



Recurrent training using a portable solution

Maintain the student's currency without taking them from an active deployment.

- Needs to be portable
- Need to be low cost
- No loss in functionality
- Use high fidelity graphics



Recurrent training using a portable solution

Classroom based training systems are:

- Larger
- Heavier
- Permanent installations
- Single uses
- Low availability

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Existing classroom system in Norway:



- 4 x large tower gaming computers
- 6-8 x desktop monitor screens
- 2 x large ceiling mounted projectors
- 1 x gesture recognition device
- 1 x audio system
- 1 x communications system
- 1 x push-to-talk system



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Portable Solutions

- Range dramatically in terms of 'portability'
- Often considered portable but are not a single man lift

Our solution is not only a single man lift, but can be taken on a commercial airline as hand luggage



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Solution overview



- 1 x 17" Laptop with NVIDIA Quadro P4000:
- 1 x Universal Serial Bus (USB) portable screen
- 1 x Oculus VR HMD + VR Controllers
- 1 x Microsoft Kinect Sensor
- 1 x Xbox 360 Gaming Controller
- 1 x Pelicase





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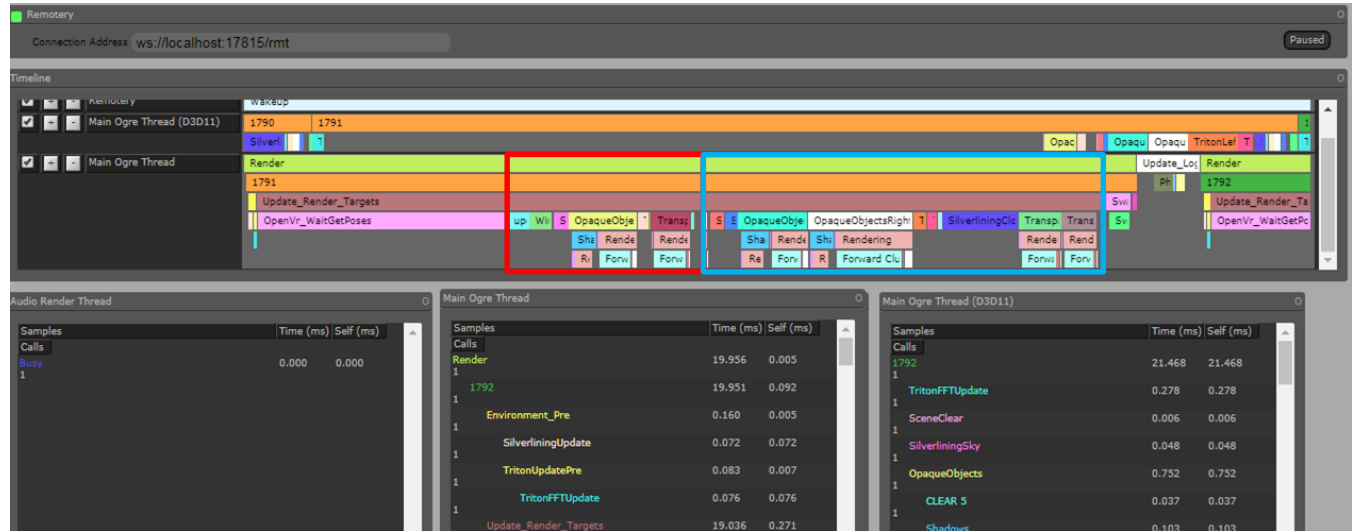
Performance Analysis

- Deficit in performance between the fixed and portable solutions

	Number Of Views	Number of Pixels rendered	Framerate (Hz)	Total Pixels per second
Fixed System	1	2,073,600	50	103,680,000
Portable System	3	4,665,600	90	419,904,000
Delta	2 (300%)	2,592,000 (225%)	40 (180%)	316,224,000 (405%)

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Performance Optimisations





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Performance Optimisations

- Updates to internal libraries
- Further analysis, using tools like Remotery and NVIDIA Nsight
- Special considerations for VR based applications

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Emulated equipment

- Fixed system uses a series of touch screens
- Rendering equipment into VR headset
- Interacting with equipment within VR headset



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Graphical Quality

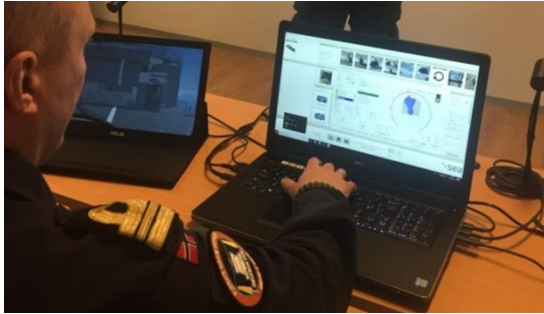
Considerations for developing VR applications

- Display technologies
- Stereoscopic rendering, ie depth perception
- User has ability to look around world at will



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Conclusion



“So far I have used the system to re-qualify four FDOs. The feedback from them was that it was more immersive than the original simulator, the fact that you could see the helicopter the whole time and turn around and see the FDC was pointed out by them all”.

“This week I was on a course for bridge officers, I took the VR simulator and used it to give them a lesson in deck operations. They could see what happens on the deck, and we could discuss it. We will continue to use the VR simulator on that course also”.