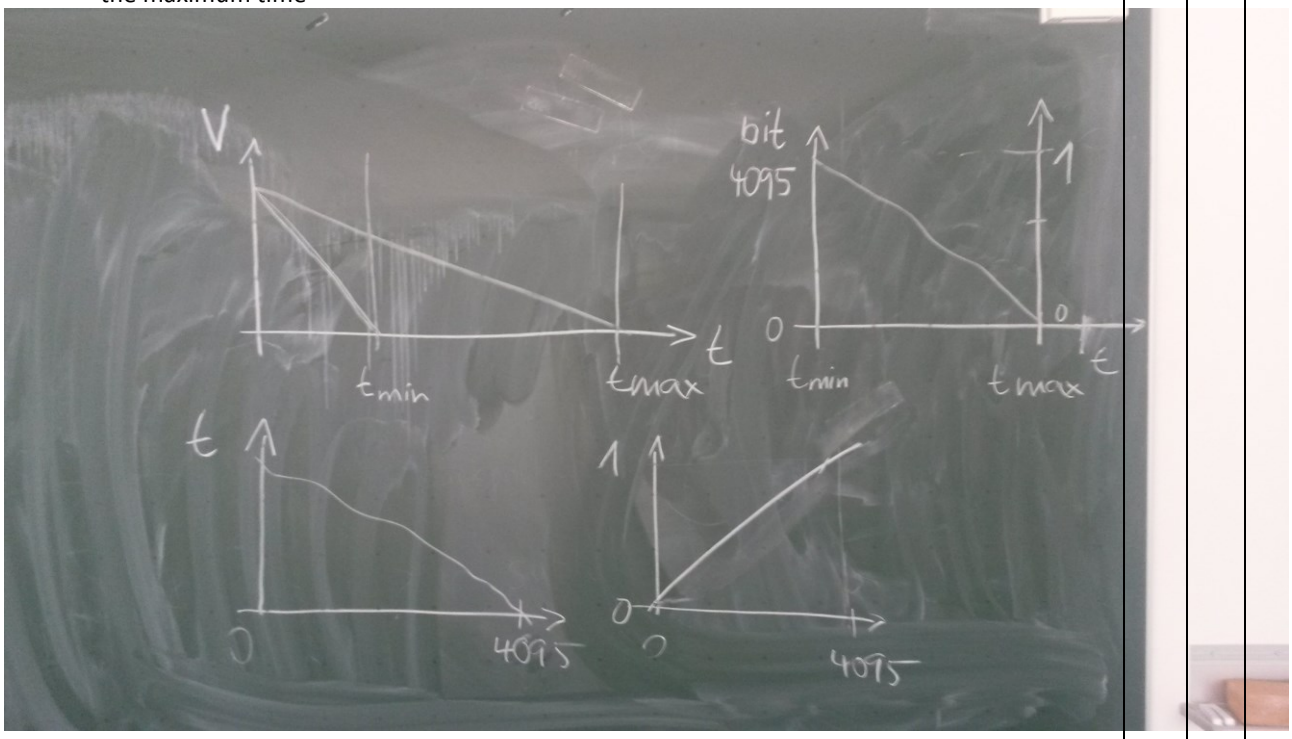
3. How shall the set value be represented in the interface of the FESA class?

Three possible options were discussed:

1. The set-value shall be represented without conversion as 0-4095 integer
2. The set-value shall be represented by a 0-1 decimal value, where 0 is the maximum time, 1 is

the minimum time

3. The set-value shall be represented by a 0-1 decimal value, where 0 is the minimum time, 1 is the maximum time



Decision:

- The set-value shall be represented by option 2 to provide a certain level of user-friendliness and device-agnostic interface.
- SBDE shall provide calibration data based on the normalized (0-1) scale

4. How shall the conversion be handled?

Questions came up if the set-value scale conversion will be done linearly (1:1) or might require non-linear conversion?

Decision:

- The scale shall be normalized linearly ($S_{normalized}$(set-value) = 1/4095 * set-value)

5. Representation of the power supply/ies in FESA

Questions aroused if the Bumper power supply shall be represented in FESA as 1 device (approach in last meeting on the Bumper power) or rather as 2 devices. The second approach has some advantages with respect to detecting incompatible system settings concerning physical switch at the device and choice of power supply in the software.

Decision:

- The decision of last meeting was confirmed. The Bumper power supply shall be represented as 1 device in FESA. Possible inconsistent states during operation will be caught by interlock and shall be prevented by administration/training.