HL-LHC motorized jacks
Project organisation, status and plans for pre-series supply

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Meeting – 06/07/22

Outlook

- Scope
- Procurement scenarios and boundary conditions for HL-LHC jacks
- Project organisation, status and plans for pre-series supply

Scope (I)

In the framework of the HL-LHC project, motorized jacks will be used to position remotely equipment such as cryomagnets, crab cavities and TAXN. It turns out that the jacks are on the critical path for the HL-LHC project and in particular for the IT string.

Due to the lack of resources with relevant experience and availability in the MSC group, it has been asked to the VSC group, namely Jaime Perez Espinos, to take over the coordination of the following deliverables (indicative dates are shown in brackets):

- Finalize and/or review functional specification (including interfaces) according to jack and motorization owner's inputs (Q2 2021).
- Define and review with the different stakeholders a planning of deliverables (Q2 2021).
- Design jacks based on the present working principle from LHC jacks (no fundamental change in the functional specification).
- Paolo and Arnaud to organize a technical review when a 3D CAD model is finished, before start of manufacturing drawings.
- Liaise with EN/MME for the manufacturing of a prototype.
- Perform functional tests of the prototype.
- Validate pre-series together with the different stakeholders.
- Define acceptance criterions with the different stakeholders.

VSC group is not in charge of the budget allocation and the fabrication follow-up (including detailed 2D drawings for fabrication).
Documentation (2D drawings, relevant execution and QC procedure) for Serbian collaboration are prepared by EN-MME with support from HL-LHC PO. The follow-up of production is carried out by EN-MME with support from HL-LHC PO.
VSC activities are limited to the above-mentioned mandate, assumed not to last more than 1.5 years. Other tasks such as motorization (selection, installation, cabling, control,…), installation, operation and maintenance of the jacks are not part of the VSC mandate. Additional temporary personnel resources will be allocated to VSC to fulfil its mandate while limiting the impact on its other activities.

Extraction from e-mail sent by P. Chiggiato on 06/04/22

Scope (II)

Coming steps for the HL-LHC jacks

- J. Perez [TE-VSC] has kindly accepted to take the responsibility for the jacks to help TE-MSC.
  - Next 3 months as of mid-May will be used to review the specifications
    - Effects of bus-bars, tie-rods, W bellows, etc.
    - Not with the objective to change the design, just ensure that nothing is overlooked.
  - Feedback to EN-MME.
    - If minor impacts, fast validation of 3D design and finalisation of 2D drawings for execution (1 month)
    - In case of significant changes, 3D drawing would need to be retuned (2-3 months)
- Responsibilities
  - J. Perez would be responsible for (until the end 1.5y)
    - The design an approval of 2D drawings
    - The acceptances tests of the prototypes/pre-series
    - The decisions in case of NCs during production
  - EN-MME will follow-up the execution through the Serbian collaboration of
    - The prototypes/pre-series
    - The series production

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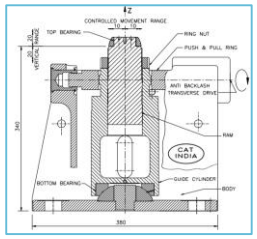
Slide presented by J. M. Jiménez on 06/05/21

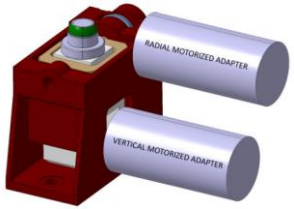
Procurement scenarios and boundary conditions
HL-LHC Jacks

DDR PRR

2018 **2019** **2020** **2021** **2022**



- **Initial discussions with Serbia** (2018)
- **2019 - Memo** issued for the potential in-kind contribution from **Serbia** to **HL-LHC** as **special contribution** to **get the Associated MS status**
- **2019- Collaboration Agreement drafted** for **the production of the mechanical bodies of the Jack (structural body, Motorization not included in the scope)**
- **Contribution estimations based on the LHC design of the Jacks (designed and produced by India)**
- Technical meetings already started



- **Design evolution** to cope with **requirements from different users** as well as **FRAS requirements**
- **Design evolution to cope with the requirements from the in-kind Contribution (welded construction instead of casting)**
- Technical discussions with the Serbian Collaboration were maintained and design was progressing towards the final solution
- **Industrial partner** (**UNIOR**) **selected by Serbia also participated in the meetings**

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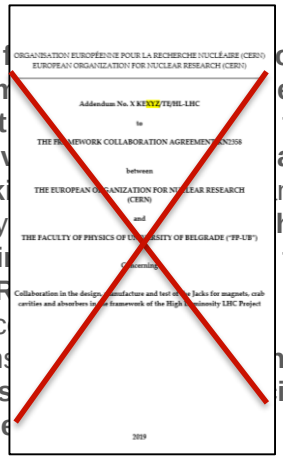


- Due to the **impact and urgency of the IT String units**, **IPT agreed to have a Noncompetitive tender (with the Serbian Firm) for the IT String units,** but MS/IT are required for the Series units (LHC)

- **Unofficial RfQ to UNIOR has confirmed that the price largely exceeds the initial CERN estimations**
- Following the **Financial Rules at CERN for non-competitive tenders**, the **order** for the IT String units **would need FC Approval (next one in June)**
- **HL Coll Officer working on price reduction to enable to place the order soon**
- **Series production will follow the usual procurement process at CERN (not part of the PRR Scope)**

Slide by H. García Gavela during PRR for the IT String jacks procurement (on 30/03/22)

Project organisation, status and plans for pre-series supply

- Plans for pre-series supply:
  - Orders for already released (EDH #9204149 and EDH #9280625) and paid entirely by WP3
- Project status:
  - HL-LHC jacks
    - DR and PRR already made → design approved and overall production strategy endorsed
      - Final lubrication decision, pending of lubricant irradiation campaign and latter dedicated tests → **draft of test specification for irradiation campaign under internal review**, to be followed by review and approval by WP leaders → **campaign to start at best in Oct. '22 → dedicated tests along 2023 → decision on lubrication decoupled from jacks for IT String**
    - Production: see next slides
  - CERN acceptance test tool → need identified due to split of supply and/or orders → originally supposed to be designed and delivered by supplier
    - Design → OK
    - Production and assembly foreseen for **end of July 2022 (W30)**
    - Test (on CERN prototype) in **August 2022 (by W34)**
    - Shipment to supplier, **beginning of September 2022**
  - CERN prototype
    - Metrology of subcomponents expected **beginning of July (W27)**
    - Assembly to follow, **~ mid-July (W29)**

HL-LHC jack production

Status of IT String Jacks Production (UNIOR)

- **Documentation status**
  - Material certificates and standard components orders OK
  - Welding and inspection documentation OK
  - Traceability documents OK (to be seen how to implement in MTF)
  - MIP to be received next week for approval

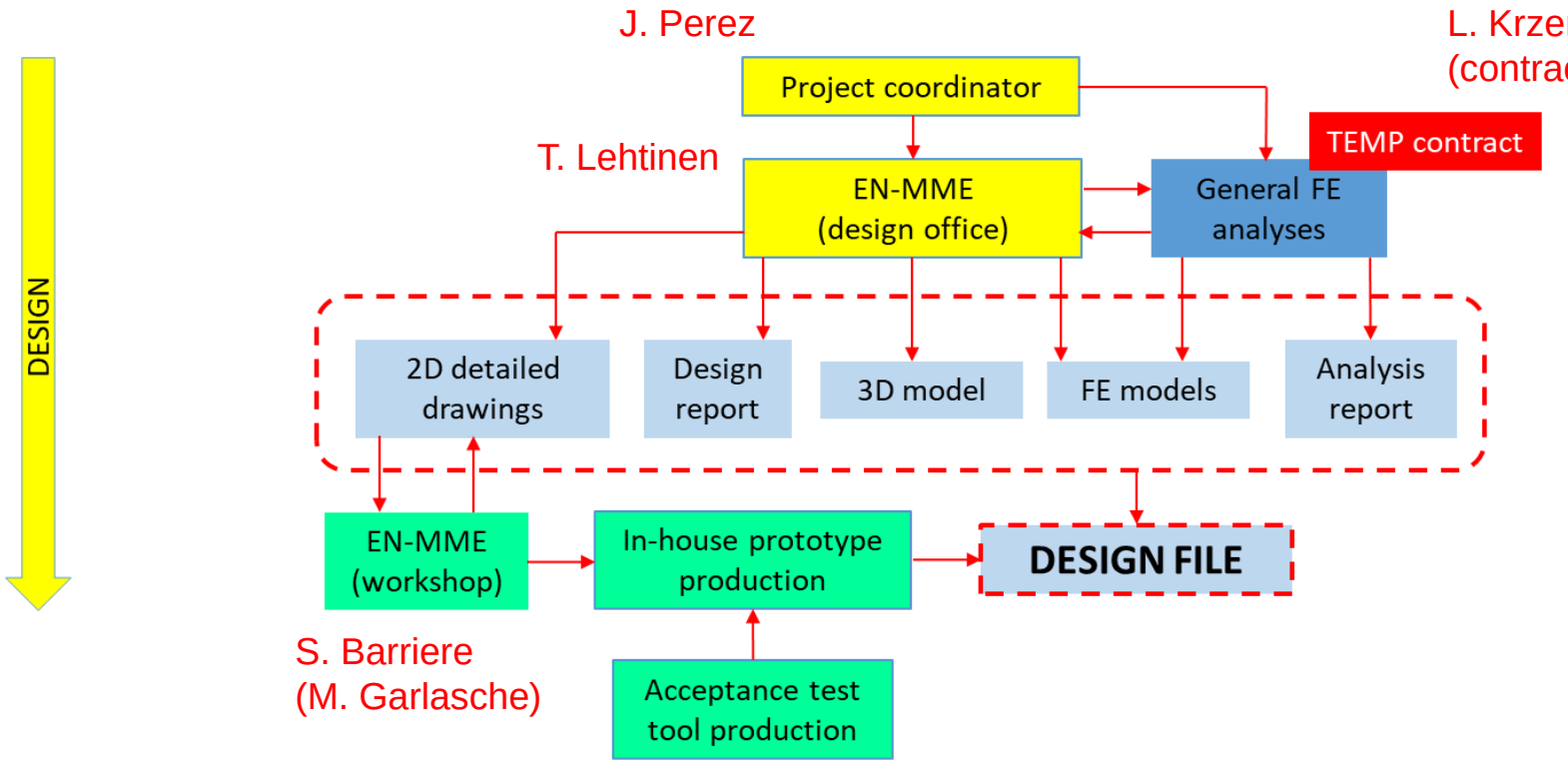
- **Fabrication schedule (Batch #1)**
  - June 2022: raw materials received and start of production
  - July 2022: standard components received
  - August 2022: machining completed and metrology checks
  - Sept. 2022: Assembly completed of Batch #1

- **Delivery schedule**
  - Batch #1 = 4L + 1C
    - End Sept. 2022: CERN to visit UNIOR to help perform the acceptance tests
    - Oct. 2022: Reception at CERN of 4+1 jacks for functional tests
    - **End Oct. 2020: greenlight to UNIOR for final machining of Batch #2**
  - Batch #2 = 15L + 3C
    - Jan. 2023: Assembly completed
    - Feb. 2023: Test at UNIOR
    - Mar. 2023: Reception at CERN

Schedule agreed with UNIOR is Dec. '22 for production and Jan. '23 for tests at their facilities

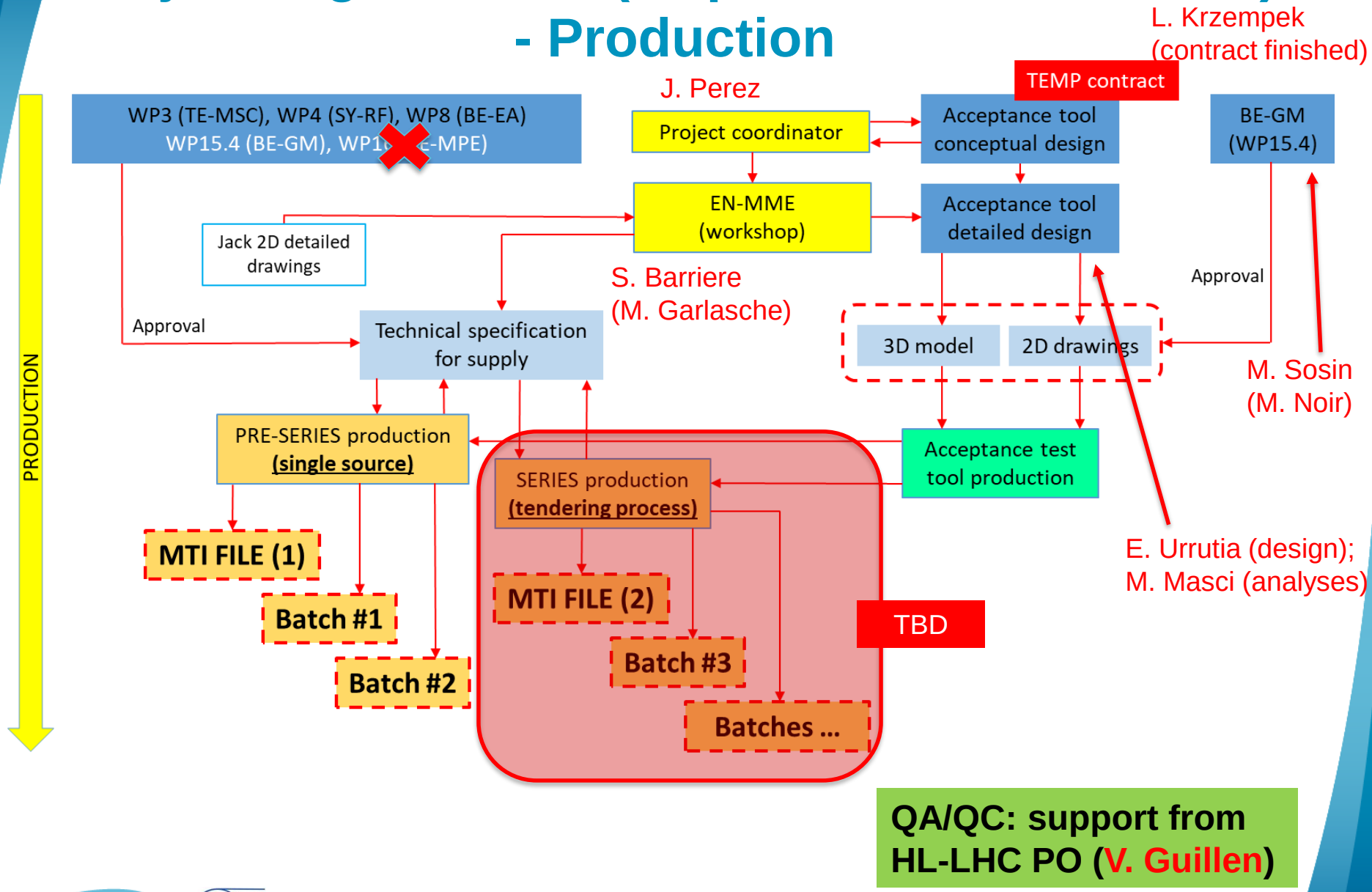
S. Bamière, EN-MME 2

Project organization (as presented in the PRR) - Design



QA/QC: support from HL-LHC PO (V. Guillen)

Project organization (as presented in the PRR) - Production



Thank you for your attention