



# Notes on the March 25-27 OPA IPR

US ATLAS HL-LHC Project Office  
CCB Meeting  
January 14, 2025



# Timeline to the Review

| Week of:          | 13-Jan                      | 20-Jan                          | 27-Jan   | 3-Feb | 10-Feb | 17-Feb                         | 24-Feb  | 3-Mar | 10-Mar   | 17-Mar | 24-Mar  |
|-------------------|-----------------------------|---------------------------------|--|-------|--------|--------------------------------|---|-------|--|--------|---|
| <b>Milestone</b>  | Updated risk register ready | Maturity score updates complete | (1) Working schedule after January status available, (2) start simulation & production of cost books |       |        | Cost books and schedules ready | Mature drafts of presentations posted in docdb for scrubbing/rehearsals |       | Final versions of all materials posted, website goes live. |        | Review, all DOE L2s and L3s are expected to be present at BNL |
| <b>Date req'd</b> | 15-Jan                      | 22-Jan                          | 31-Jan   |       |        | 20-Feb                         | 24-Feb  |       | 10-Mar   |        | 25-27 Mar   |

- L2 & L3 presentation templates were distributed last Friday, 1/10 (Hal).



## Feb '24 Charge

Your review committee is requested to perform a general assessment of the project's progress, status, the identification of potential issues and address the following questions:

1. Is the project making adequate technical progress to ensure that the completed project will perform as planned and the key performance parameters will be met?
2. Are the resource-loaded schedule and the estimate-to-complete up-to-date, accurate, and credible?
3. Does the project understand its dependencies on outside resources such as international collaborators, funding from other agencies, and participation by researchers with other funding sources?
4. Are the major procurements being managed successfully?
5. Is Environmental Safety and Health being handled appropriately?
6. Has the risk analysis been updated to reflect the real risks of completing the project and are the contingencies acceptable?
7. Has the project satisfactorily responded to the recommendations from previous reviews?
8. Are there any other significant issues that require management attention?

As Program Manager for the HL-LHC ATLAS Detector Upgrade, Dr. Athanasios Hatzikoutelis will serve as the contact person for the Office of High Energy Physics for this review.



# Feb '24 IPR Agenda

**Wednesday, February 21, 2024 (EDT): Plenary (includes 7' for questions), Berkner B**

|          |  |                    |
|----------|--|--------------------|
| 8:30 am  | Full Committee Executive Session ..... | Kurt Fisher        |
| 9:30 am  | Welcome .....                          | Dmitri Denisov     |
| 9:35 am  | Project Status and Overview .....      | Jonathan Kotcher   |
| 10:20 am | Technical Status, I&I .....            | Hal Evans          |
| 10:55 am | Break                                  |                    |
| 11:10 am | Baseline Cost & Schedule, EVMS.....    | Penka Novakova     |
| 11:45 am | Maturity & Risk, Monte Carlo .....     | Gustaaf Brooijmans |
| 12:20 pm | Lunch                                  |                    |
| 1:20 pm  | Pixels .....                           | Philippe Grenier   |
| 1:55 pm  | Strips .....                           | Tony Affolder      |
| 2:30 pm  | Global Mechanics .....                 | Eric Anderssen     |
| 3:05 pm  | Break                                  |                    |
| 3:20 pm  | Liquid Argon.....                      | John Parsons       |
| 3:50 pm  | Trigger & Data Acquisition .....       | Stephanie Majewski |
| 4:20 pm  | Full Committee Executive Session ..... | Kurt Fisher        |
| 6:00 pm  | Adjourn                                |                    |
| 6:30 pm  | Dinner (TBA)                           |                    |

**Thursday, February 22, 2024: Breakout Sessions**

|          |  |                               |
|----------|--|-------------------------------|
| 8:30 am  | Subcommittee Breakout Sessions .....           | Sub. Chairs                   |
| 10:15 am | Break (timing TBD by each subcommittee)        |                               |
| 10:30 am | Subcommittee Breakout Sessions .....           | Sub. Chairs                   |
|          | <i>Includes CAM interviews, if/as required</i> |                               |
| 12:30 pm | Lunch  |                               |
| 1:30 pm  | Responses to Questions.....                    | Full Committee & Project Team |
| 2:30 pm  | Subcommittee Executive Sessions .....          | Sub. Chairs                   |
| 4:00 pm  | Executive Session, report writing .....        | Kurt Fisher                   |
| 6:00 pm  | Adjourn  |                               |

**Friday, February 23, 2024: Final Report Preparation & Closeout, Berkner B**

|          |  |
|----------|--|
| 8:30 am  | Executive Session/Report Writing       |
| 10:00 am | Closeout Dry Run                       |
| 11:30 am | Break, fact checking with project team |
| 12:30 pm | Closeout Presentation                  |
| 1:30 pm  | Adjourn                                |



# Scorecard from the Dec '24 Monthly Report

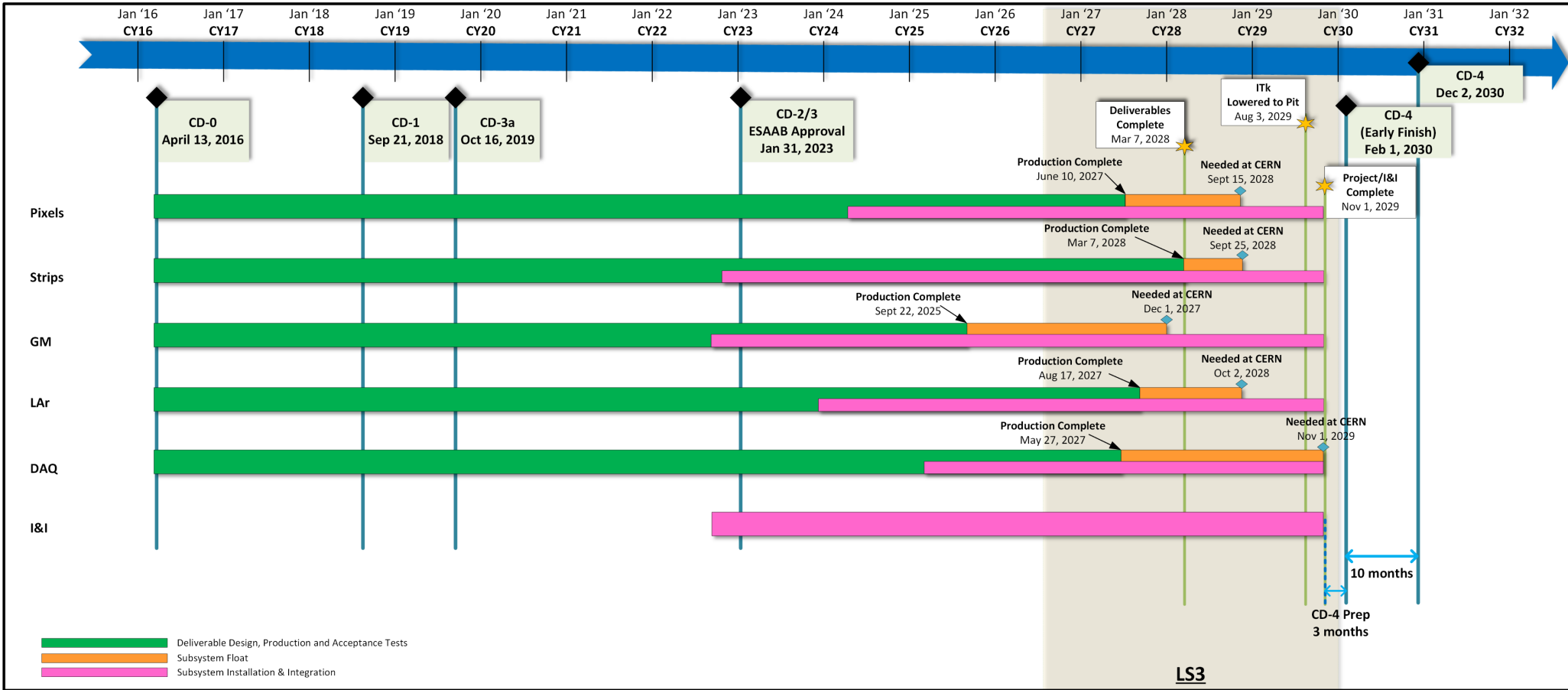
|  |                                   |   |                                    |
|--|-----------------------------------|---|------------------------------------|
| <b>Current CD:</b>                       | CD-2/3                            | <b>Date of Current CD Approval:</b>                   | 31-Jan-23                          |
| <b>Next CD:</b>                          | CD-4                              | <b>Planned:</b> Q1 FY 2031                            | <b>Actual:</b> N/A                 |
| <b>% Complete:</b>                       |                                   | <b>Planned:</b> 66%                                   | <b>Actual:</b> 61%                 |
| <b>Total Cost/CD-1 Range:</b>            | <b>TPC:</b> \$200.0M              | <b>CD-1 range:</b> \$149M to \$181M                   |                                    |
| <b>ETC:</b>                              | <b>Total:</b> \$67.4M             | <b>Technical Deliverables:</b> \$46.3M                | <b>I&amp;I:</b> \$15.9M            |
| <b>Contingency Remaining*,<br/>CCTG:</b> | <b>Total:</b> \$18.6M, 27.6% CCTG | <b>Technical Deliverables:</b> \$14.9M,<br>32.2% CCTG | <b>I&amp;I:</b> \$3.1M, 19.2% CCTG |
| <b>Float to CD-4:</b>                    | 559 working days                  |   |                                    |
| <b>Management Reserve:</b>               | <b>Remaining:</b> \$0.1M          | <b>Last Allotment Approved:</b>                       | 18-Sep-2024 (#10)                  |
| <b>Cumulative CPI:</b>                   | 0.97                              | <b>Cumulative SPI:</b>                                | 0.93                               |

\*Contingency is based on EAC. Total includes nominal cont. (~10%) allotted to remaining PMO & common costs.

- Data is through November 2024, reflecting the normal one month offset consistent with EVMS processing and reporting.
- CCTG on deliverables = 32.2%. These are the project's priority.
- Cumulative: CPI = 0.97, SPI = 0.93.

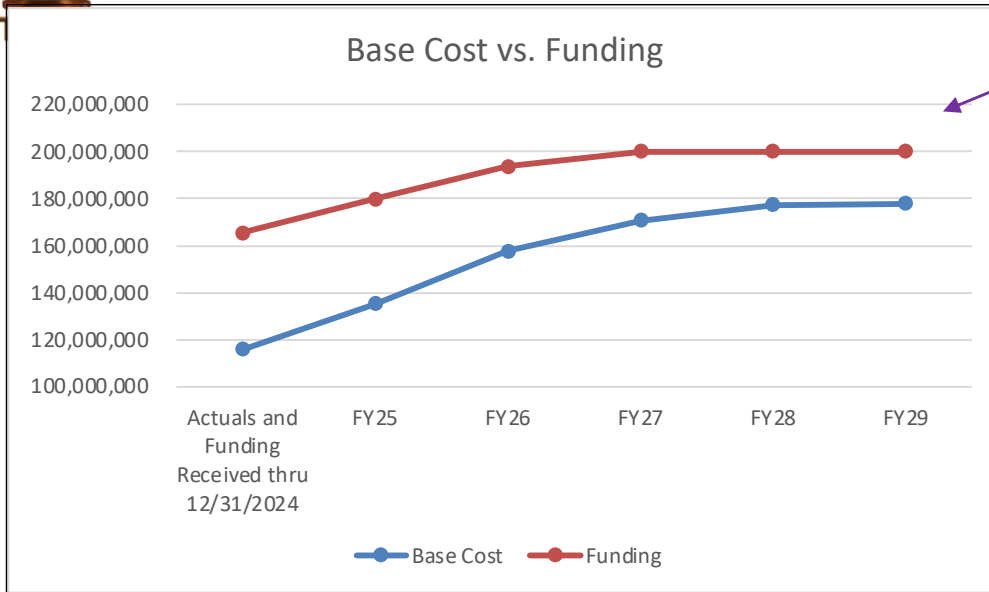


# Summary Schedule – DOE Scope

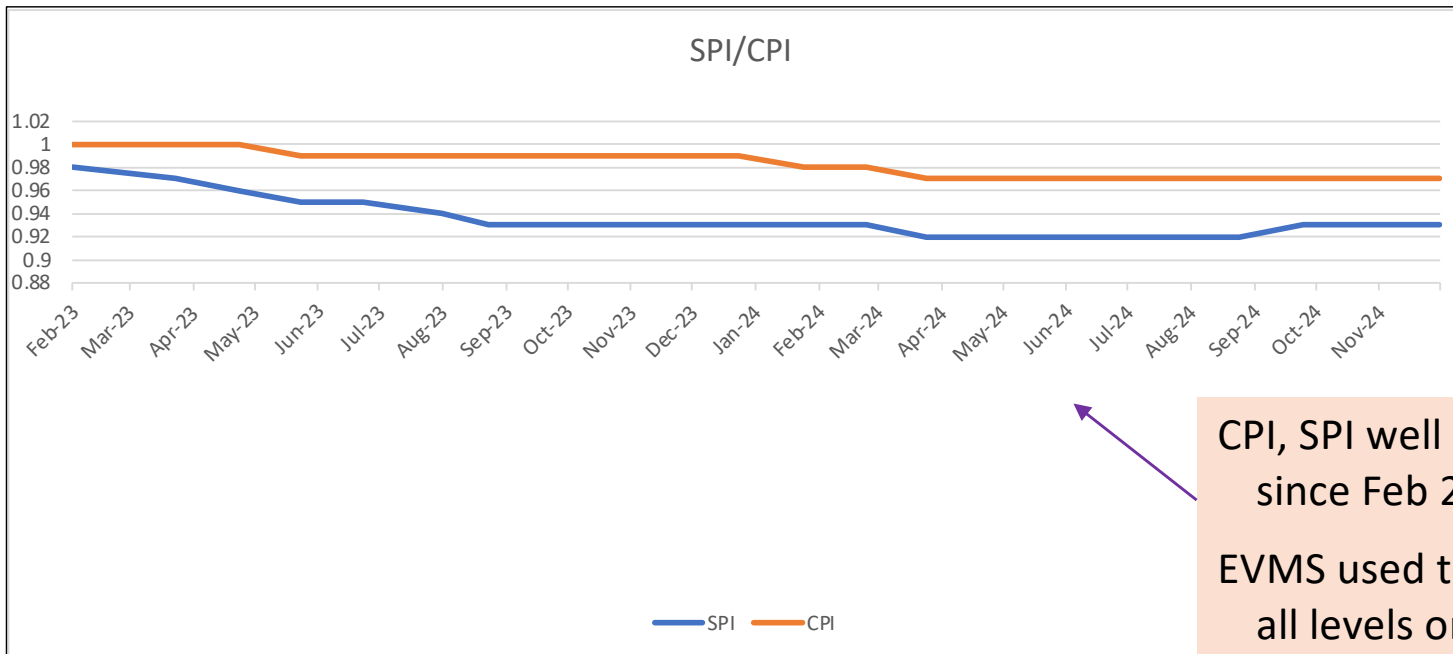




# Cumulative Cost vs. Funding, CPI/SPI



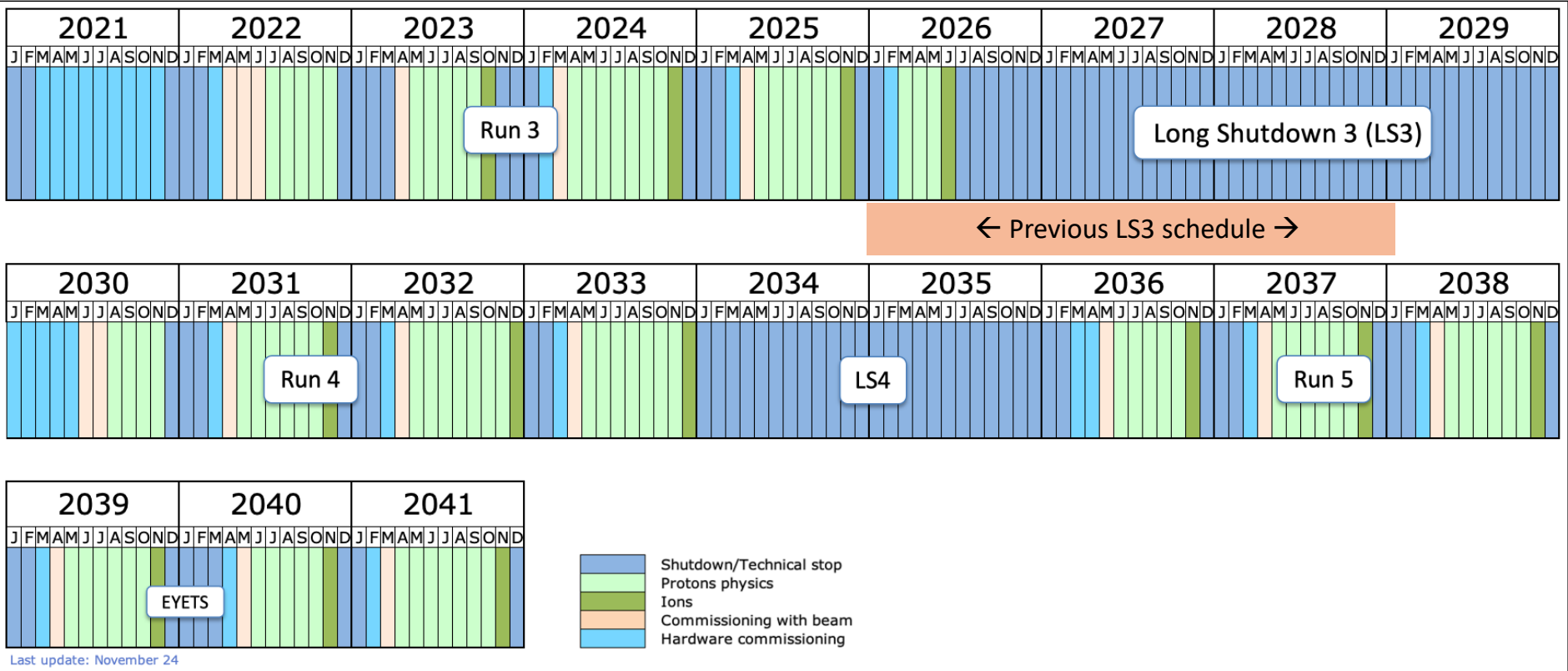
- Work scope well supported by the funding profile: no pinch points. Depends on the funding profile being maintained.
- Obligation profile ~ identical to cost profile (large procurements do not drive costs).



CPI, SPI well within bounds (>0.9) since Feb 2023 baseline.  
EVMS used to manage the project at all levels on monthly basis.



# Updated CERN LS3 Schedule



The new CERN LS3 schedule results in an effective end-date extension of ~ 17 months. All ATLAS/CERN “need-by” dates (targets) have been pushed out accordingly. If much of this addt’l time is required it will force an increase in contingency usage. This will be discussed in detail, including latest MC results, at the March ‘25 IPR.





# Scope Contingency

| System          | Decision Date | Potential Savings (AY\$K) | Potential Savings (months) | Description                                      | Performance Impact   |
|-----------------|---------------|---------------------------|----------------------------|--|--|
| 6.1 Pixels      | Q2 FY25       | 2600                      | 4-5                        | Reduced eta coverage 4.0 → 3.0                   | Reduced eta coverage, reduced forward pile-up rejection  |
| 6.2 Strips      | Q2 FY25       | 3000                      | 6                          | Build 40 fewer staves (20% US scope reduction)   | Fewer hits on track complicates pattern recognition, reduced track reconstruction efficiency                                 |
| 6.3 G.M.        | -             | -                         | -                          | No viable scope contingency                      |  |
| 6.4 LAr         | Q1 FY25       | 500                       | 0                          | Forego full system test with DAQ system          | Full integration longer to complete  |
| 6.7 DAQ         | Q1 FY25       | 470                       | 0                          | Reduced number of GCM boards produced 18 → 10    | No L0Calo [legacy Phase-I] support   |
|                 | Q1 FY25       | 1200                      | 0                          | Reduced number of FELIX cards produced 200 → 110 | Several subdetector systems to use Phase-I FELIX leading to reduced readout bandwidth  |
| <b>Subtotal</b> |               | <b>7770</b>               |                            |  |  |
| 6.11 I&I        |               | 8260                      | 0                          | Reduced US contribution to I&I                   | Heavier reliance on scientific labor; I&I slower to complete leading to lost data; higher risk of damage during installation |
| <b>Total</b>    |               | <b>16030</b>              |                            |  |  |

*From Feb '24 IPR. For Mar review, shift emphasis from "scope contingency" to savings associated with closing out at threshold KPPs. Analysis is the same. Description column corresponds to thresh KPPs.*

4-5 months (pixels) and 6 months (strips) can be gained by adopting threshold KPPs.