



Multiplexing in FESA

Overview

- **Part I - The concept**
- **Part II - Before execution**
- **Part III - Setting a new Voltage to the Hardware**
- **Part IV - Returning a new current to the client**
- **Part V - Exercise**



Part I - Our facility

Accelerator

- SIS
- ESR
- UNI
- SIS18
- SIS100
- ...

- ## Accelerator
- SIS
 - ESR
 - UNI
 - SIS18
 - SIS100
 - ...

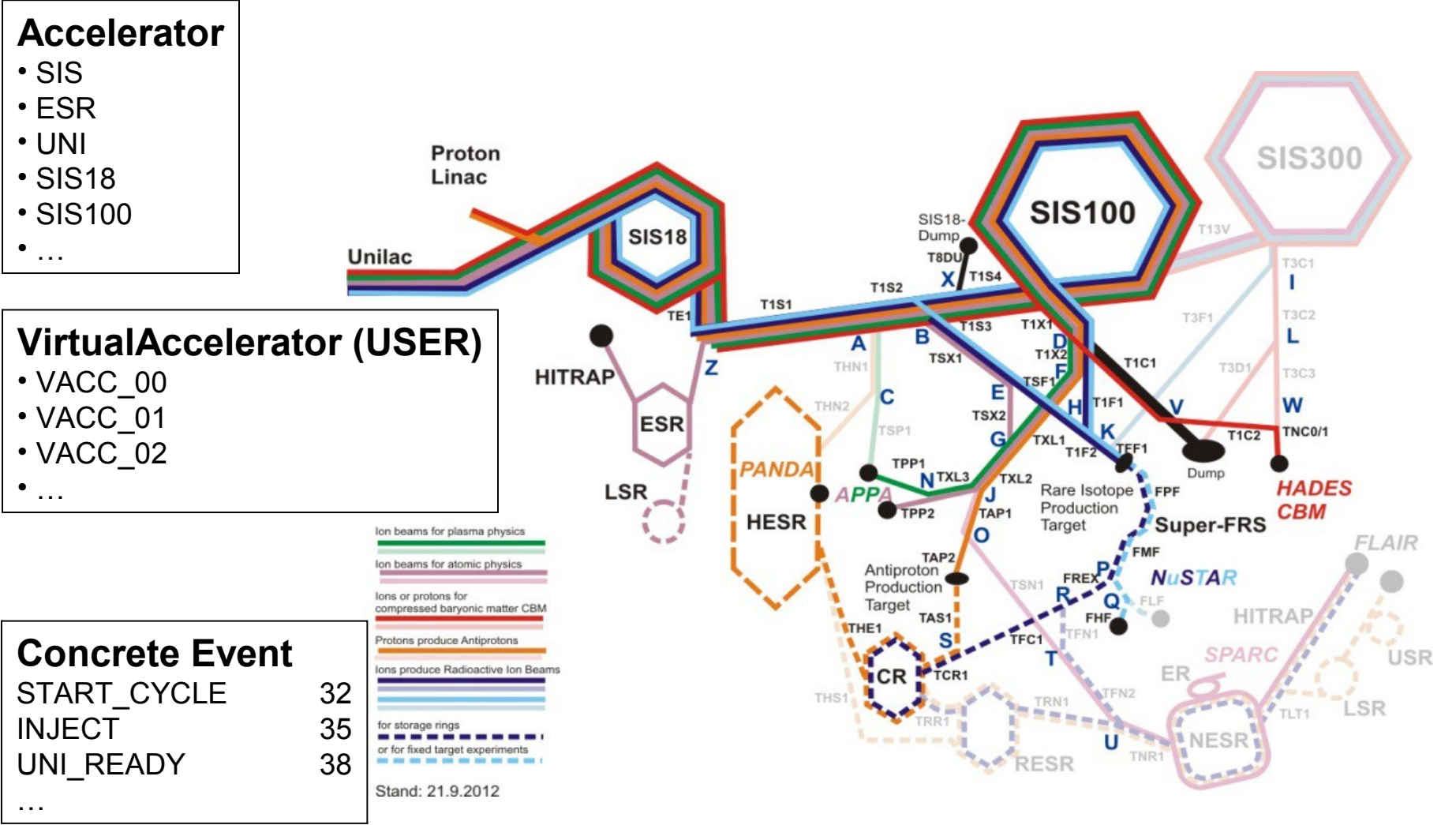
- **VirtualAccelerator (USER)**
- VACC_00
- VACC_01
- VACC_02
- ...

- **VirtualAccelerator (USER)**
 - VACC_00
 - VACC_01
 - VACC_02
 - ...

Concrete Event	
START_CYCLE	32
INJECT	35
UNI_READY	38
...	

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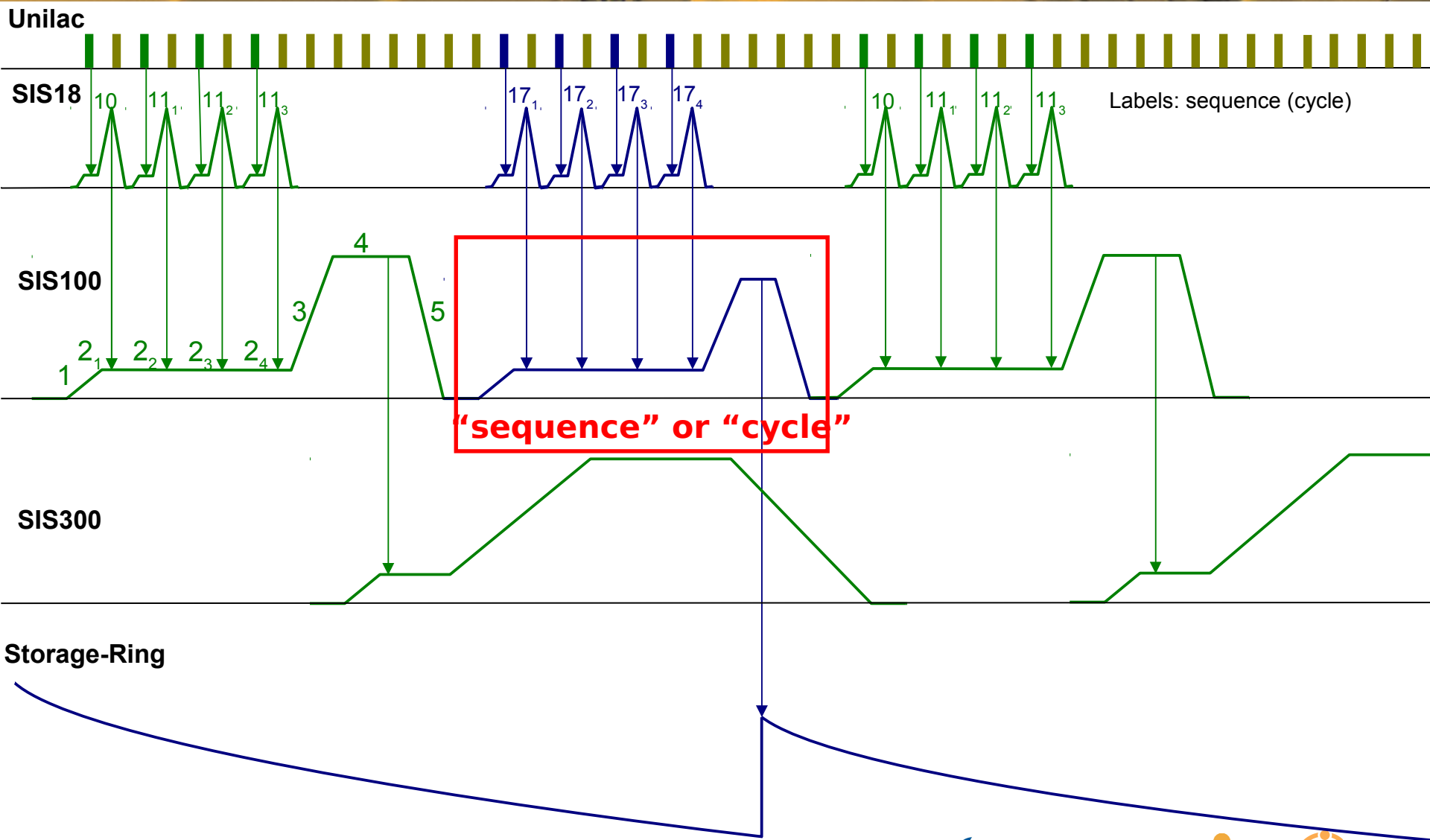
Concrete Event	
START_CYCLE	32
INJECT	35
UNI_READY	38
...	



Part II Timing Configuration

```
<telegram-layout>
  <group name="USER" groupId="1" type="EXCLUSIVE" size="32"
    multiplexable="yes" comment="Virtual Accelerator names of the SIS Cycle">
    <line name="VACC_00" value="1" default="no" comment="VrtAcc S00" />
    <line name="VACC_01" value="2" default="no" comment="VrtAcc S01" />
    <line name="VACC_02" value="3" default="no" comment="VrtAcc S02" />
    <line name="VACC_03" value="4" default="no" comment="VrtAcc S03" />
    <line name="VACC_04" value="5" default="no" comment="VrtAcc S04" />
    <line name="VACC_05" value="6" default="yes" comment="VrtAcc S05" />
    <line name="VACC_06" value="7" default="no" comment="VrtAcc S06" />
    <line name="VACC_07" value="8" default="no" comment="VrtAcc S07" />
    <line name="VACC_08" value="9" default="no" comment="VrtAcc S08" />
    <line name="VACC_09" value="10" default="no" comment="VrtAcc S09" />
    <line name="VACC_10" value="11" default="no" comment="VrtAcc S10" />
    <line name="VACC_11" value="12" default="no" comment="VrtAcc S11" />
    <line name="VACC_12" value="13" default="no" comment="VrtAcc S12" />
    <line name="VACC_13" value="14" default="no" comment="VrtAcc S13" />
    <line name="VACC_14" value="15" default="no" comment="VrtAcc S14" />
    <line name="VACC_15" value="16" default="no" comment="VrtAcc S15" />
  </group>
</telegram-layout>
```


Part I - The Beam Production Chain

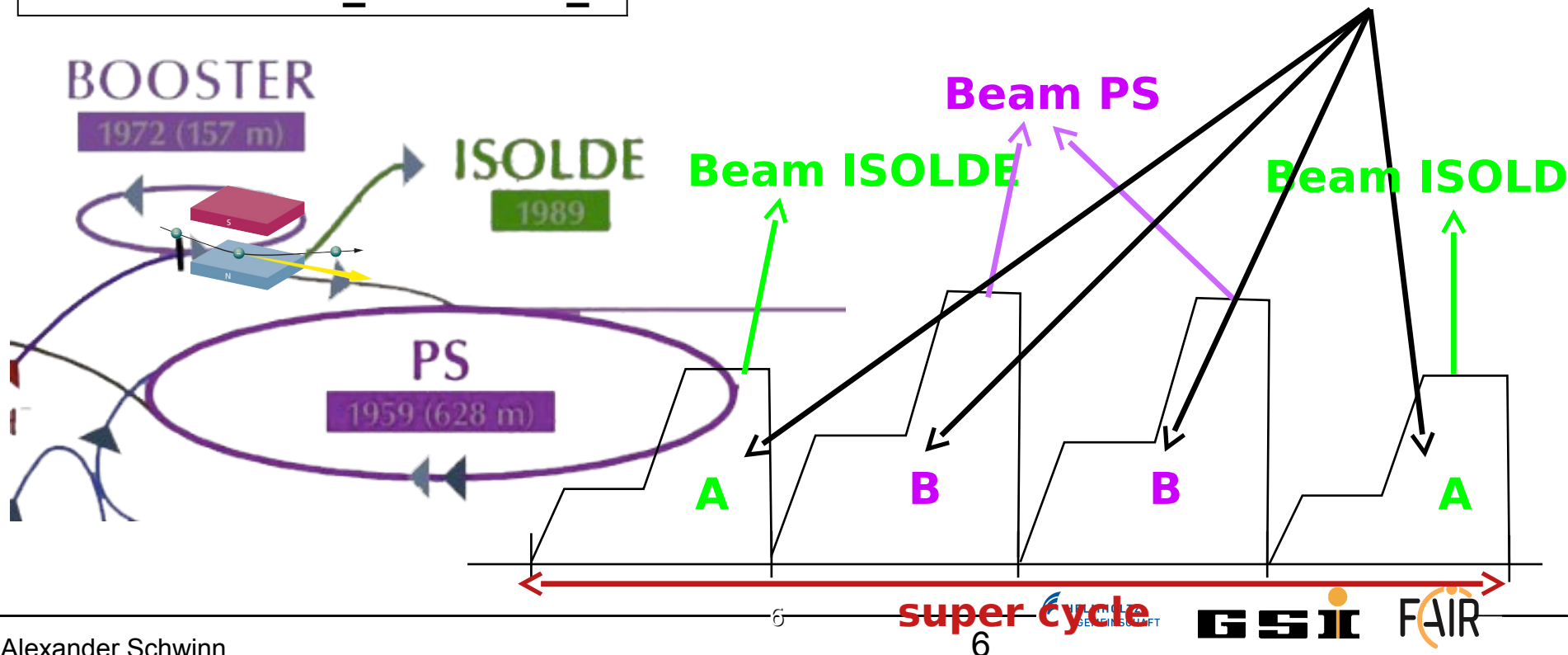


Part I - The cycle-concept

- Different types of beams (cycles)
- Cycles are organized in a sequence called “super cycle”
- A super-cycle is repeated continuously.
- Supercycles are accelerator-specific

Accelerator = TL_BoosterPS_1

VirtualAccelerators (USERS)

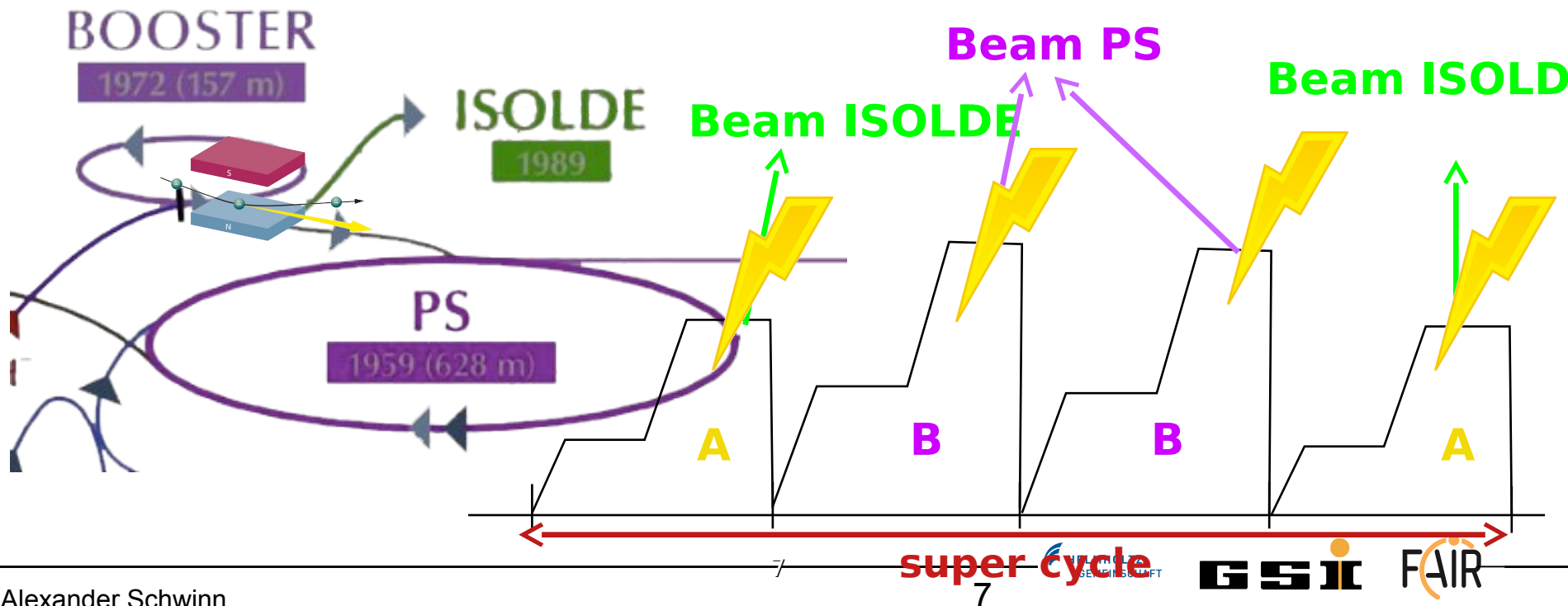


Part I - The cycle-concept

Field: **fdCurrent**

VirtualAccelerator	A	B	B	A
Field-Value	3.1kV	1.5kV	1.5kV	3.1kV

t



Part II Design Phase

▼ e data	(device-data
▼ e device-data	(configuration
▼ e setting	((state-field?,
▼ e field	((description'
a multiplexed	true
a name	
a persistent	true
▼ e array	((dim custo
a type	long
e dim	10

▼ e interface	(device-interface
▼ e device-interface	(setting?, acquis
▼ e setting	(command-prop
e command-property	((description?), (
e setting-property	((description?), (
▼ e setting-property	((description?), (
a visibility	operational
a name	
a multiplexed	true
e value-item	((description?, (s
e update-flag-item	(custom-type-sc
e cycle-name-item	(array, data-field
e set-action	(server-action-re
e get-action	(server-action-re

▼ e events	(sources?, logical-eva
e sources	(timing-event-source
▼ e logical-events	(logical-event+)
e logical-event	
e logical-event	
▼ e logical-event	
a use	required
a name	
a type	timing

Part II Instantiation File (per FEC)

▼ **e** device-instance

ⓐ name

▼ **e** configuration

▷ **e** description

▷ **e** accelerator

▼ **e** timingDomain

ⓐ value

SIS

▼ **e** mainMuxCriterion

NONE

ⓐ value

SIS

▷ **e** global-instance

ESR

UNI

▼ **e** mainMuxCriterion

ⓐ value

USER

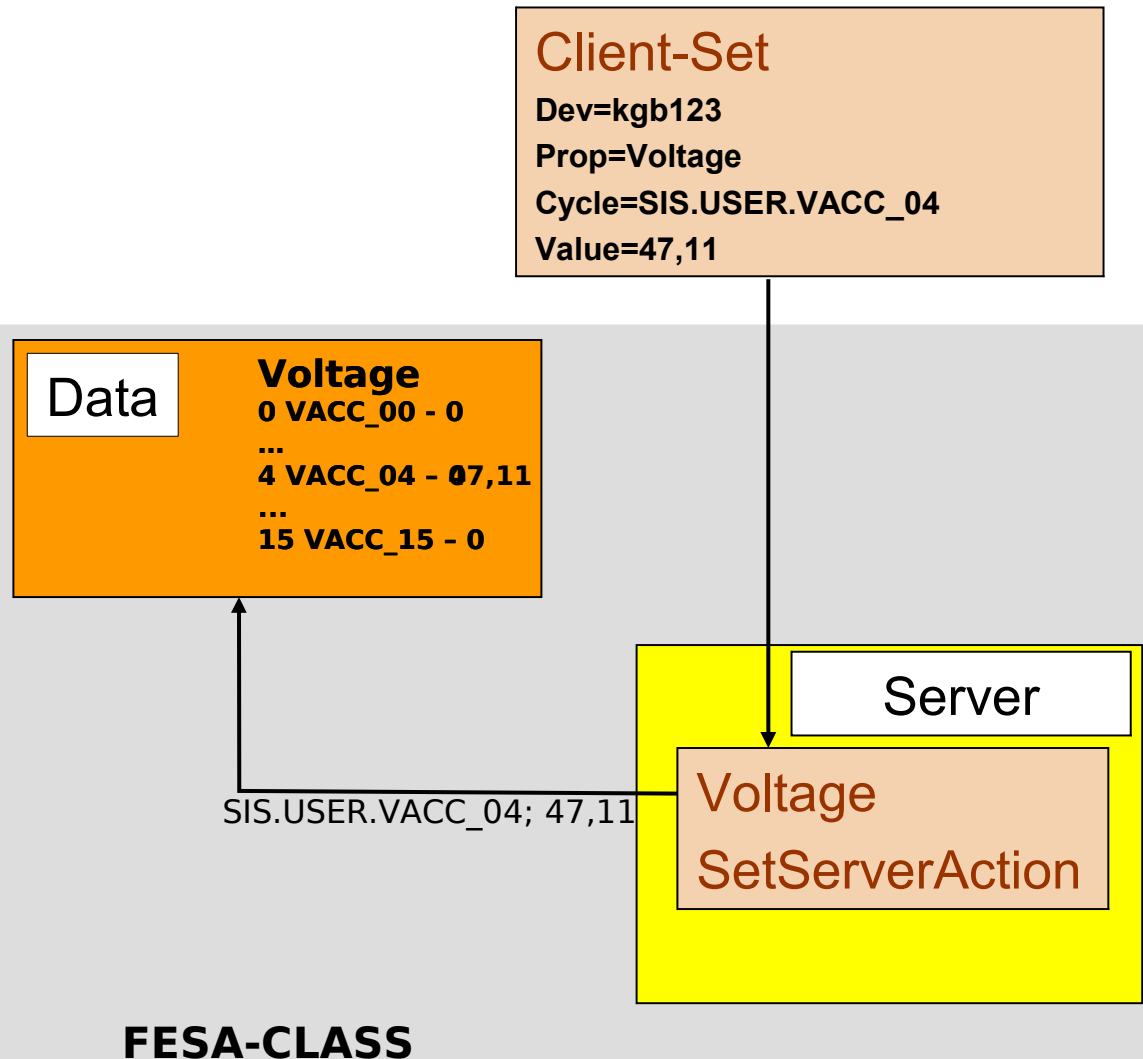
▼ **e** global-instance

NONE

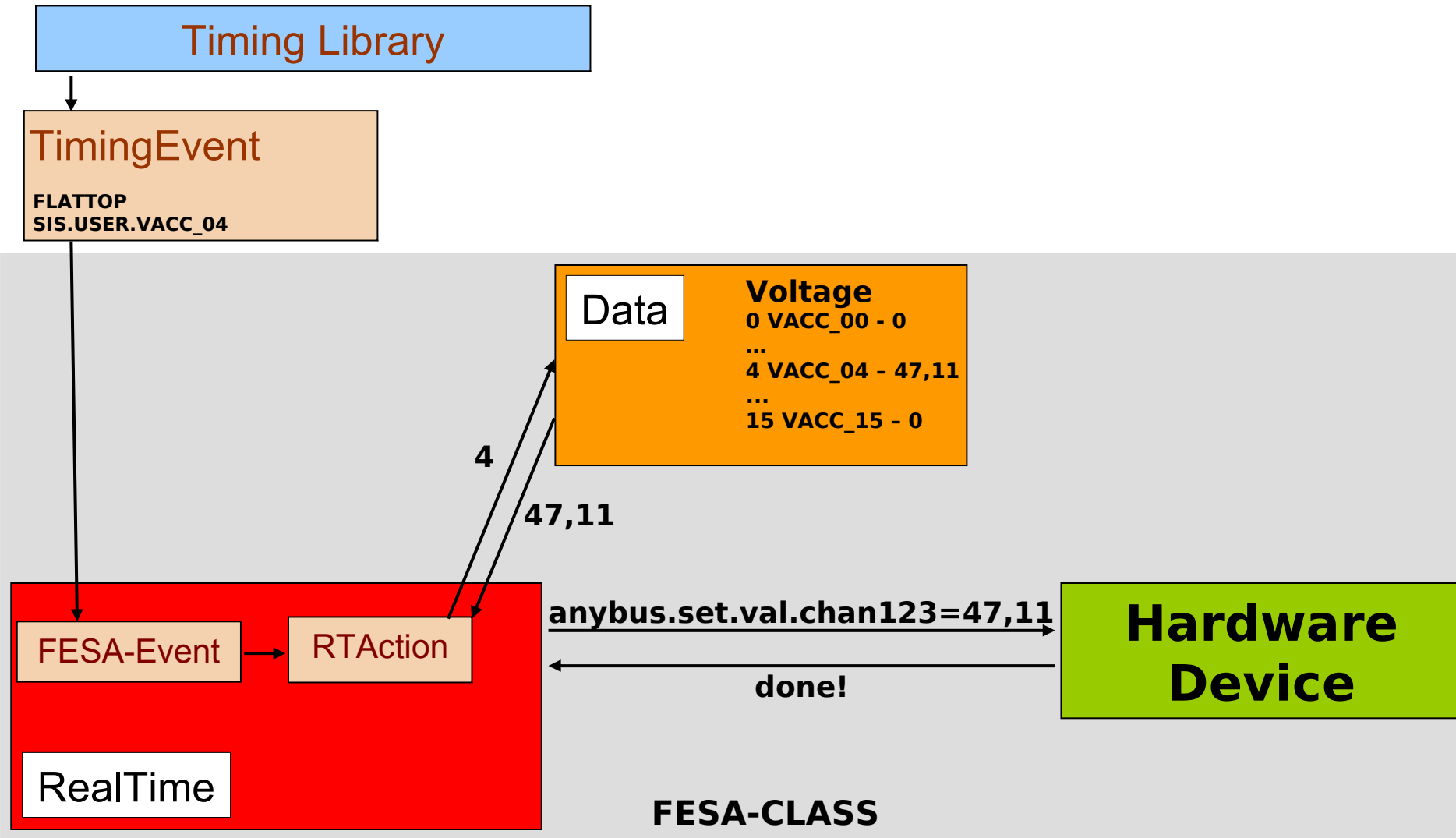
ⓐ name

USER

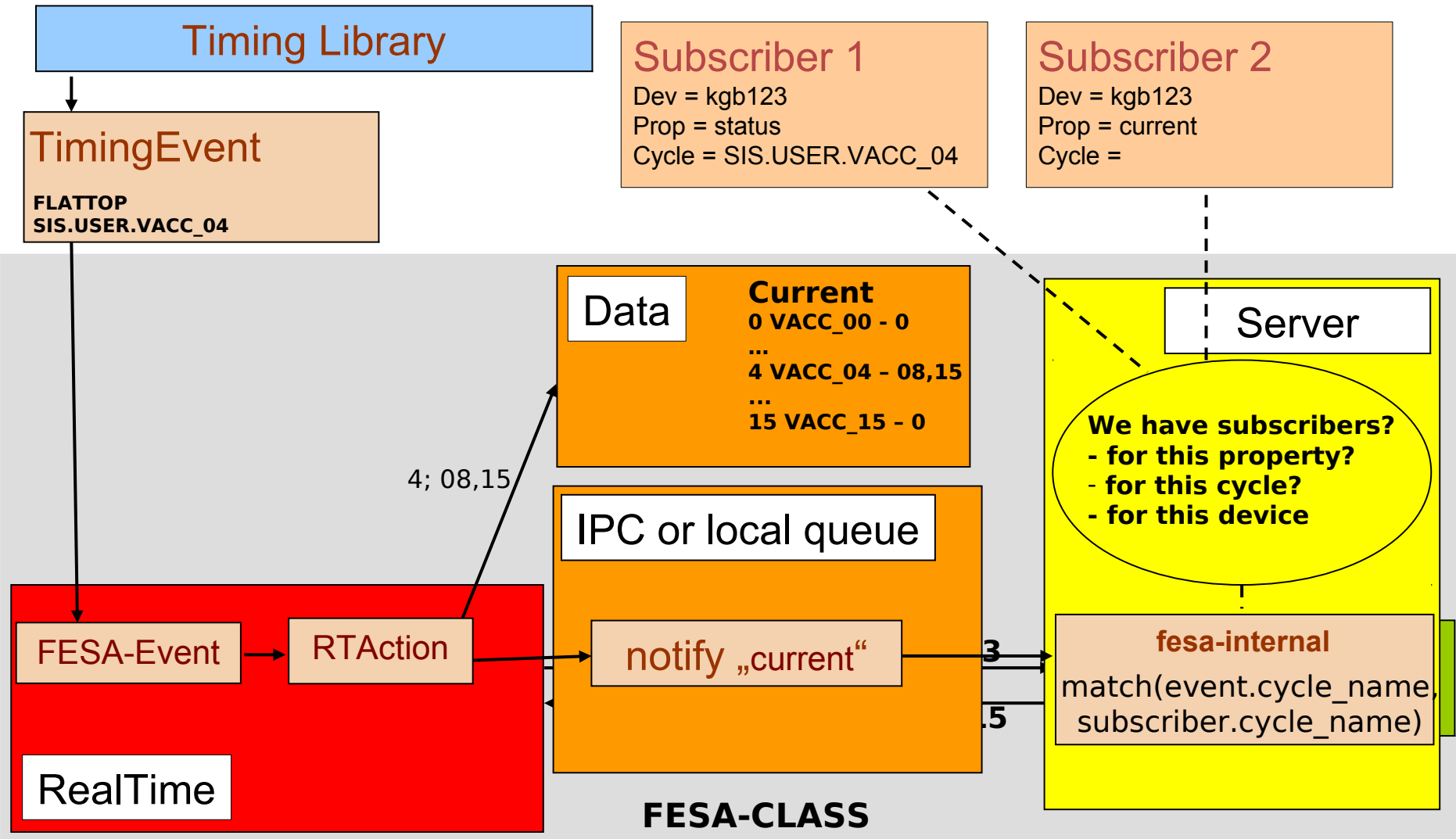
Part III - Setting a New Value



Part III usage of new voltage



Part IV Notification of Server-side



Part V Exercise

- **Class**

- Use your class from “08_advanced_RealTime”
- Add a multiplexed acquisition-field “voltageFlattop”
- Add a multiplexed acquisition-property “Voltage”
 - Add a value-item voltageFlattop to refer to the field
- Add “Voltage” as notified-property of your RTAction
- Set the field “voltageFlattop” in the C++ code
- Print the cycle-name of the current cycle in the C++ code

- **Instantiation File**

- Use the event-configuration “TimingConfig” for both devices
- Update the following information in your device/configuration
 - accelerator = SIS
 - timing-domain = SIS
 - MainMuxCriterion = USER

- **FESA-Explorer**

- Subscribe to VACC_12, VACC_13, VACC_11 and ALL

On any problem: fesa-support@gsi.de

Part V Exercise



```
DeviceData_MyVoltmeter2_DU_0.1.0.instance ✕
17 </on-demand-event-sources>
18 </MyVoltmeter2>
19 </classes>
20 <deploy-unit/>
21 </prio-management>
22 <classes>
23 <MyVoltmeter2>
24 <rolling-buffer depth="10"/>
25 <events-mapping>
26 <MeasVoltEvent>
27 <event-configuration name="TimingConfig">
28 <Timing>
29 <hardware-event name="FLATTOP#CTIM#45" />
30 </Timing>
31
```