BPM interlock status and plans
Update 1

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Outline

1. Interlocking concept and motivation **RECAP**

2. Validation status **RECAP**

   - Log file **RECAP**

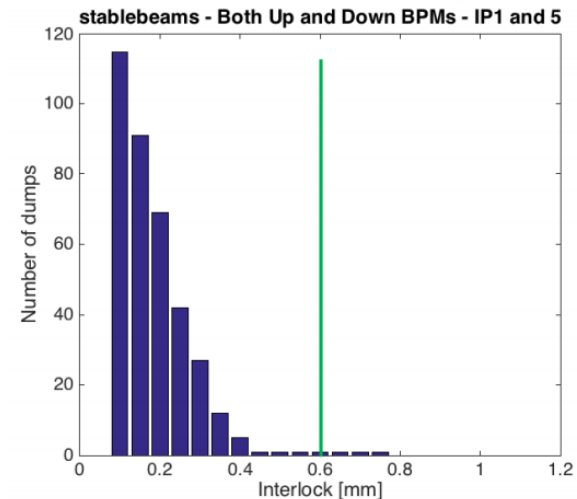   - Result (as from 4th June till MD1) **New**

3. Plans

Motivation

RECAP

SIS follows the **collimator beam center** measured from the **embedded BPMs**.

Following the TCT BPM performance analysis *(A.Mereghetti et.al, Evian2016)*

- 600 μm interlock limit was set (from 2016)

In addition to the analysis of orbit quality/stability, this **new analysis of sis logs will also provide an assessment of the overall chain**, addressing the complete implementation (status of acquisitions, etc) and **the reliability**.

stablebeams - Both Up and Down BPMs - IP1 and 5

Motivation

- The SIS produces the log file for **EVERY** interlocking case.

Current SIS implementation:

- ❑ All collimator BPM interlocks are running reliably (at least on the SIS side).
- ❑ All interlocks are in the interlock tree, but are currently <u>masked</u>.
- ❑ The interlock limits are currently set to 4σ except for:
  - ○ **1σ** in IR1 and IR5 at $\beta^* = 40$ cm,
  - ○ **1.5σ** in IR6 at $\beta^* = 40$ cm (linked to IR5 β^*),
  - ○ **2.5σ** in IR8 at $\beta^* = 3$ m.

J. Wenninger, 127th MPP meeting

How many (false?) dumps we would have, if in 2017 we use 2016 analysis result?

Analysing (and understanding) the log file will give the answer!

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1. Interlocking concept and motivation **RECAP**

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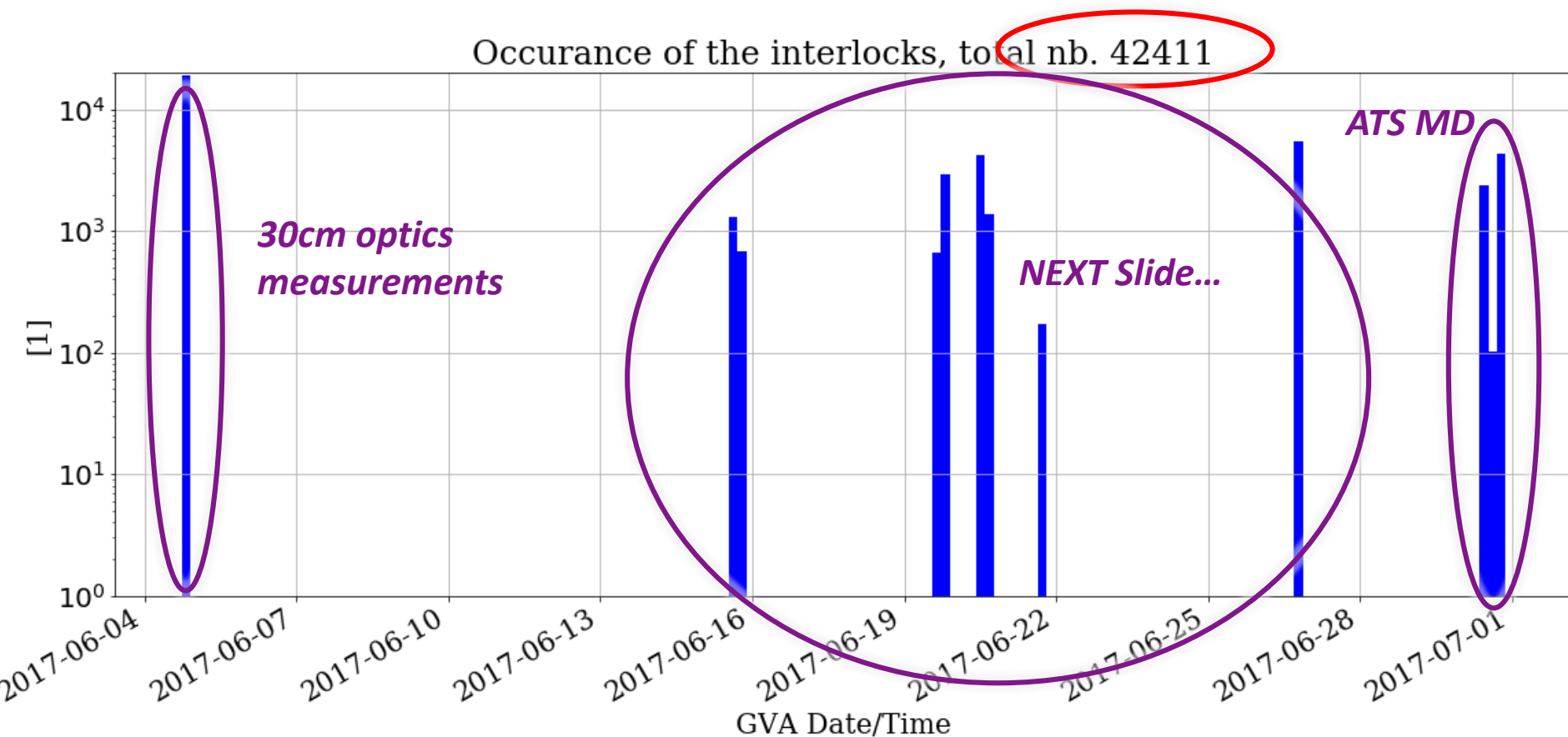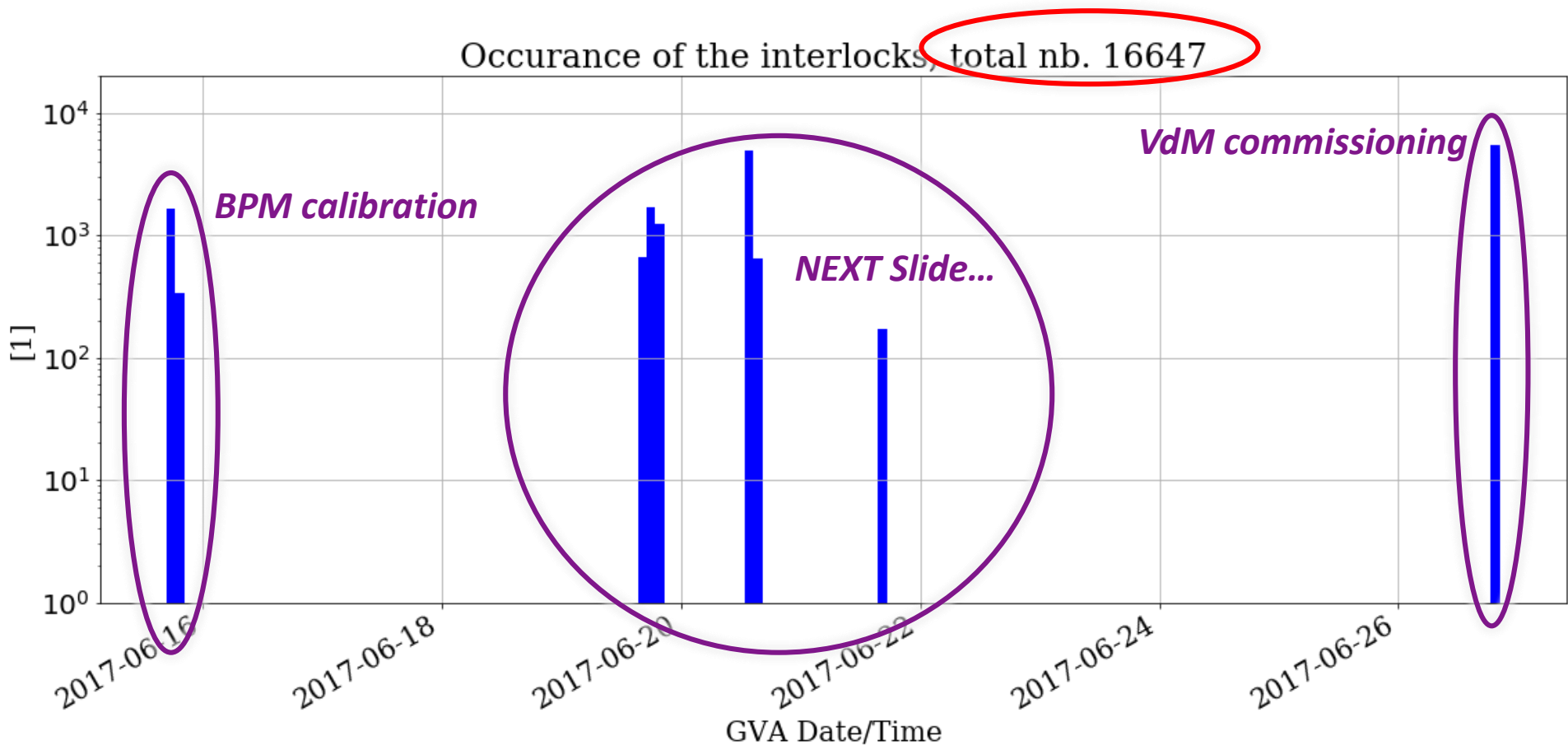   - Result (as from 4th June till MD1) **New**

3. Plan

The SIS Log File

RECAP

2017-05-25 22:49:43,004 [EventUpdaterThread-null-5] ERROR BpmCollimatorCenterValueConditionExtI
adc97491-418b-11e7-843f-0f3eb12d931c =>
*** Collimator beam center [SISREF_TCTPV_4R2B2 / BPTUV_A4R2B2_ACQ - BPTDV_A4R2B2_ACQ] :
 Beta @ collimator   =   101.7 [m] for beta* =   10.00 [m] @ IR2
 Beam sigma @ collimator =   0.232 [mm] with tolerance = 4.00 [sigma] @ E =   6499 [GeV] - emit =
3.5 [um]
 Up   BPM position =   -1.123 [mm] -   -121 [tol %] status = true
 Down BPM position =   -1.193 [mm] -   -129 [tol %] status = true
 Dump count =

2017-05-25 22:49:45,003 [EventUpdaterThread-null-5] ERROR
BpmCollimatorCenterValueConditionExtImpl aefaa191-418b-11e7-843f-0f3eb12d931c =>
*** Collimator beam center [SISREF_TCTPH_4R8B2 / BPTUH_A4R8B2_ACQ - BPTDH_A4R8B2_ACQ] :
 Beta @ collimator   =   234.5 [m] for beta* =   3.00 [m] @ IR8
 Beam sigma @ collimator =   0.352 [mm] with tolerance = 2.50 [sigma] @ E =   6499 [GeV] -
emit =   3.5 [um]
 Up   BPM position =   2.899 [mm] -   329 [tol %] status = true
 Down BPM position =   3.101 [mm] -   352 [tol %] status = true
 Dump count =

2017-05-25 22:49:45,003 [EventUpdaterThread-null-5] ERROR BpmCollimatorCenterValueConditionExtImpl aefaa191-
418b-11e7-843f-0f3eb12d931c =>
*** Collimator beam center [SISREF_TCTPV_4R2B2 / BPTUV_A4R2B2_ACQ - BPTDV_A4R2B2_ACQ] :
 Beta @ collimator   =   101.7 [m] for beta* =   10.00 [m] @ IR2
 Beam sigma @ collimator =   0.232 [mm] with tolerance = 4.00 [sigma] @ E =   6499 [GeV] - emit =   3.5 [um]
 Up   BPM position =   -1.123 [mm] -   -121 [tol %] status = true
 Down BPM position =   -1.194 [mm] -   -129 [tol %] status = true
 Dump count =

June (as from 4th)

Occurance of the interlocks, total nb. 42411

30cm optics measurements

NEXT Slide…

ATS MD

June (as from 4th) 🏷️ New

Special activities related interlocks -> **MASKING NEEDED!**

Occurance of the interlocks, total nb. 16647

BPM calibration

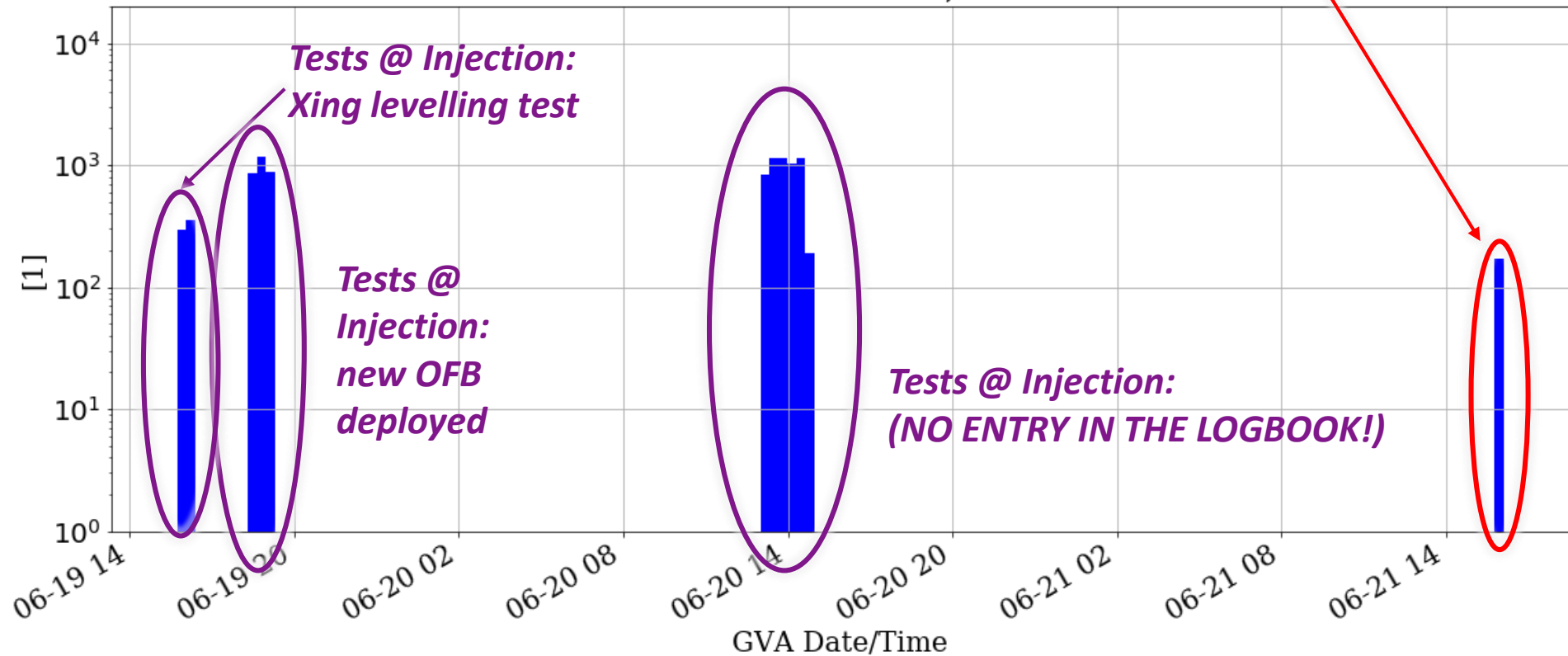NEXT Slide…

VdM commissioning

June (as from 4th) New

Operation related interlocks - potential dump cause?

TCTPH, R2 B2
*(orbit excursion, **5850** Dumped by **IR6 BPM**)*

Occurance of the interlocks, total nb. 9265

Tests @ Injection:
Xing levelling test

Tests @ Injection:
new OFB deployed

Tests @ Injection:
(NO ENTRY IN THE LOGBOOK!)

Miscellanea

- **No** signature of **IP1 TCTPH (B1/B2)** logged

  - With all of these unusual tests triggering other interlocks it is likely that is not 'included'

    - *Check if imported to SIS!*

→ [SISREF_TCTPH_4L8B1] with 7820 interlocks
→ [SISREF_TCTPV_4L5B1] with 952 interlocks
→ [SISREF_TCTPH_4R8B2] with 6222 interlocks
→ [SISREF_TCTPV_4R5B2] with 1176 interlocks
→ [SISREF_TCTPV_4L2B1] with 5124 interlocks
→ [SISREF_TCTPV_4L8B1] with 1080 interlocks
→ [SISREF_TCTPV_4R2B2] with 3747 interlocks
→ [SISREF_TCTPV_4R8B2] with 5385 interlocks
→ [SISREF_TCTPV_4R1B2] with 165 interlocks
→ [SISREF_TCTPH_4R5B2] with 3327 interlocks
→ **[SISREF_TCSP_A4L6B2] with 249 interlocks**
→ [SISREF_TCTPH_4L2B1] with 139 interlocks
→ [SISREF_TCTPH_4L5B1] with 3678 interlocks
→ [SISREF_TCTPV_4L1B1] with 3158 interlocks
→ **[SISREF_TCSP_A4R6B1] with 19 interlocks**
→ [SISREF_TCTPH_4R2B2] with 170 interlocks

Plans

- Before we finally activate this SIS channel:
  - One fill (today?) with collimator by collimator interlock test.
  - Another 2 weeks of physics fills for a similar analysis.
- Joined ColWG and MPP meeting on 24th July with (yet) another update in this subject.

Wrap up

- **No spurious triggers**,
- **One dump trigger** case where beam was dumped by another interlock.

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