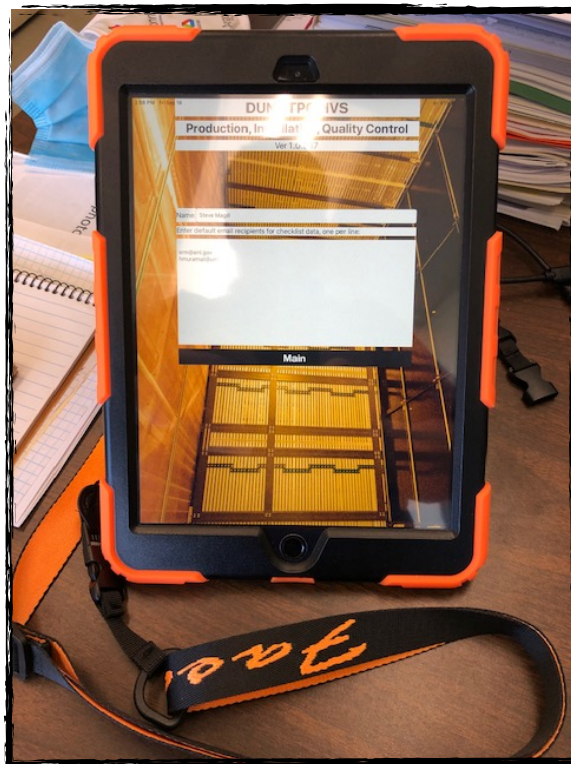


Managing QA/QC processes with HWDB



Hajime Muramatsu and Marvin Marshak

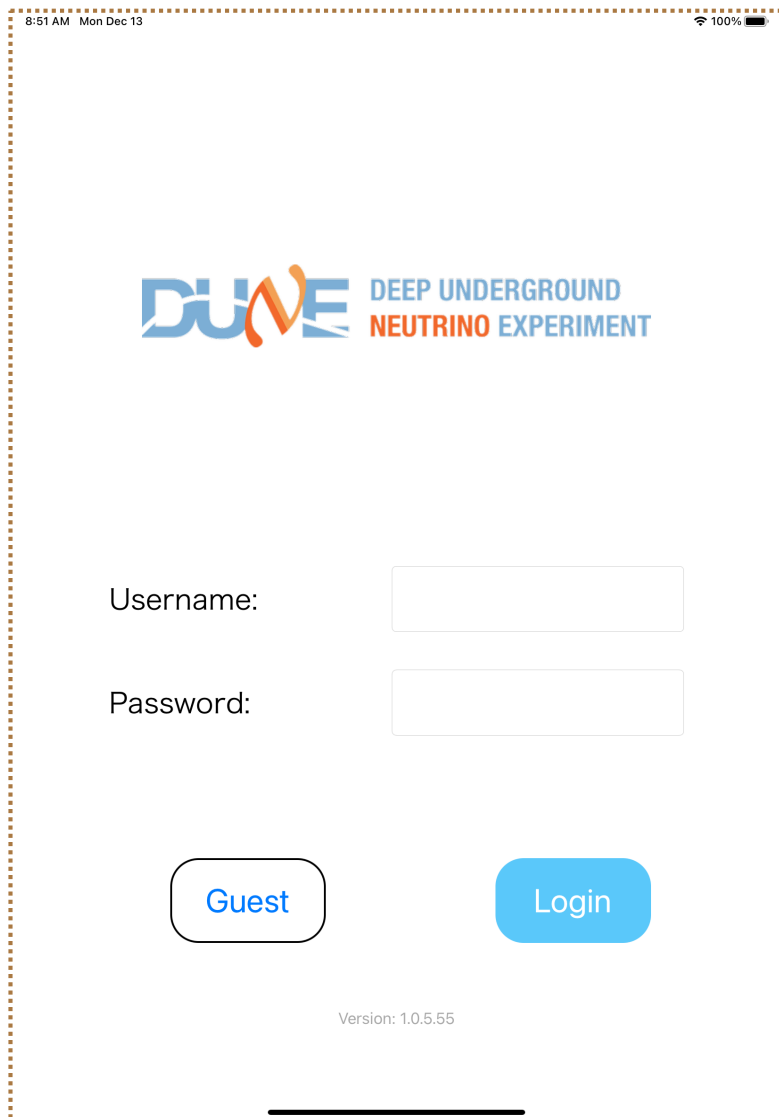
University of Minnesota

An iPad app that communicates with HWDB

- **HWDB: stores the official record of all the fabrication related info.**
- **MN group has been developing an iPad app:**
 - ▶ **Provides a user friendly interface to communicate with HWDB.**
 - ▶ **This ensures a unified way to communicate with HWDB.**
 - ▶ **Also provides assembly/installation procedures.**
 - ▶ **Once can take photos with the attached camera as well.**
 - ▶ **It's an iPad (computer), so one can also do;**
 - ➔ **store the recorded info locally on iPad and/or send it out through emails,**
 - ➔ **and one could perform a quick analysis within the app.**

Let us briefly show you how the app works in the next few pages

Multi-users are allowed



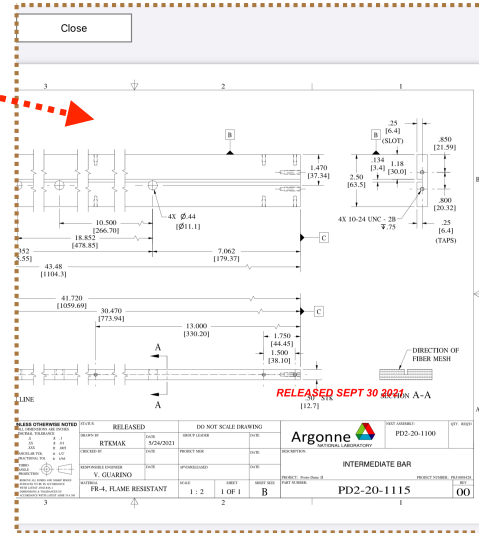
- Multiple QC testers could be using our app at their institutions/labs. (X.509 cert. through CILogon)
- Or one could login as a “Guest” and still use the all feature, except accessing to HWDB (so only saving locally or sending email)

Provides assembly procedures

- Step-by-step assembly procedure, with links to pinchable corresponding drawings.

9:12 AM Mon Dec 13 100%

- Attach intermediate bar (**PD2-20-1115**) with #10-24 x 1.5" bolts to bottom of upper unit.
- Attach intermediate bar (**PD2-20-1115**) with #10-24 x 1.5" bolts and side vertical bars (LH **PD2-20-2123**, RH **PD2-20-1224**) with 1/4-20 x 2.25" SS bolts to form the middle unit.
- Slide RP (from PD1 middle unit) in slot from bottom to top of middle CPA Unit.
- Attach intermediate bar (**PD2-20-1115**) with #10-24 x 1.5" bolts to bottom of middle unit.
- Attach intermediate bar (**PD2-20-1115**) with #10-24 x 1.5" bolts and side vertical bars (LH **PD2-20-2134**, RH **PD2-20-3333**) with 1/4-20 x 2.25" SS bolts.
- Slide RP (from PD1 lower unit) in slot from bottom to top of lower CPA Unit.
- Attach Main Support Bar (**PD2-20-1312**) at bottom to side vertical bars using 1/4-20 x 2.25" SS bolts.
- Align to template, fill in **CPA PD2 Panel Frame Dimensions Checklist** and clamp in place.
- Insert pins (0.25" x 2.5" long SS dowel) at top, upper-middle intersection, middle-lower intersection, and bottom (8 total).
- HV Bus cables:



- Links to QC checklists, embedded among steps.

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ProtoDUNE II

CPA Partial Panel Frame Dimensional Checklist

Cancel Print

Date: Dec 13, 2021 9:16 AM

CPA Panel # (1, 2, 5 or 6) 1

Panel ID D0050201000-XXXX-US-125

Drawing Number PD2-020-1000

Visual	Length	Length	Width	Width	Width
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diagonal	Diagonal	Side Straightness	Side Straightness	Flatness	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

CPA Panel # – Panel 1 is most downstream Panel (with HV Connection Donut), Panel 2 is paired with Panel 1, Panel 6 is most upstream Panel, Panel 5 is paired with Panel 6.

Panel ID – Unique PartID for each Panel (will be D0050201000-0001 for Panel 1, D0050202000-0001 for Panel 2, D0050202000-0002 for Panel 5 and D0050203000-0001 for Panel 6).

Visual – Inspect both sides of panels for absence of cracks, scratches on coatings, any other damage.

Length, Width – Check dimensions frame-to-frame – all must lie within the ranges (Length: (237.28 - 237.48 in), Width: (45.38 - 45.58 in)). Take 2 length measurements and a width measurement for each of the 3 units.

Diagonal – Both diagonal measurements must lie within (241.60 - 241.80 in).

Side Straightness – Check for absence of crooked connections using metal straight edge.

Flatness – Check that frames contact table around full perimeter - no gap > 1 cm.

Comment:

[Email](#)

[Upload to Database](#)

Taking pictures

9:24 AM Mon Dec 13 100%

CERN / CERN
USA / Argonne National Laboratory
USA / Kansas State University
Country/Institution ID: USA / Louisiana State University
USA / Sanford Underground Research Facility
USA / South Dakota School of Mines and Technology
USA / University of Minnesota Duluth

Date: Dec 13, 2021 9:23 AM

Parts ID


Drawing # DFD-22-5522

Profile #

Pass/Fail Failed

Comment:

Source of photos Photos



- Can use the attached iPad camera to take photos and send/store them.

- Or use the ones stored in “Photos”.

This allows users to use cameras other than the attached one.

(Photos can also sync with MS OneDrive)

Quick analysis on the fly

10:53 AM Wed Aug 25 100%

[Cancel](#) **MRB** [Update](#)

Number of MRBs:

Maximum Acceptable Deviation (%):

Include MRBs with Failed Tests on Chart: No Yes

MRB Type	# Received	Visual	# Passed	Mean Resistance	Standard Deviation
Blue	80	69	69	4.807	0.812
Yellow	70	68	68	4.998	0.379
Black	50	39	39	4.941	0.582

MRB Type To Display: Black All

[Print](#)

can also print this out

Total Entries Listed on Chart: 184 [Generate Chart](#)

Generated bar-chart

- iPad is a computer,
it allows one to perform a quick
analysis based on the info just
upload to the HWDB
(e.g., distributions of measured
MRB resistances).

Status of the app development

- The basic functionality is there.
- So far, we have been working with the HVS consortium only.
- Currently, we are preparing for their PD2 assemblies at CERN next year, where the consortium uses our app.
- We have been also extensively testing our app v.s. the dev. version of HWDB. In doing so, Steve White and Vladimir Podstavkov have been very helpful and quick to respond to our requests.

- It turns out, it rather consumes a lot of the time to understand how exactly our users like to use our app, besides just coding.
- We also expect to start to receive more requests after the PD2 assemblies next year.

(And we certainly would like to invite more customers)

The Minnesota group needs another developer!

The MN group for this app development

- Me (Hajime) and Marvin.
- We have had CS undergrad students (we currently have one).
But we can't depend on students for long term and it takes time for a newly hired student to get used to our development environment.
- With this fund, we seek a dedicated developer:
 - ▶ S/he should take over what we have been doing, that includes coding and working with the student.
 - ▶ We can concentrate mainly on the communication between our developer group and our customers.
 - ▶ This will definitely boost our development speed and improve the quality of our app.

The hiring status

- Still hiring (see <https://hr.myu.umn.edu/jobs/ext/341149>)
- We do have a really good candidate now.
Recently graduated (CS) and is currently applying for the US working authorization.
We have told him we would keep seeking other candidates until he gets the authorization.
- We have another candidate, who is in the University online process.
We have not interviewed with this person, yet.