



Electronic Lab Notebooks: Sandia Pilot Project

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What is a lab notebook?

- A complete record of scientific data, including procedures (the actions you took), observations made, etc.—with sufficient information to reproduce your science, to support evidence for a patent, and to become a part of your scientific legacy¹

What are Sandia’s requirements?

- Laboratory Policy System (LPS) has policies to protect **and** retain scientific information (including RD001, IT010, QA001)

What are some Sandia resources?

- Common Operating Environment (COE); Common Engineering Environment (CEE); Approved Systems; COE includes MS Windows and integration of MS Office tools, including SharePoint, OneNote
- Lessons learned from past efforts for ELN at SNL

Hypothesis:

Using MS OneNote, combined with a CCHD-approved hardware platform and specialized training, improves the SNL R&D environment by:

- Making the lab and PI more efficient with documentation and organization;
- Sharing resources, documentation of procedures, etc.
- Making data easily accessible and organized for retrieval and future use by researchers
- Automating backups
- Complying with SNL policies such as R&D policy, data retention policy (access to archived data)

What do we learn if unsuccessful?

- What were the pain points that did not make the PI’s life easier

What do we do if successful?

- Seek resources for broader implementation in “bench-scale R&D/S&E” across larger portions of SNL
- Seek resources to look at different possible solutions for different types of R&D performed at SNL

Project plan:

- Identify pilot participants, resources (IT support, training, Human Factors, hardware)
- Execute pilot (16 participants from 01800, 08600, 09000)
- Obtain feedback
- Submit recommendations

What is an Electronic Lab Notebook (ELN)?

- A complete record of scientific data, including procedures (the actions you took), observations made, etc.—with sufficient information to reproduce your science, to support evidence for a patent, to become a part of your scientific legacy¹ (but powered by electronics, rather than ink-and-paper)

What are some practices outside Sandia?

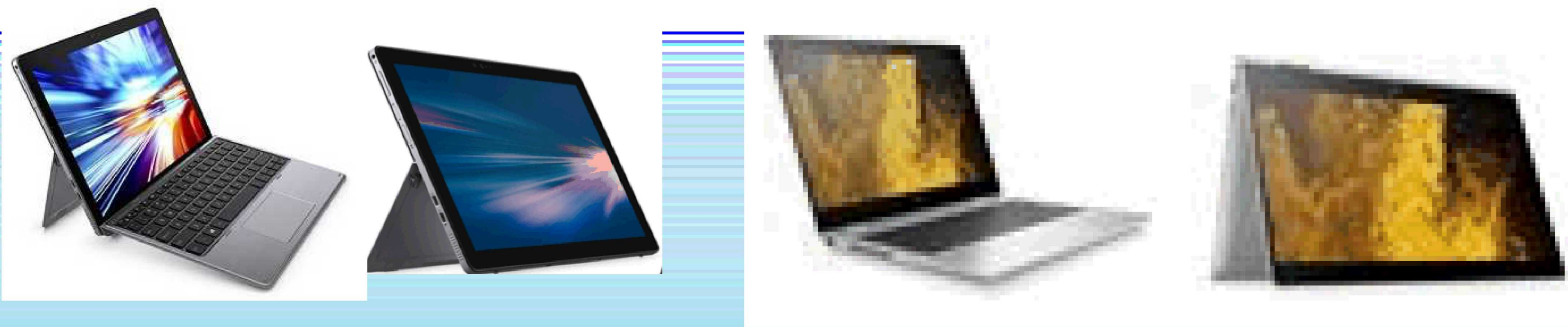
- NIST adopted the use of MS OneNote together with a specific Dell 2:1 tablet in calibration services
- INL and ORNL allow the use of MS OneNote
- Many discipline-specific ELN software products, especially for biosciences and chemistry R&D: See references^{3,4}

What do Sandians want in an ELN?²

- Data backed up seamlessly
- Share/collaborate with team, but also control access and security. Make peer review easy.
- Retain anything, including thoughts, notes, emails, sponsor correspondence, results, path to results, constraints/assumptions: **R&D reproducibility**
- Methodology: Why you made particular choices
- Version control: Can’t delete (“pen”, not “pencil”); time and date stamps. Verification of data for accuracy.
- Format that won’t go bad over time
- Ease of use. Voice recording/camera (where allowed)
- Final “correct” version to formally document what you did and how you got there

Windows laptops used in the pilot						
Model	Weight (lb)	Screen	Camera	Touchscreen	# of USB ports	Notes
HP X360	3.0	13”	Yes	Yes	2 USB-C, 2 USB-A	Folds like tent. Needs ethernet dongle
Dell 7200	2.0 (tablet) + 0.8 (keyboard)	12”	Yes*	Yes	2 USB-C, 1 USB-A	Keyboard detaches. Needs ethernet dongle

A non-Bluetooth stylus, compatible with the tablet’s stylus protocol.



References

1. Philip Ryan, NIH Office of Intramural Training and Education, “Keeping a Lab Notebook”
2. Notes from participants in SNL “How to be an effective PI workshop,” 2/21/2019
3. “Lit Review and More” document from Alice Parsons, SNL Technical Library, including scholarly and trade articles, presentations, websites, and videos (will be in SNL Libguides and SNL ORD1 resources)
4. Such as: “How to pick an electronic laboratory notebook,” Roberta Kwok, *Nature* (2018), doi: 10.1038/d41586-018-05895-3