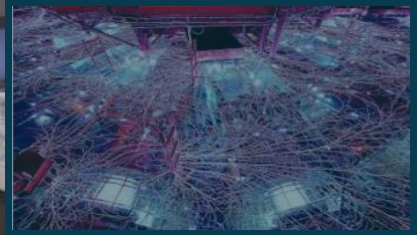
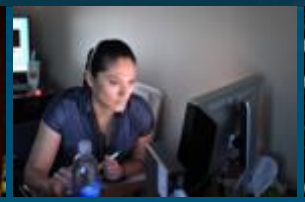
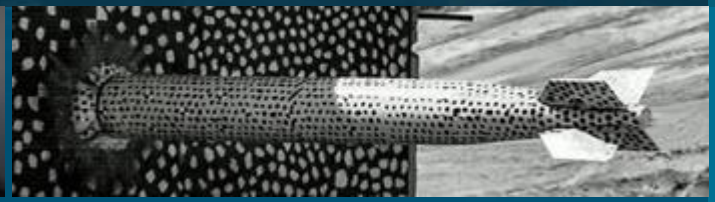
SAND2021-9820C

Sandia National Laboratories

2021 SEERI Summer Presentation: Department 1673 Year Round Internship Projects







PRESENTED BY

Shane Bramley

U.S. DEPARTMENT OF ENERGY NNSA

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School and Degree

Major: BS/MS Computer Science (Shared Credit)

School: University of New Mexico (School of Engineering)

Organization/Manager/Mentor(s)

Org: 1673

Manager:

Mark Kiefer

Mentor(s):

Rafael Aragon (ZQL Web)

Brandon T. Klein (XR@Z)

Collaboration:

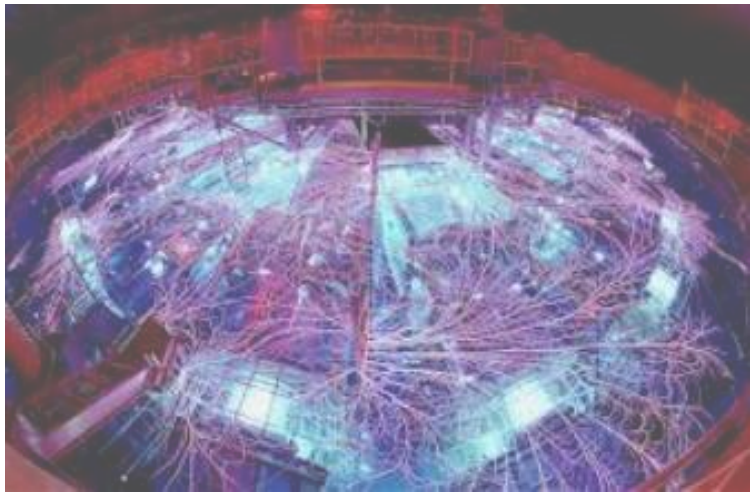
Nadine Miner (XR)

Z Machine Daily Operations

Z Machine is the worlds largest pulse power machine.

- Every shot is unique and shot complex has also grown over time; because of this, training up the work force is key in daily operations.

- Developing technologies to train the work force, gathering data, and create solutions to help better science is critical to the continued success of Z.



Projects Overview

Software Engineering:

- Agile (Scrum)
- Kanban
  - Epics
  - Features
  - User Stories
- Waterfall

Projects:

- Web development (Rafael Aragon/Trent Yocom)
  - Dashboard
  - Daily Work Planner
  - MITL Gap Measurements

- Power BI (Anh Lui)
  - Training
  - Data Visualization

Power BI

- XR@Z (Brandon Klein/Nadine Miner)
  - MenuFramework
  - STTK (Sequential Training ToolKit)
  - ExTK (Exploration ToolKit)

HoloLens 1

HoloLens 2

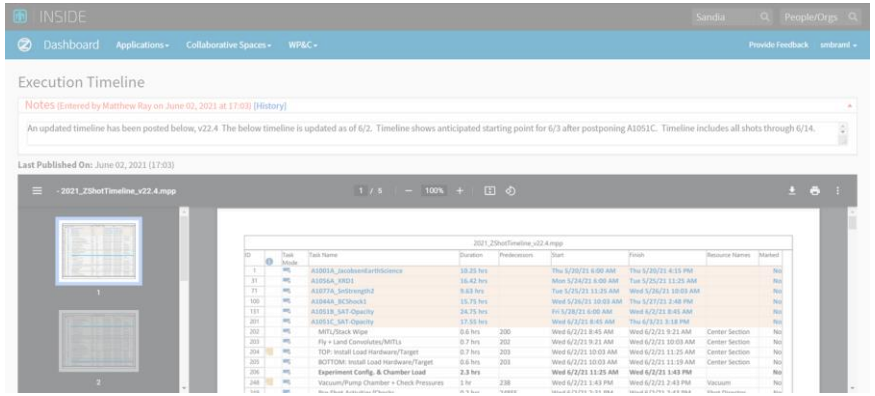
Web Development

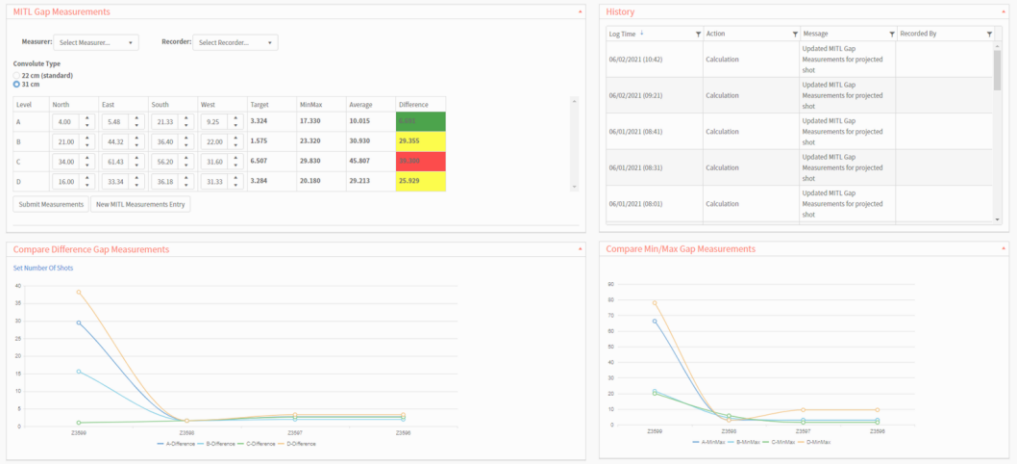
Major works:

- **ZQL Dashboard** – Main page for ZQL website used for daily Z operations.
  - Notes update for PIT. Database tables for historical data page.

- **Daily Work Planner** – Used by shot directors to sent out what the current shot plan and status on a day to day basis.

- **MITL Gap Measurements** – Page using SignalR 2 to for taking down and calculating measurements for the MITL Gaps checked between each shot.
  - Built database tables to hold the data. Then query these tables to pull previous data.

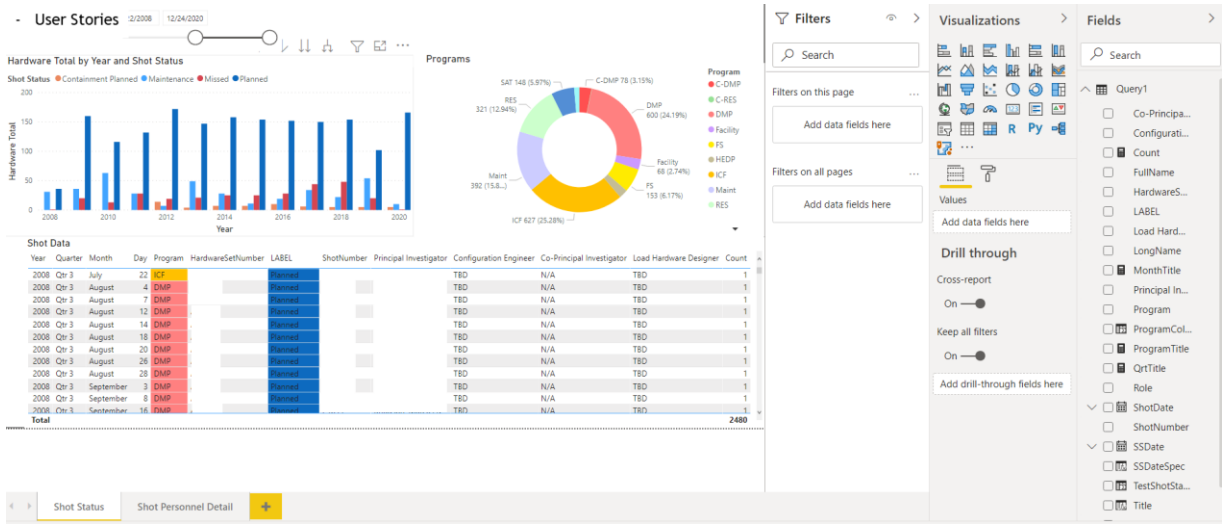




Updates:

- **AMAP**, updating the images and the layout of the pages.
- **SML**, adding EVAC symbol

Power BI



- **Training** – Collaborating with my team (Anh Lui, and Brandon Klein) to produce a training for Power BI to help the teams at Z build smart data reports.
  - Use case 1670 for gathering and visualizing data:
    - 1671 PIT team to gather and data and make visualizations to display out for daily updates.
    - 1671 Shot Directors interest in displaying data out to the z shot schedule group.

- **Examples** – Used to display out shot data and allow for the ability easily manipulation data. Data may include:
  - Database stored procedures
  - Excel spread sheets
  - Direct SQL Calls

Power BI

XR@Z - Extended Reality at Z

Collaboration: Shane Bramley, Brandon Klein, Nadine Miner PhD, Lexie Ruben (Previous Year Round Intern)

Open Source (MIT) Software copyrights:

- MenuFramework – A menu system built to be used to open multiple applications and reuse for other applications. Utilizing Microsoft's Mixed Reality Toolkit (MRTK) the menu system is used for multiple parts of our software to have a generic menu used to show the data than needs to be displayed out to the users in what ever platform they prefer.

- STTK – Sequential Training ToolKit used to build sequential training applications for multiple platforms combined with MenuFramework it will be used at Z for augmented reality training. This project was built with 6000 cross collaboration.

- ExTK – Exploration ToolKit software used to explore and manipulate models for training and exploration. This software was written with 6000s AR Explore functionality in mind while rebuilding the software for reusability.

STTK – Sequential Training ToolKit

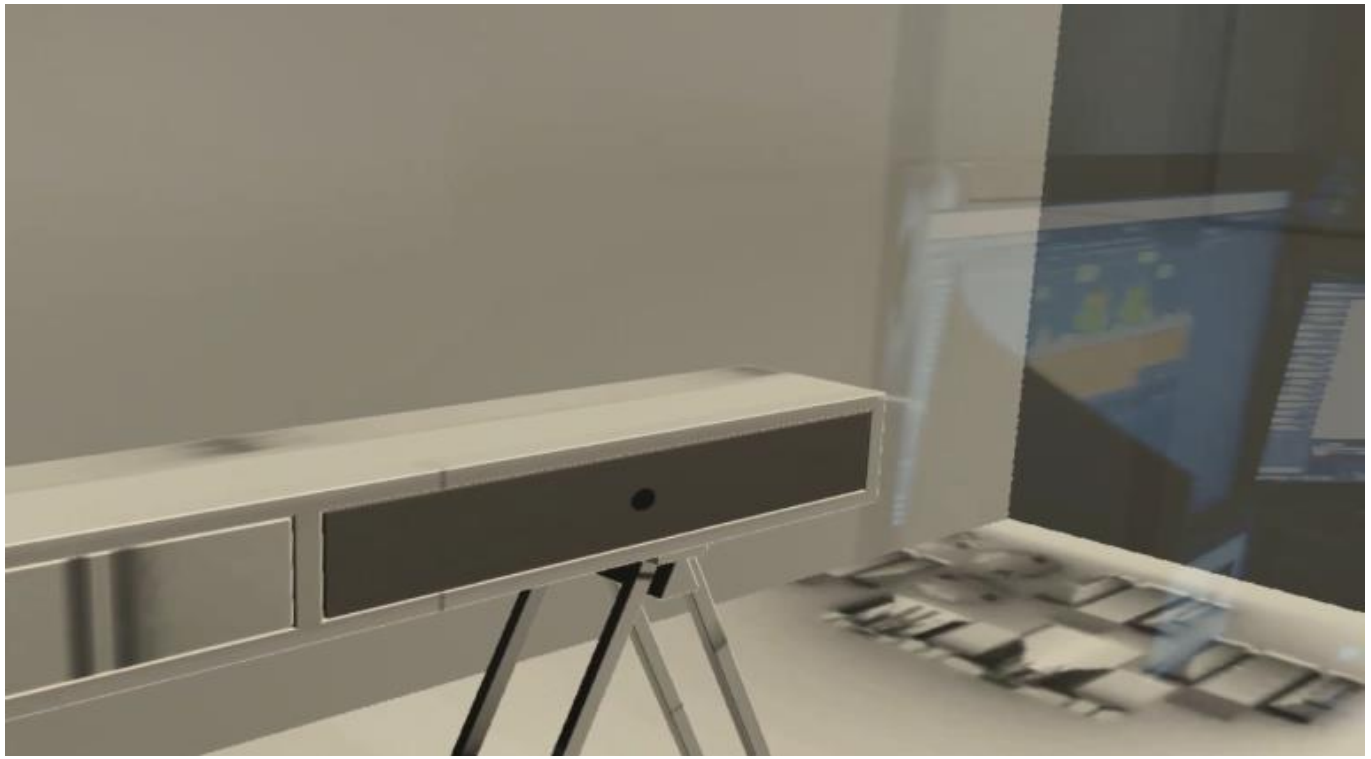
- STTK – Sequential Training ToolKit is used to build sequential training applications for multiple platforms. Combined with MenuFramework it will be used at Z for augmented reality training. This project was built by cross collaboration with 6000.

STTK Video:

ExTK – Exploration ToolKit

- **ExTK** – The Exploration ToolKit was built with 6000s team and their AR Explore product. ExTK is used to explore and manipulate models.
- ExTK allows the user the ability to explore a model providing an entirely new setting and can be beneficial for visual learners.

ExTK Video:



Thank you!

Questions?

Email: smbraml@sandia.gov