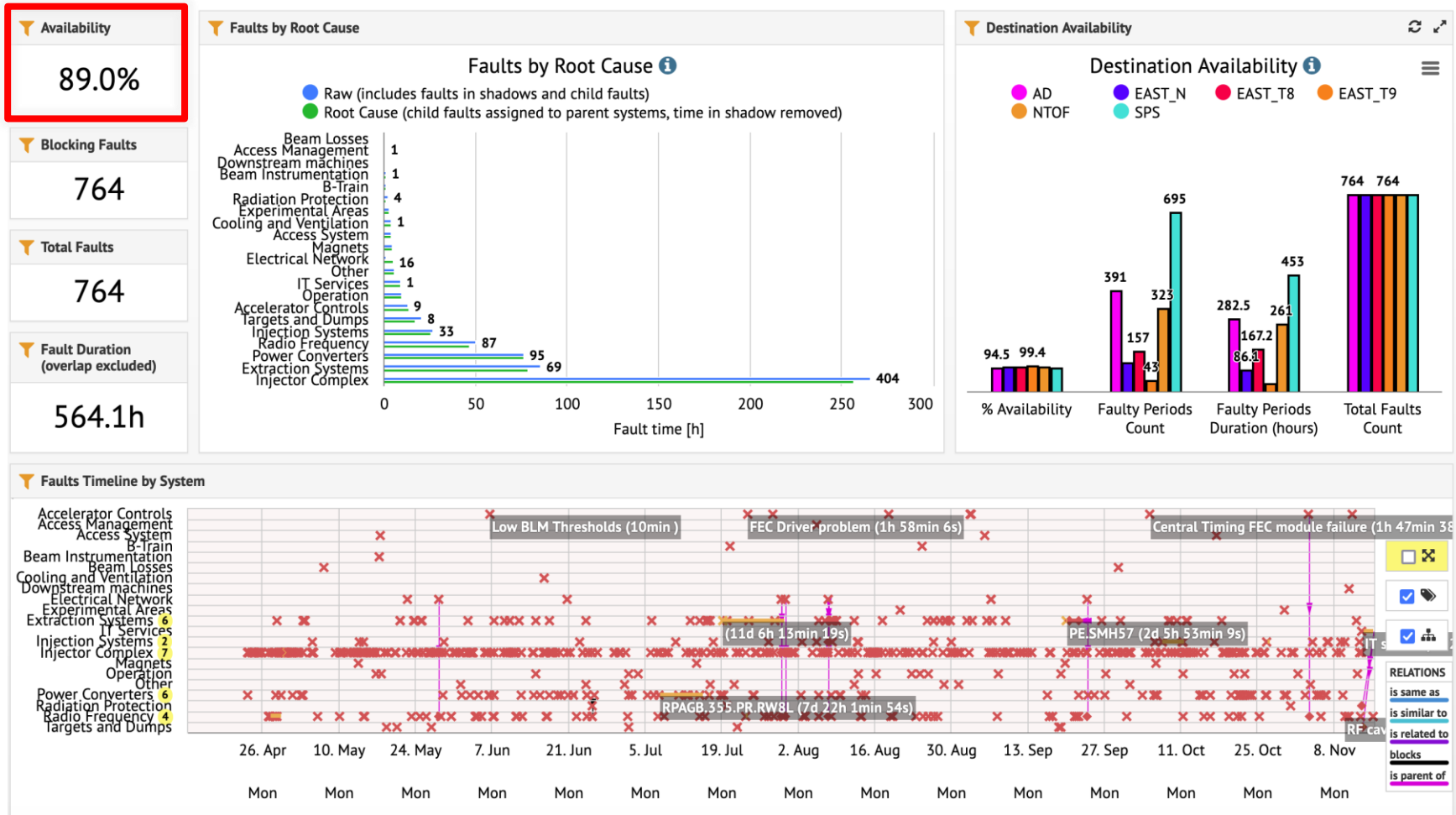# 2021 Availability Statistics for the PS

B. Mikulec for the PS team
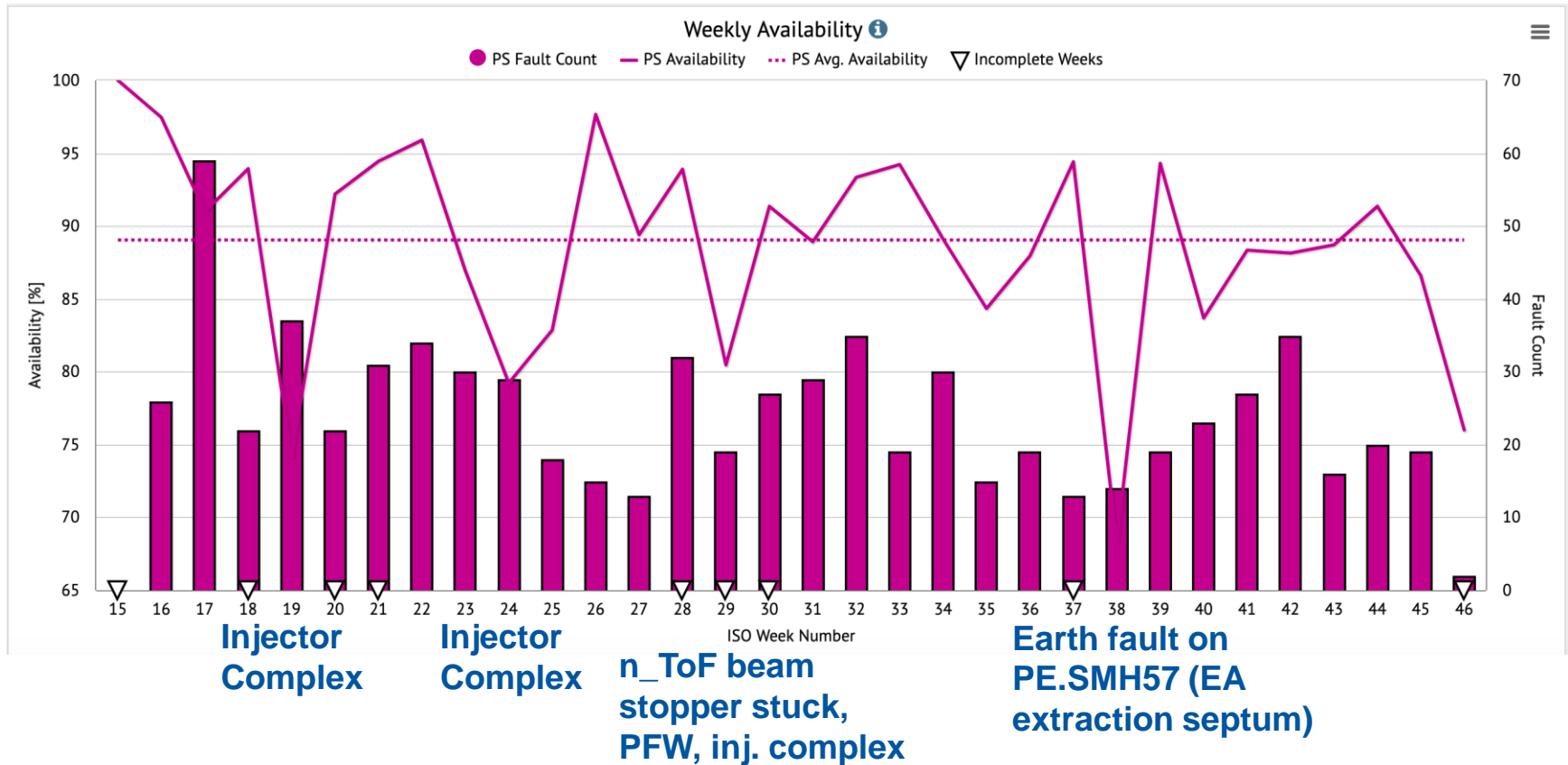
Availability along the Run (12/4 9am – 15/11/2021 6am)

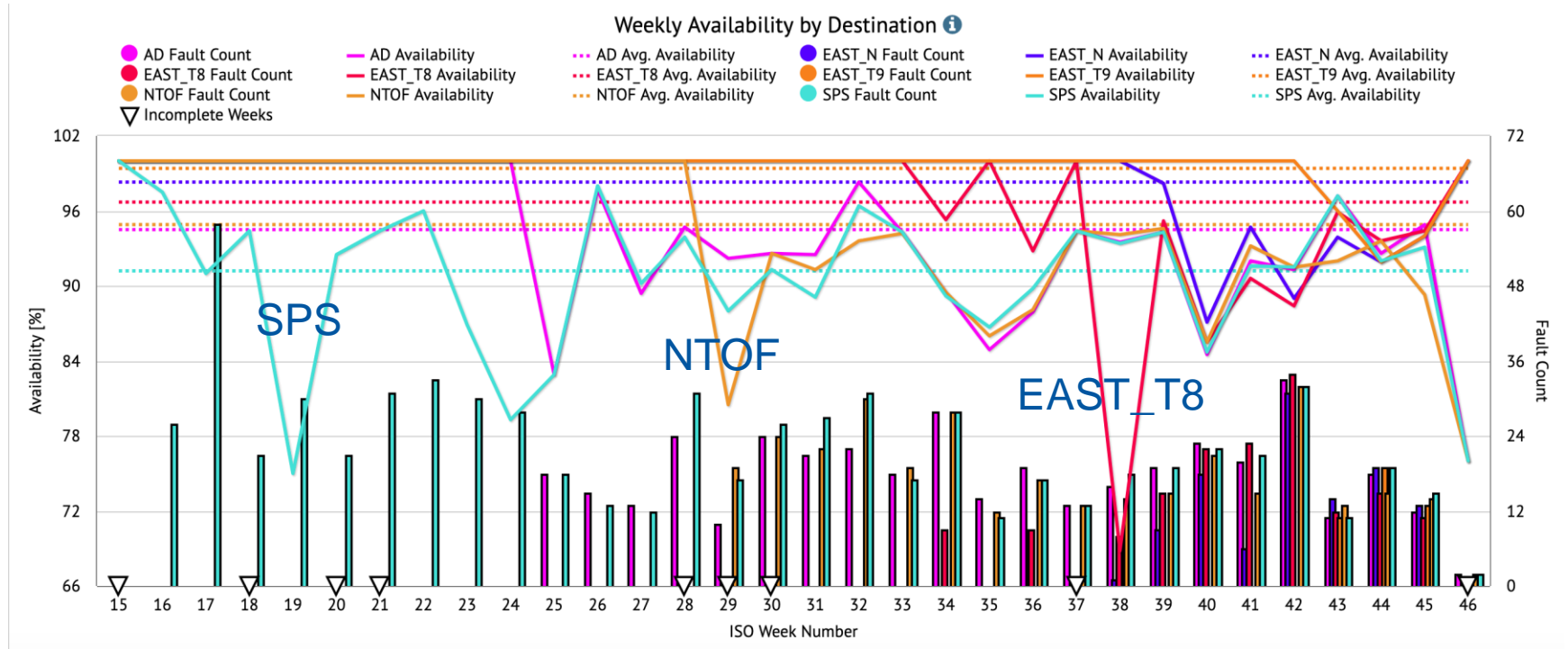## 12/4/2021 corresponds to first beam sent to SPS

Weekly Availability

Availability dips in w**19**, **24**, **29** and w**38**

Weekly Availability by Destination

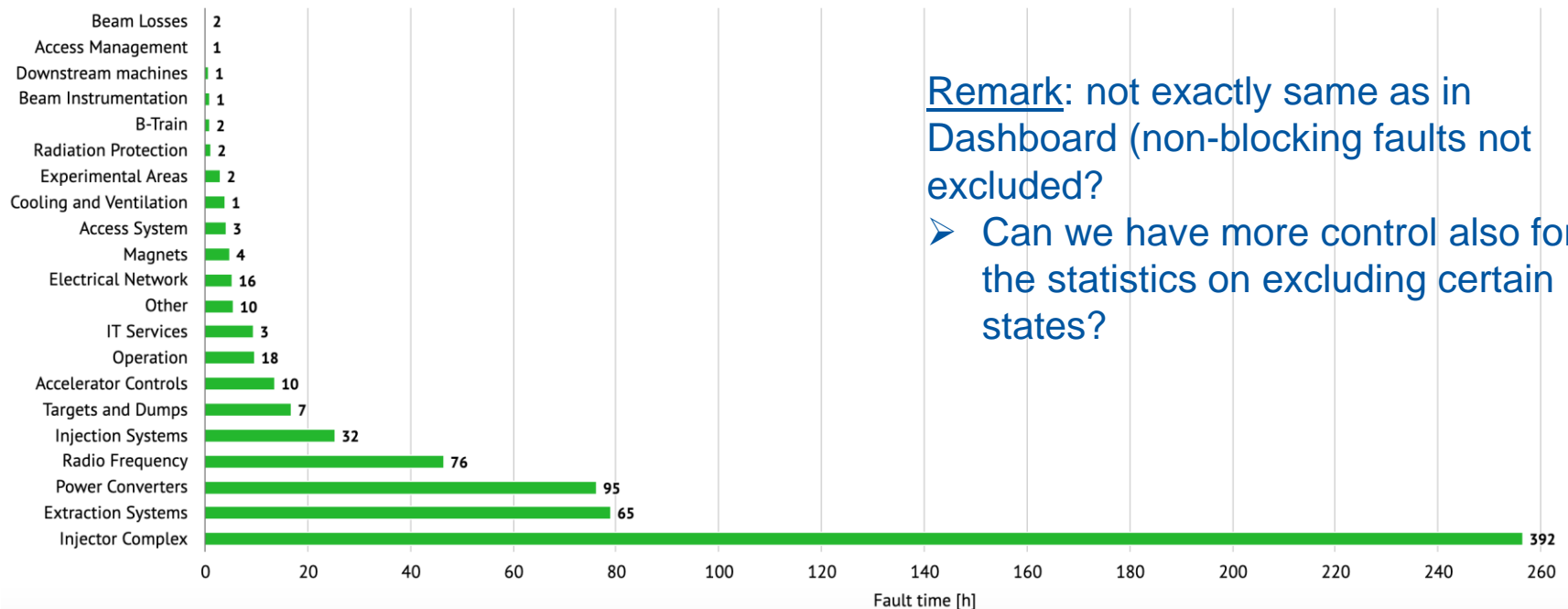# Global Availability by Destination

>91% for all destinations!
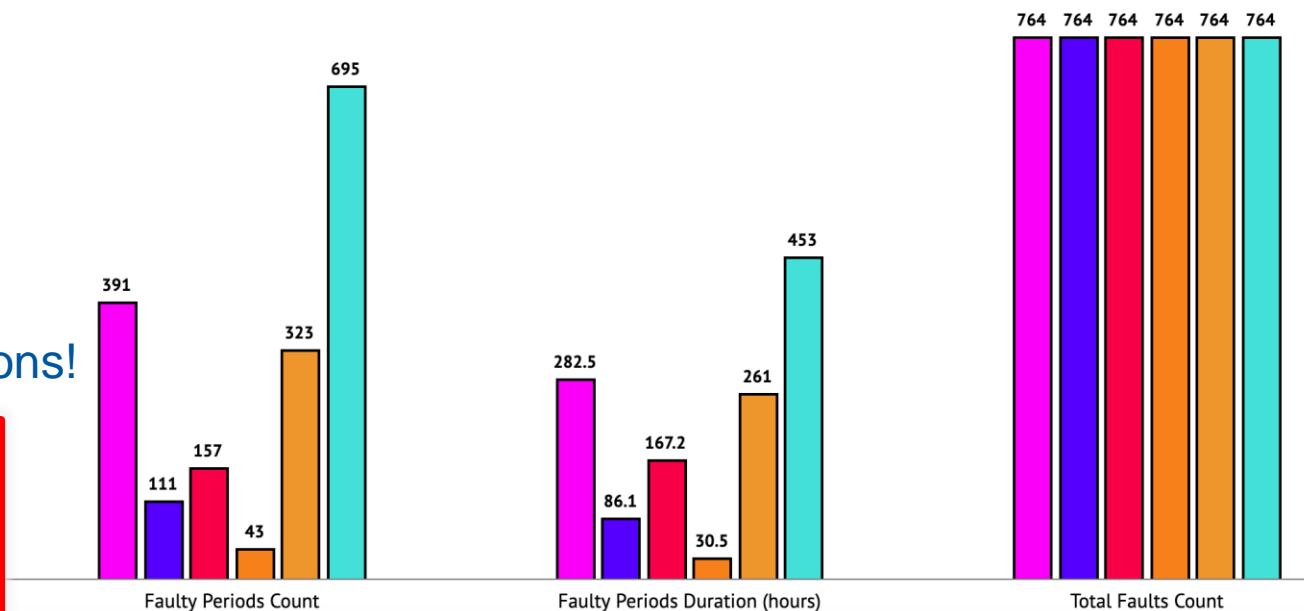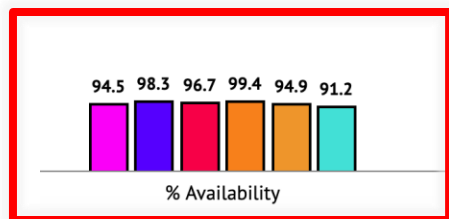
System Downtime – Root Cause

System Downtimes: Root Cause ⓘ
● Fault time by system

Remark: not exactly same as in Dashboard (non-blocking faults not excluded?
➤ Can we have more control also for the statistics on excluding certain states?

System Downtime – Root Cause – Top 2

System Downtimes: Root Cause ⓘ
● Fault time by system

System	Fault time [h]
Beam Losses	2
Access Management	1
Downstream machines	1
Beam Instrumentation	1
B-Train	2
Radiation Protection	2
Experimental Areas	2
Cooling and Ventilation	1
Access System	3
Magnets	4
Electrical Network	16
Other	10
IT Services	3
Operation	18
Accelerator Controls	10
Targets and Dumps	7
Injection Systems	32
Radio Frequency	76
Power Converters	95
Extraction Systems	65
Injector Complex	392

- >2 days earth fault for PE.SMH57 (condensation after not having pulsed for whole LS2 period)
- Several (also longer) faults of PE.KFA71
  - Controls upgrade planned for LS3…
  - Some changes during this YETS (mainly better diagnostics)

System Downtime – Root Cause – Top 3

System Downtimes: Root Cause ⓘ
● Fault time by system

- Several POPS trips
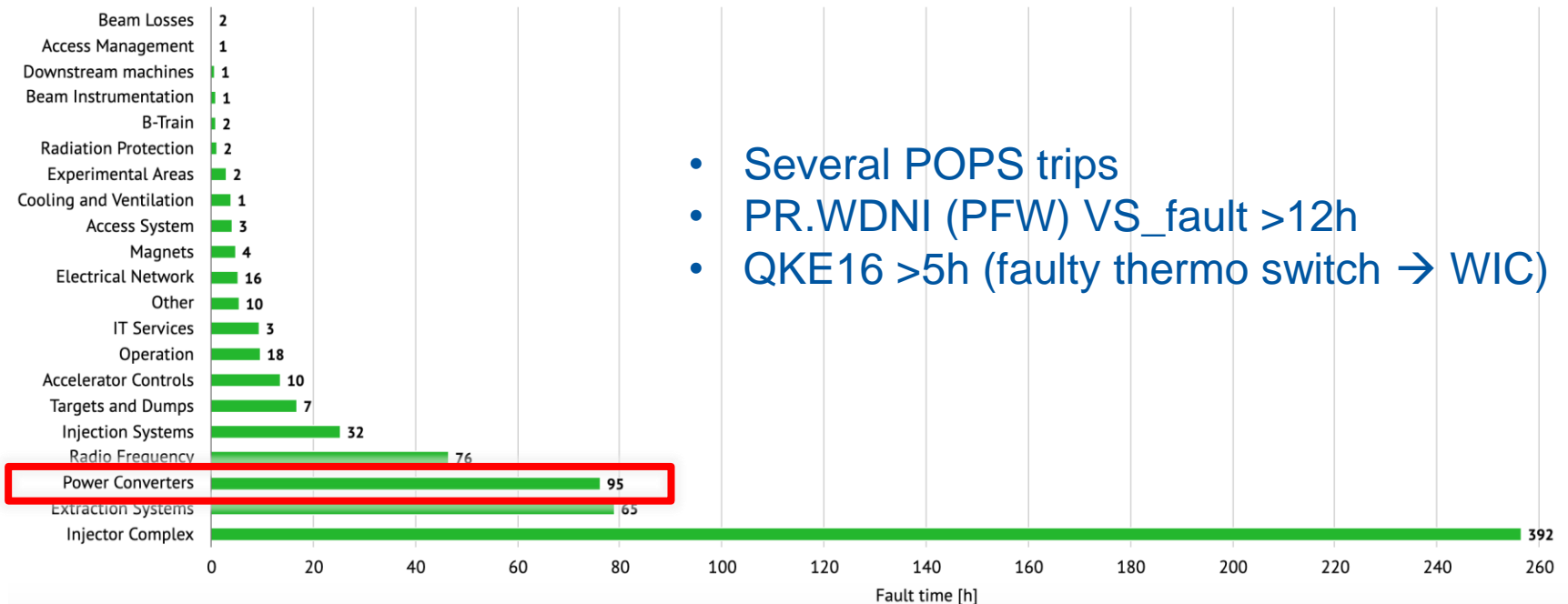- PR.WDNI (PFW) VS_fault >12h
- QKE16 >5h (faulty thermo switch → WIC)

Chart data (Fault time [h]):
- Beam Losses: 2
- Access Management: 1
- Downstream machines: 1
- Beam Instrumentation: 1
- B-Train: 2
- Radiation Protection: 2
- Experimental Areas: 2
- Cooling and Ventilation: 1
- Access System: 3
- Magnets: 4
- Electrical Network: 16
- Other: 10
- IT Services: 3
- Operation: 18
- Accelerator Controls: 10
- Targets and Dumps: 7
- Injection Systems: 32
- Radio Frequency: 76
- Power Converters: 95
- Extraction Systems: 65
- Injector Complex: 392

System Downtime – Root Cause – Top 4

System Downtimes: Root Cause ⓘ
● Fault time by system

System	Fault time [h]
Beam Losses	2
Access Management	1
Downstream machines	1
Beam Instrumentation	1
B-Train	2
Radiation Protection	2
Experimental Areas	2
Cooling and Ventilation	1
Access System	3
Magnets	4
Electrical Network	16
Other	10
IT Services	3
Operation	18
Accelerator Controls	10
Targets and Dumps	7
Injection Systems	32
Radio Frequency	76
Power Converters	95
Extraction Systems	65
Injector Complex	392

- Renovated RF systems → teething issues
  - One reason for frequent 10 MHz trips understood and will be solved during YETS
  - Working also on automatic reset procedure within OP with RF support

Fault Count vs. Fault Duration by Element

Fault Count vs. Fault Duration by Faulty Element ⓘ

Earth fault on W8L (crowbar control card damaged most probably due to dust)
- Mostly **non-blocking**!!!
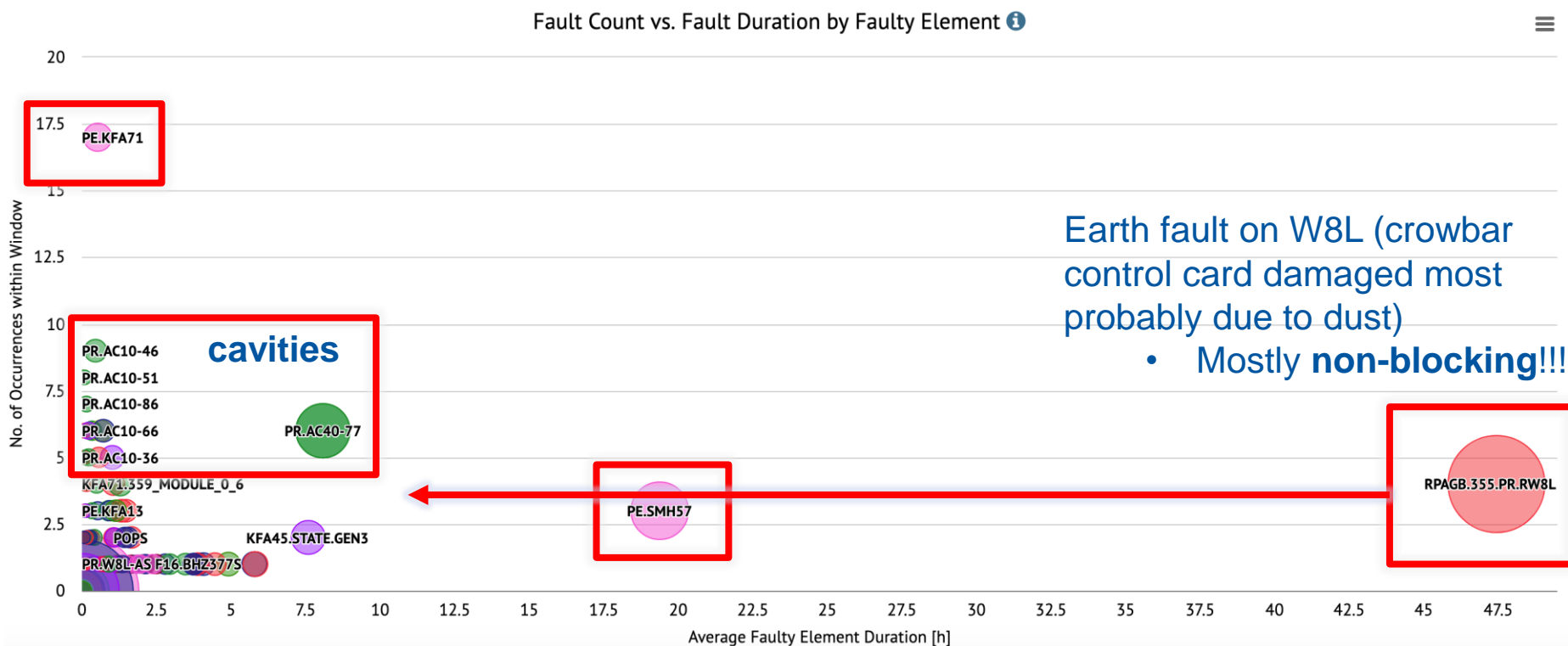
Remark: such kind of statistics **could be extremely useful for equipment groups**, BUT:
➢ In PS for >50% of the cases, the faulty element is either not entered at all or in different variations (despite the pre-defined element names)
  ➢ Have to find a way in the future to **automatically propose the faulty equipment**
  ➢ Until then: who should correct each single AFT entry? The coordinators? The equipment expert? Or should we just continue as it this?

Big Sister

- Aim at using Big Sister in the PS for the upcoming run

- Logic: check intensity before extraction

  - If PR.BCT/HotspotIntensity#dcBefEje1 is < 0.3E10 p for > 1 minute (should we change this to 2 minutes?), create a fault and an automatic entry in the elogbook

- Covers non-ppm case, which could be for example any fault from the injectors or at PS injection/transition

- In a longer-term vision, we should

  - Think how to automatically propose the faulty system

  - Add checks depending on the extracted destination (needs to be combined with the request)…

AFT Desiderata

See slide from Gian Piero

- **Automatic fault entry in downstream machine/facilities** when a fault occur in one accelerator:
  - We said it already many times, but it worth repeating.
  - For instance now the PSB operator has to enter the fault twice for any L4 fault
  - **Cloning an entry to other AFT** in case?

- Ideally in the future, a fantastic project would the **complete automatization of the fault entry.**

- **Feedback from the IEF WS:**
  - Use more effectively AFT to **help driving the CONSolidation project**
  - For instance **no global report done at the IEF WS**

Additional proposal: request reports from each equipment group at the end of each run, addressing recurrent / major faults and ideas for mitigations.