Progress Meeting 1

Lowering the adoption barriers for Formal Verification of ASIC and FPGA designs in the Space sector

ESA Contract No. 000144681/24/NL/GLC/ov

Hipólito Guzmán-Miranda
Department of Electronic Engineering
Universidad de Sevilla
Sevilla, Spain

Date: 20 September 2024

Outline

- Work performed
- FVM Methodology (WIP)
- Progress: actual vs schedule
- Updated schedule
- First dissemination activity?
- Demo
- Next actions
- Any other business

Work performed

- ## Since last meeting (I)
  - ### All work detailed in the three first progress reports:
    - #### Progress Report 1 (June 2024): mostly setup
      - License procurement, software installation, license server installation, markdown-to-pdf workflow for MoMs and Reports, advance payment paperwork, document repository, among others
    - #### Progress Report 2 (July 2024): mostly advances on the build & test framework
      - Docker images, CI pipeline, python front-end, added support for Lint and PropCheck, support for command-line arguments (verbose, list, step, continue, gui, guinorun), tool log processing, store tool outputs in log files, add python coverage and lint tools to the CI, add project badges to the gitlab project

Work performed (II)

- Since last meeting (II)
  - Progress Report 3 (August 2024): vacation month
    - No work to report
- September 2024: advances on WP.1 (methodology definition)

Work performed (III)

Advances in WP.1:

- Documentation review almost finished
    - For the 'mandatory' tools such as PropCheck, Lint, CoverCheck
    - Also for AutoCheck
    - PSL Guide reviewed
    - Only missing the review of the PSL standard
- CoverCheck and Lint studied
    - And also integrated in the framework
- Coverage Metrics, Formal-Friendliness, wavedrom-to-PSL in progress

Work performed (IV)

Reasons why WP.1 is more work than foreseen:

- Work is not only theoretical, but actually a bit intermingled with WP.2 (methodology implementation) and WP.3 (build & test framework)
  - It makes a lot of sense to create proof-of-concepts and/or integrate the tools in the build & test framework while reading
- It can condition the rest of the project so it pays to be extra cautious
  - We have some issues almost ready to be closed, but I want to review and test some things before closing them
- Some items are improvements for the project that don't make sense to implement now
  - Such as formal-driven design, connection to simulation, synthesizable assumption monitors

FVM Methodology (WIP)
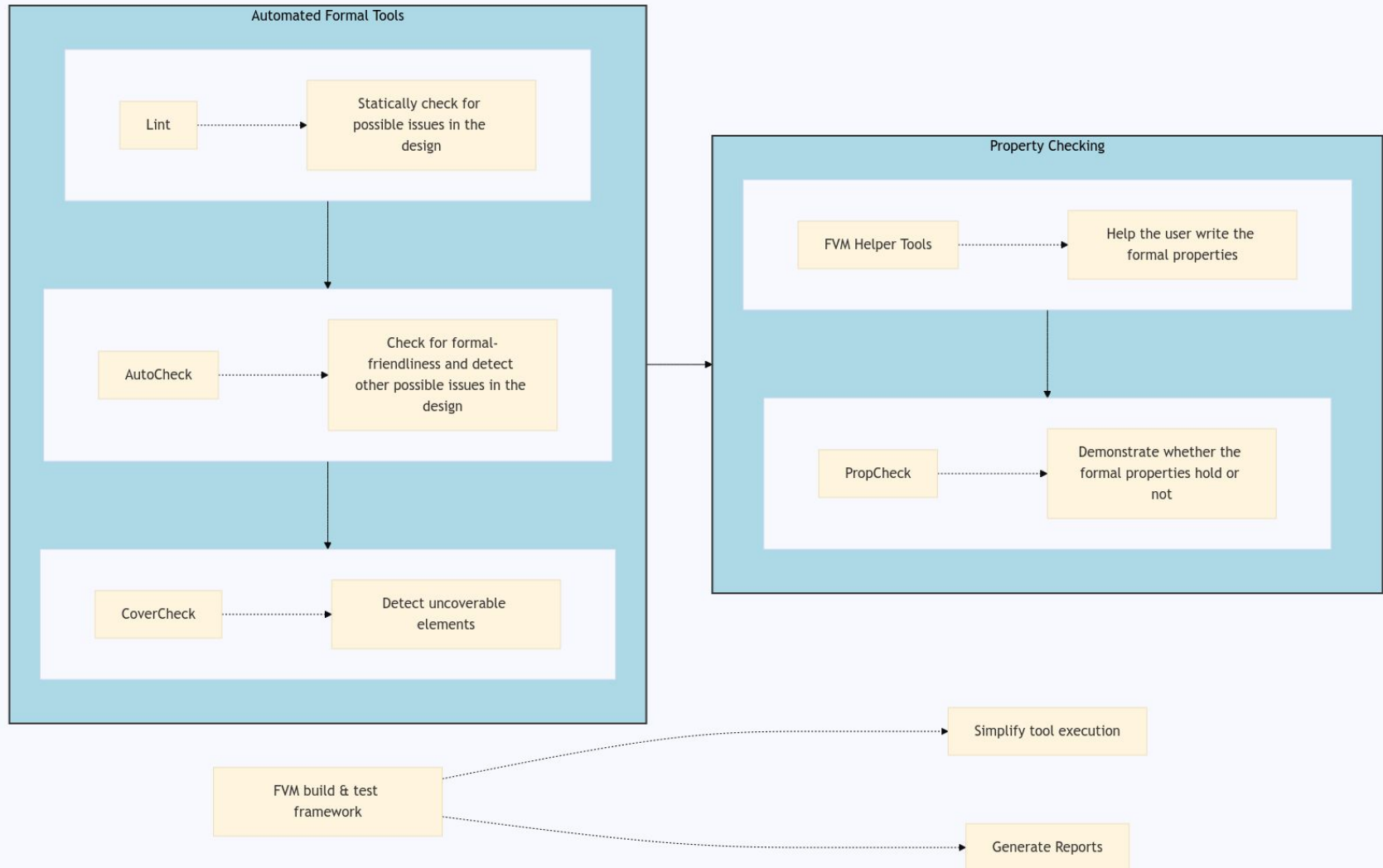
Progress: actual vs schedule

- We have currently three Work Packages open:
  - WP.0: Project Management and control
    - Ahead of schedule
  - WP.1: Formal Methodology definition
    - A bit late due to the vacation month, but recovering
    - It is also more work than expected so it may need a bit more than three months of effort
  - WP.2: Build and test framework creation
    - Ahead of schedule

Bar chart after kick-off

WP.0: Project management and control
Jun 1, 2024–Nov 30, 2025
Open   eda / fvm

33 Issues · 0 Merge requests 3% complete

WP.1: Formal methodology definition
Jun 1, 2024–Aug 31, 2024
Open   eda / fvm

16 Issues · 0 Merge requests 0% complete

WP.2: Formal methodology implementation
Sep 1, 2024–Nov 30, 2024
Upcoming   eda / fvm

0 Issues · 0 Merge requests 0% complete

WP.3: Build & test framework creation.
Jun 1, 2024–Nov 30, 2024
Open   eda / fvm

11 Issues · 0 Merge requests 0% complete

WP.4: Creation of repository with examples
Dec 1, 2024–Feb 28, 2025
Upcoming   eda / fvm

0 Issues · 0 Merge requests 0% complete

WP.5: Demonstration over two IP cores
Mar 1, 2025–Aug 31, 2025
Upcoming   eda / fvm

5 Issues · 0 Merge requests 0% complete

WP.6: Validation and consolidation of the proposed approach
Dec 1, 2024–Nov 30, 2025
Upcoming   eda / fvm

7 Issues · 0 Merge requests 0% complete

WP7: Dissemination of project results
Feb 1, 2025–Nov 30, 2025
Upcoming   eda / fvm

12 Issues · 0 Merge requests 0% complete

Bar chart after month 1

WP.0: Project management and control
Jun 1, 2024–Nov 30, 2025
Open · eda / fvm

39 Issues · 0 Merge requests
25% complete

WP.1: Formal methodology definition
Jun 1, 2024–Aug 31, 2024
Open · eda / fvm

16 Issues · 0 Merge requests · 0% complete

WP.2: Formal methodology implementation
Sep 1, 2024–Nov 30, 2024
Upcoming · eda / fvm

0 Issues · 0 Merge requests · 0% complete

WP.3: Build & test framework creation.
Jun 1, 2024–Nov 30, 2024
Open · eda / fvm

11 Issues · 0 Merge requests · 0% complete

WP.4: Creation of repository with examples
Dec 1, 2024–Feb 28, 2025
Upcoming · eda / fvm

0 Issues · 0 Merge requests · 0% complete

WP.5: Demonstration over two IP cores
Mar 1, 2025–Aug 31, 2025
Upcoming · eda / fvm

5 Issues · 0 Merge requests · 0% complete

WP.6: Validation and consolidation of the proposed approach
Dec 1, 2024–Nov 30, 2025
Upcoming · eda / fvm

7 Issues · 0 Merge requests · 0% complete

WP7: Dissemination of project results
Feb 1, 2025–Nov 30, 2025
Upcoming · eda / fvm

12 Issues · 0 Merge requests · 0% complete

Bar chart after month 2

WP.0: Project management and control
Jun 1, 2024–Nov 30, 2025
`Open` `eda / fvm`

40 Issues · 0 Merge requests
30% complete

WP.1: Formal methodology definition
Jun 1, 2024–Aug 31, 2024
`Open` `eda / fvm`

16 Issues · 0 Merge requests 0% complete

WP.2: Formal methodology implementation
Sep 1, 2024–Nov 30, 2024
`Upcoming` `eda / fvm`

0 Issues · 0 Merge requests 0% complete

WP.3: Build & test framework creation.
Jun 1, 2024–Nov 30, 2024
`Open` `eda / fvm`

24 Issues · 0 Merge requests
45% complete

WP.4: Creation of repository with examples
Dec 1, 2024–Feb 28, 2025
`Upcoming` `eda / fvm`

0 Issues · 0 Merge requests 0% complete

WP.5: Demonstration over two IP cores
Mar 1, 2025–Aug 31, 2025
`Upcoming` `eda / fvm`

5 Issues · 0 Merge requests 0% complete

WP.6: Validation and consolidation of the proposed approach
Dec 1, 2024–Nov 30, 2025
`Upcoming` `eda / fvm`

7 Issues · 0 Merge requests 0% complete

WP7: Dissemination of project results
Feb 1, 2025–Nov 30, 2025
`Upcoming` `eda / fvm`

12 Issues · 0 Merge requests 0% complete

Bar chart after month 3

WP.0: Project management and control

Jun 1, 2024–Nov 30, 2025

`Open` `eda / fvm`

40 Issues · 0 Merge requests

30% complete

WP.1: Formal methodology definition

Jun 1, 2024–Aug 31, 2024

`Expired` `eda / fvm`

16 Issues · 0 Merge requests 0% complete

WP.2: Formal methodology implementation

Sep 1, 2024–Nov 30, 2024

`Open` `eda / fvm`

0 Issues · 0 Merge requests 0% complete

WP.3: Build & test framework creation.

Jun 1, 2024–Nov 30, 2024

`Open` `eda / fvm`

24 Issues · 0 Merge requests

45% complete

WP.4: Creation of repository with examples

Dec 1, 2024–Feb 28, 2025

`Upcoming` `eda / fvm`

0 Issues · 0 Merge requests 0% complete

WP.5: Demonstration over two IP cores

Mar 1, 2025–Aug 31, 2025

`Upcoming` `eda / fvm`

5 Issues · 0 Merge requests 0% complete

WP.6: Validation and consolidation of the proposed approach

Dec 1, 2024–Nov 30, 2025

`Upcoming` `eda / fvm`

7 Issues · 0 Merge requests 0% complete

WP7: Dissemination of project results

Feb 1, 2025–Nov 30, 2025

`Upcoming` `eda / fvm`

12 Issues · 0 Merge requests 0% complete

Bar chart today

WP.0: Project management and control

Jun 1, 2024–Nov 30, 2025

`Open` `eda / fvm`

42 Issues · 0 Merge requests

30% complete

WP.1: Formal methodology definition

Jun 1, 2024–Aug 31, 2024

`Expired` `eda / fvm`

16 Issues · 0 Merge requests 12% complete

WP.2: Formal methodology implementation

Sep 1, 2024–Nov 30, 2024

`Open` `eda / fvm`

0 Issues · 0 Merge requests   0% complete

WP.3: Build & test framework creation.

Jun 1, 2024–Nov 30, 2024

`Open` `eda / fvm`

24 Issues · 0 Merge requests

45% complete

WP.4: Creation of repository with examples

Dec 1, 2024–Feb 28, 2025

`Upcoming` `eda / fvm`

0 Issues · 0 Merge requests   0% complete

WP.5: Demonstration over two IP cores

Mar 1, 2025–Aug 31, 2025

`Upcoming` `eda / fvm`

5 Issues · 0 Merge requests   0% complete

WP.6: Validation and consolidation of the proposed approach

Dec 1, 2024–Nov 30, 2025

`Upcoming` `eda / fvm`

7 Issues · 0 Merge requests   0% complete

WP7: Dissemination of project results

Feb 1, 2025–Nov 30, 2025

`Upcoming` `eda / fvm`
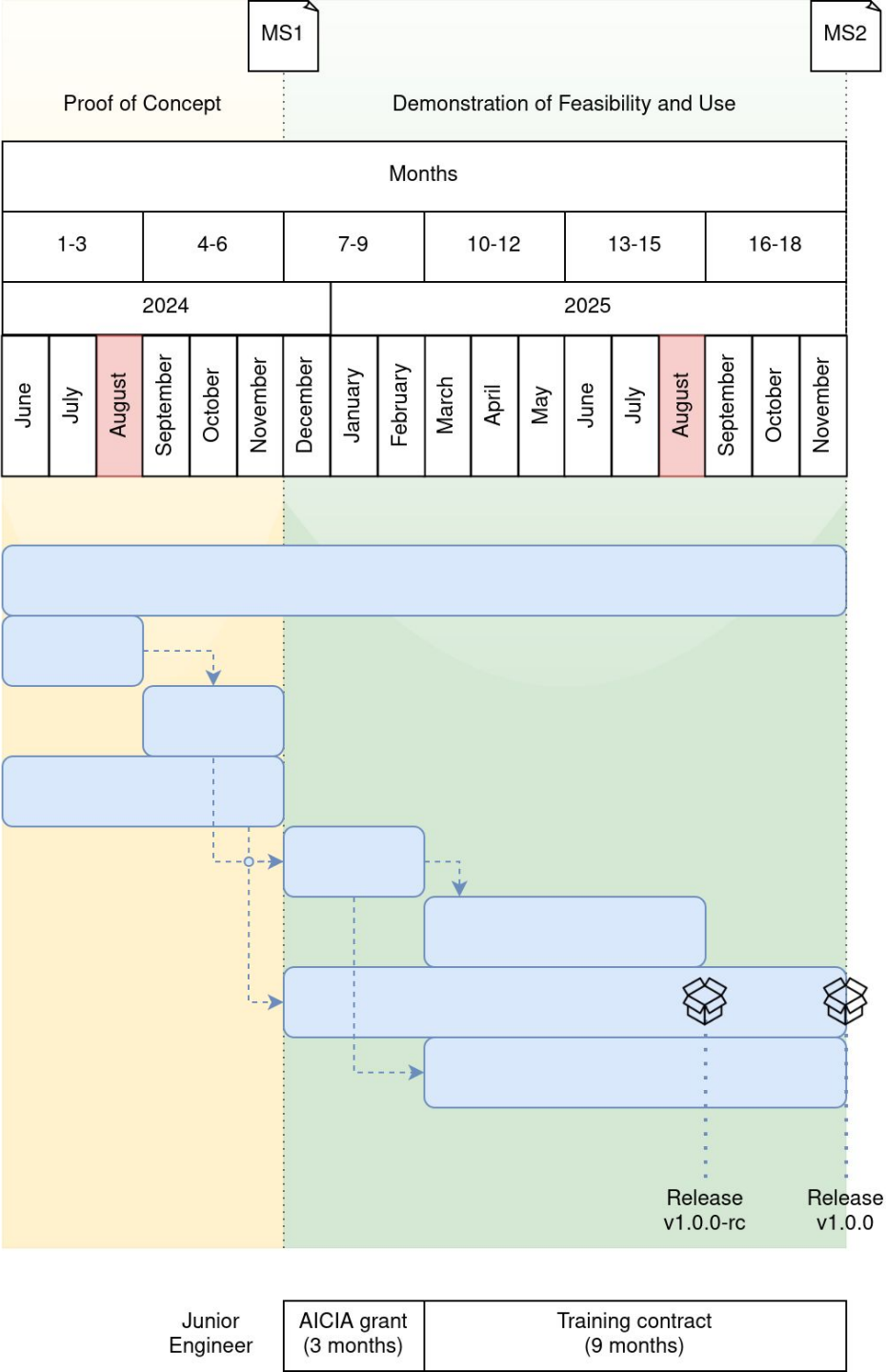
12 Issues · 0 Merge requests 0% complete

Updated Schedule

- The Gantt Chart has been updated to better reflect the reality of the development

- Previous and updated Gantt Charts follow in the next slides
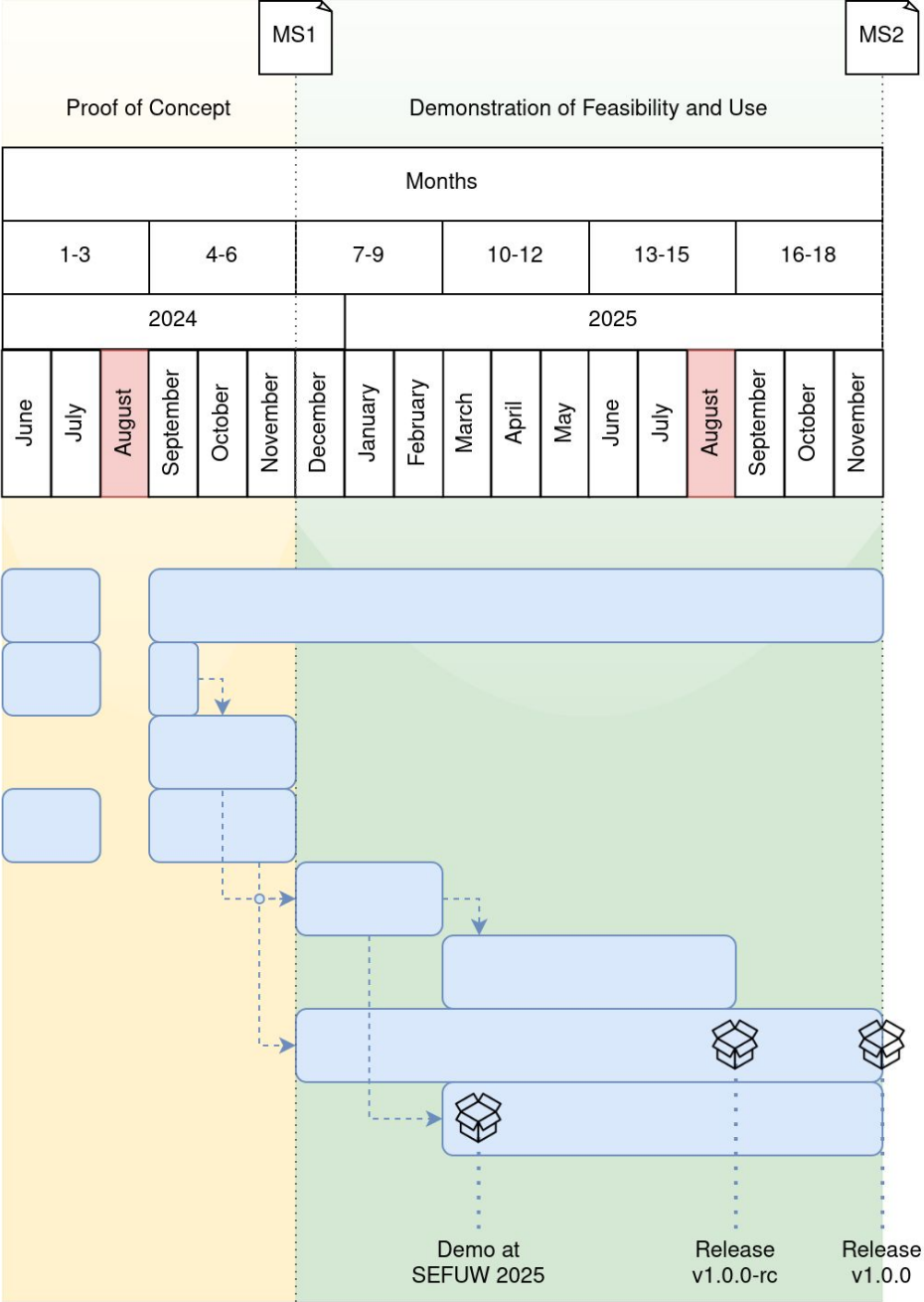
- No impact in milestones

Previous Gantt Chart

Updated Gantt Chart

Modifications on the Gantt Chart

- ● No work done during August 2024
    - ○ Vacation month
    - ○ August 2025 will probably be different because we will have the Junior Engineer with us
- ● WP.1 delayed one month
    - ○ To be finished around the end of September 2024
    - ○ Part of the work in WP.1 is being integrated into the framework as it is being developed, so it is also advancing WP.2 and WP.3
    - ○ No foreseen impact in any milestones
        - ■ It could even finish a bit later if needed
        - ■ We must take into account that actual time available for technical work as of today has been around 1.5 months
- ● Added SEFUW 2025

First dissemination activity?

- Next SEFUW will be on 25-27 March, 2025 (https://indico.esa.int/event/531/)
  - We intend to send an abstract, if accepted also do a presentation there, and if possible we would like to do a demo
  - Since we also want to fully describe the methodology with results, etc, for a journal paper, I suggest that, for the SEFUW abstract we describe the advances as Work-in-Progress (e.g.: "Towards a Formal Verification Methodology for…")
  - Alberto and David are invited to co-author the abstract (and papers) if they want
    - ESA perspective is much appreciated

Requests to ESA

- We are missing the review of Progress Report 3 (August 2024)
  - It was our vacation month so not work was performed
  - If ESA is ok with the report, we can proceed to its signature

Demo

If we have time, let's make a short demo to show what we have now

Next actions

- AICIA-US: Work towards finishing WP.1
- ESA: Feedback and/or approval of Progress Report 3 (August 2024)
- Next progress meeting: in two or three months
  - November 2024 would be ok to review the defined methodology
  - In December 2024 we should have the new hire (Junior Engineer) with us

Any other business?