

# GNSS Simulation In Trimble Virtual World

Jacob Kyle Klemick

Bachelor of Information and Communication Technologies  
Ara Institute of Canterbury  
Semester 1 - 2024



[in jacob-klemick](#)  
Jacob.Klemick@outlook.com  
Jacobklemick.com

## Background

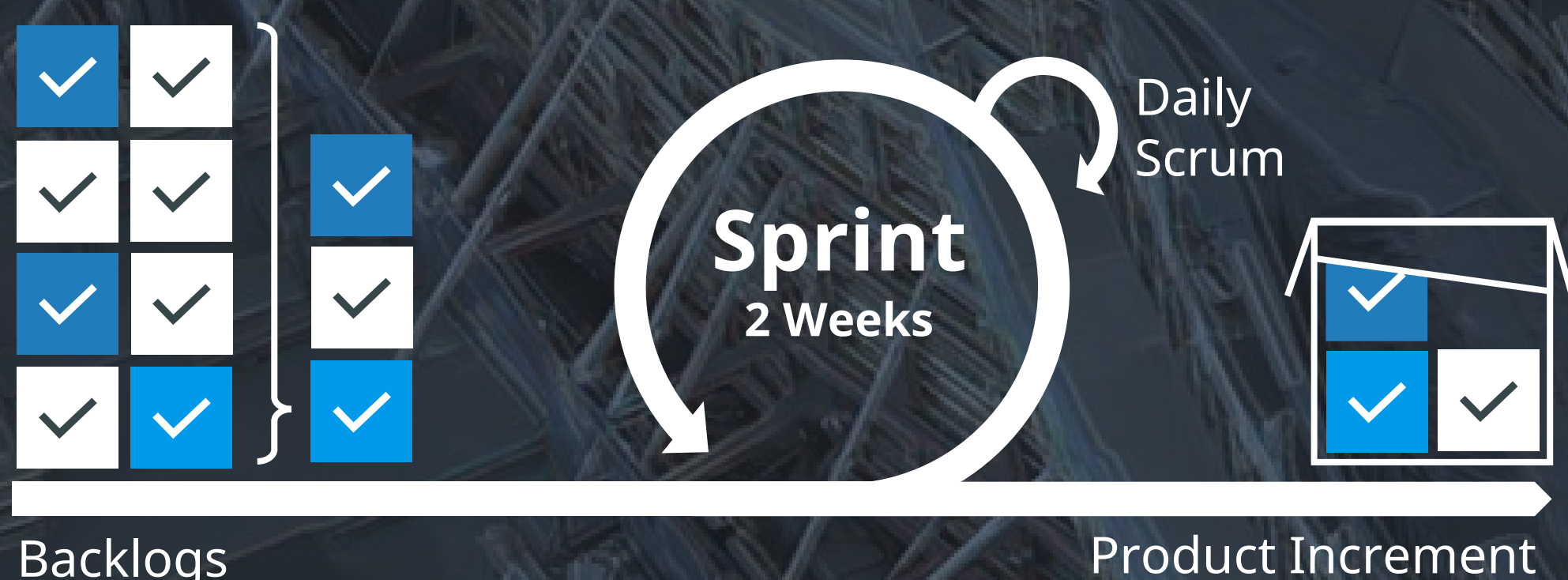
Trimble Inc. has developed Virtual Worlds, a digital twin simulator to provide virtual site training. Trimble aims to further enhance Virtual Worlds by developing Global Navigation Satellite Systems (GNSS) and Global Position System features to provide and deliver a more accurate simulation of GNSS performance when training in Virtual Worlds.

## Methodology

The project utilised an Agile Scrum methodology

Figure 1

Agile Project Management with Scrum<sup>2</sup>



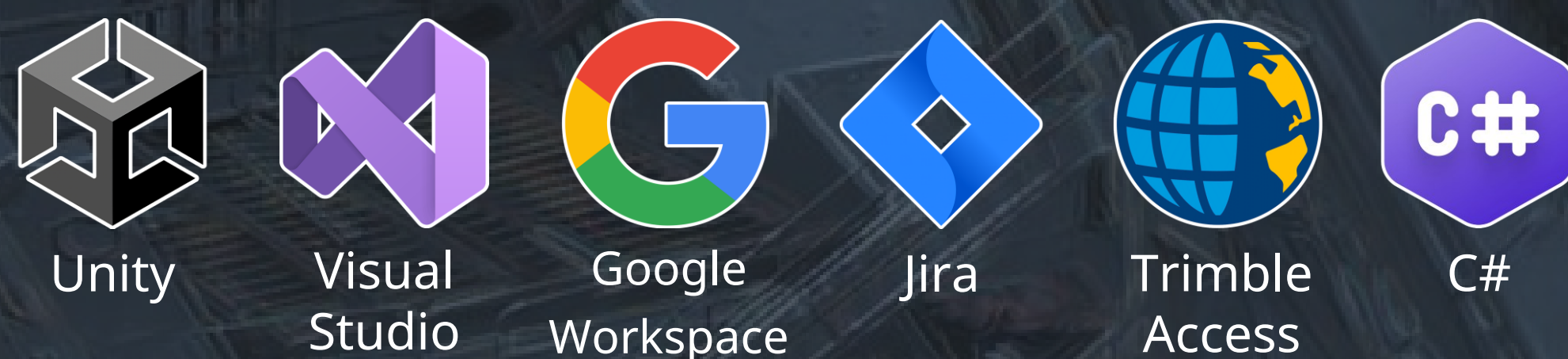
## Aim

- Simulated accuracy degradation when under buildings or obstructions
- Show and visualise GNSS signals
- Develop Quests to teach users about GNSS
- Show accuracy and dilution of precession (DOP) metrics

## Learnings

- Understanding GNSS and Land Surveying
- Using the Unity 3D game engine with C#
- Teamwork, Project Management, Communication
- Working with an Agile methodology in organisations

## Tools



## Outcomes



Learn More

- Developed Line-of-Sight System to simulate GNSS signal interference.
- Simulated accuracy degradation when user is under buildings
- Visualised GNSS and implemented Dilution of Precision.
- Develop quests to that teach users on GNSS technologies.

Figure 2

3 State Line of Sight System Visuals



Figure 3

GNSS Learner Quest

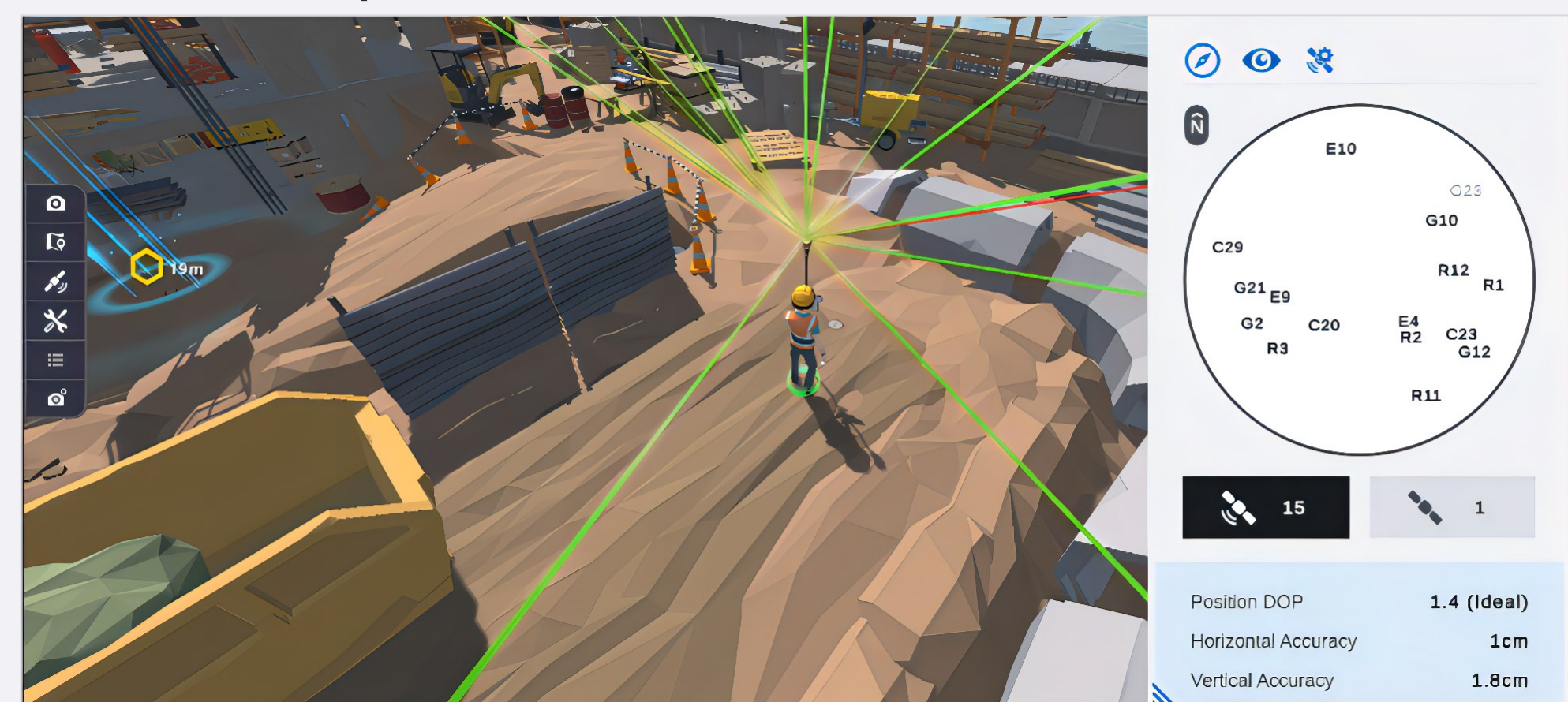
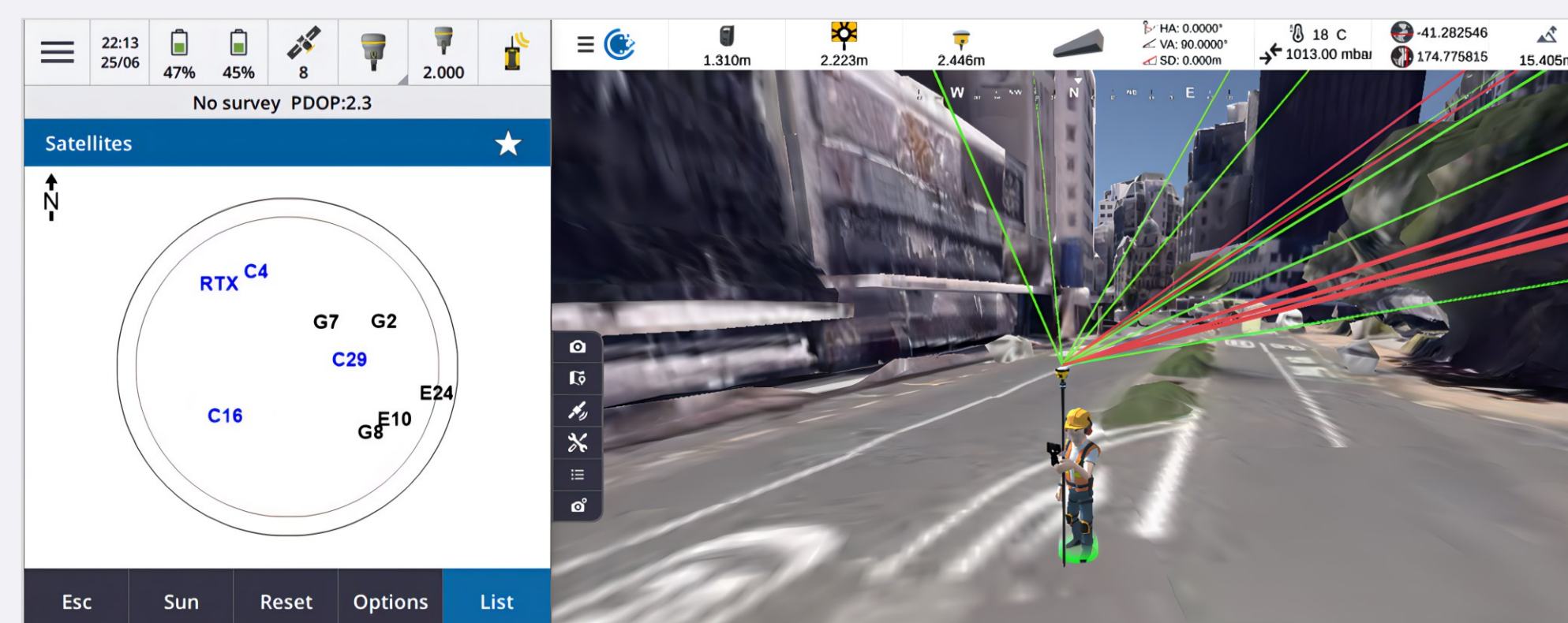


Figure 4

GNSS Simulation Emulated in Trimble Access



## References

- [1] Trimble Inc. (2022). Introducing Trimble Virtual World. Retrieved from [virtualworld.trimble.com](https://virtualworld.trimble.com)
- [2] Sliger, M. (2011). Agile project management with Scrum PMI Global Congress 2011 Project Management Institute.

## Acknowledgements

Stuart Ralston  
Industry Supervisor  
[stuart\\_ralston@trimble.com](mailto:stuart_ralston@trimble.com)

Dr Bernard Otinpong  
Academic Supervisor  
[bernard.otinpong@ara.ac.nz](mailto:bernard.otinpong@ara.ac.nz)

Dr David Weir  
Course Convenor  
[david.weir@ara.ac.nz](mailto:david.weir@ara.ac.nz)