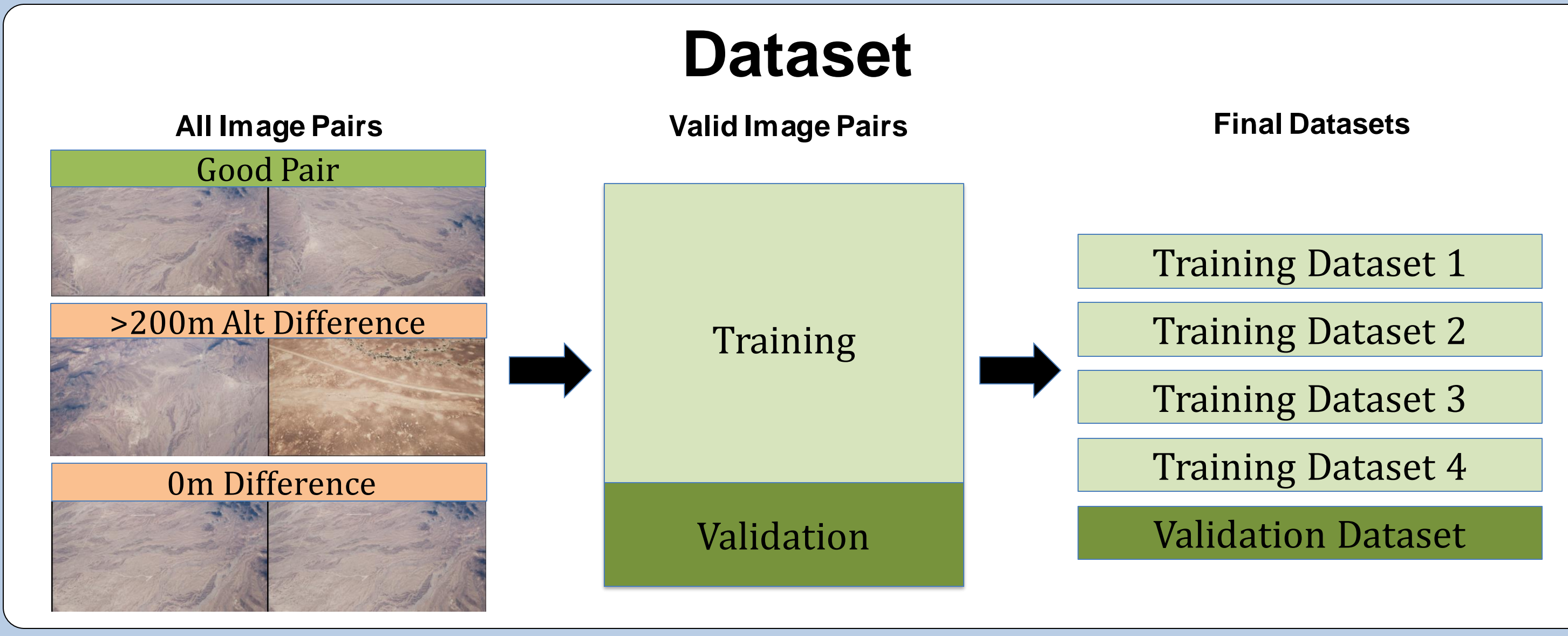
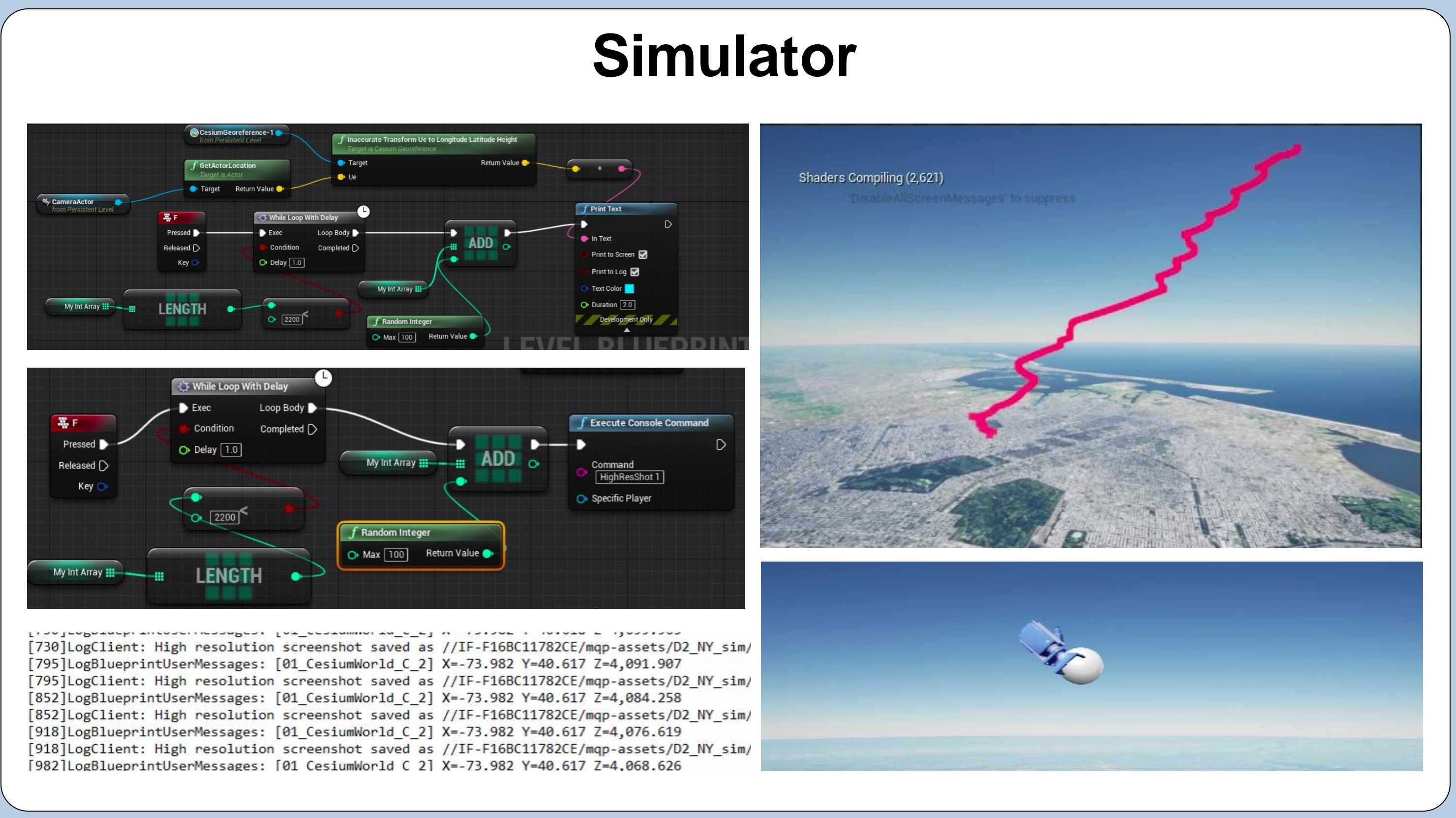
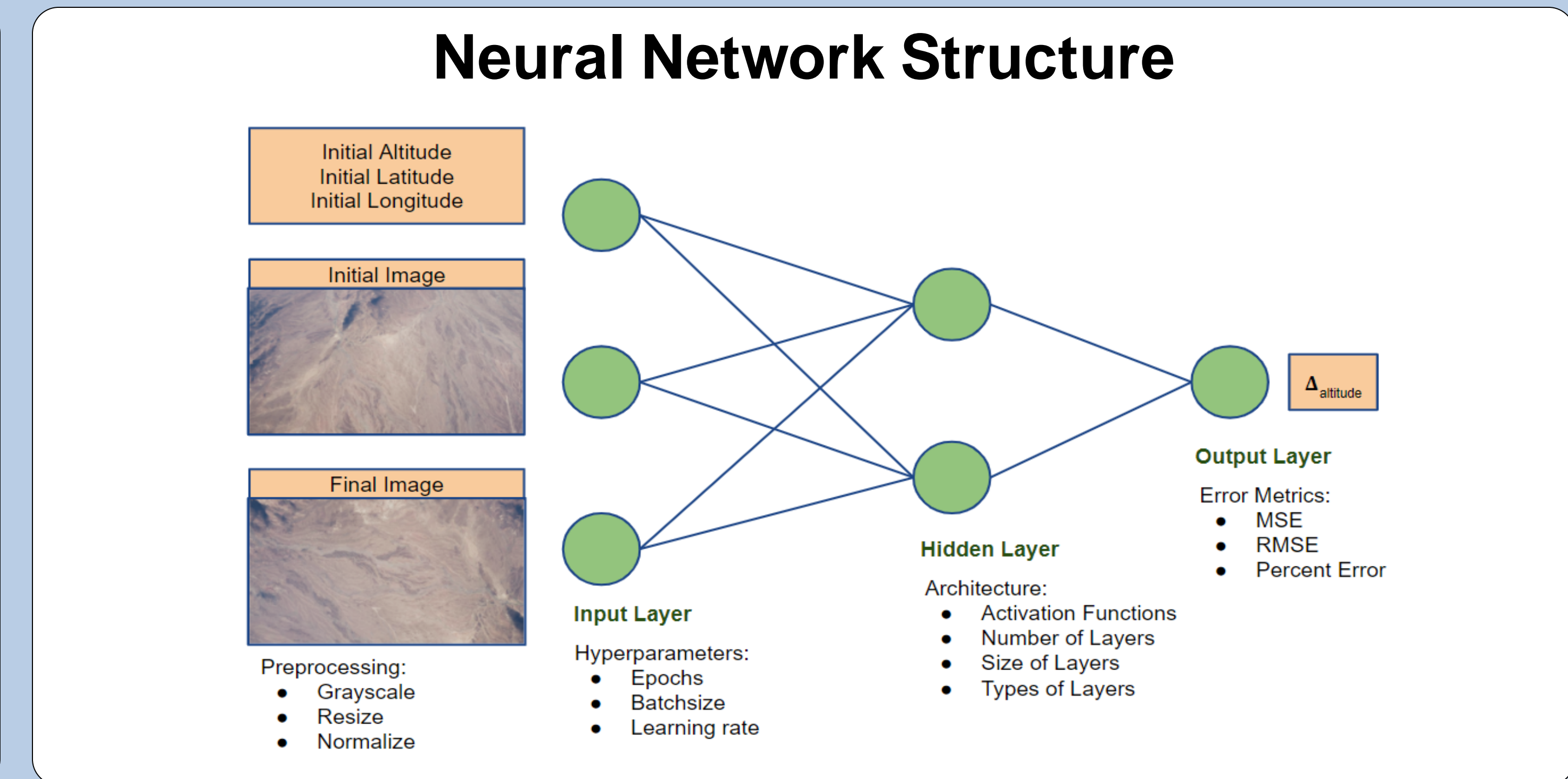
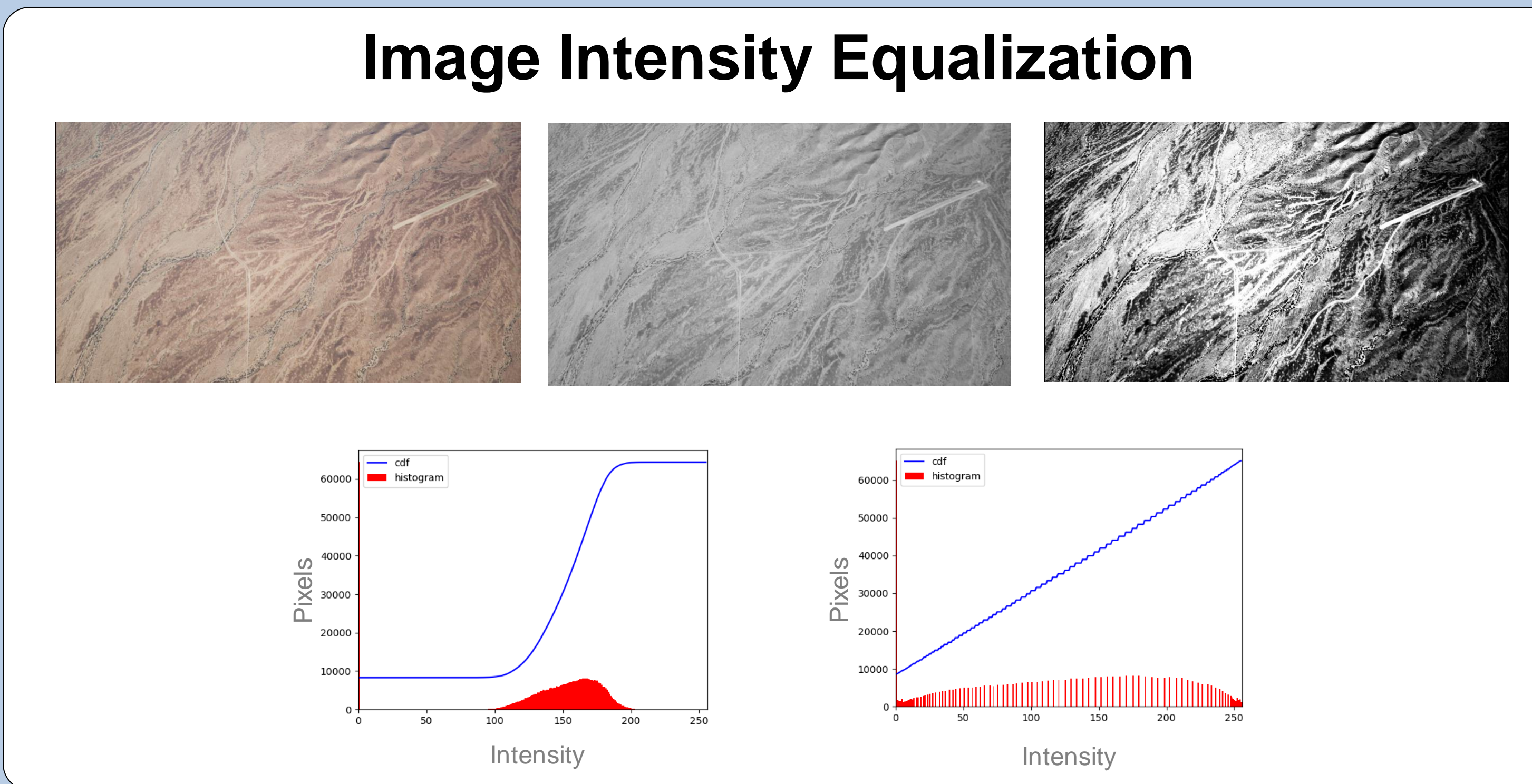


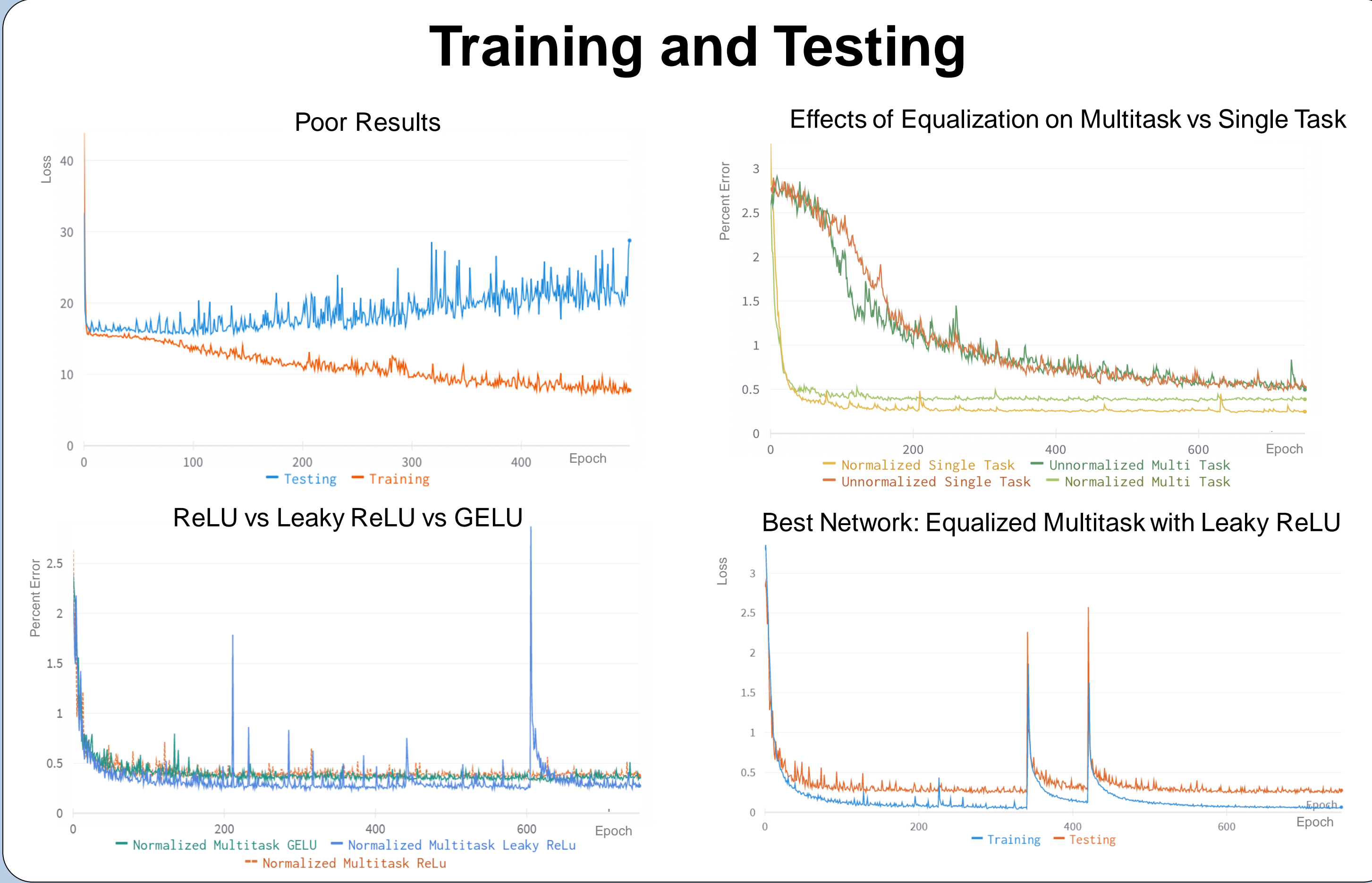
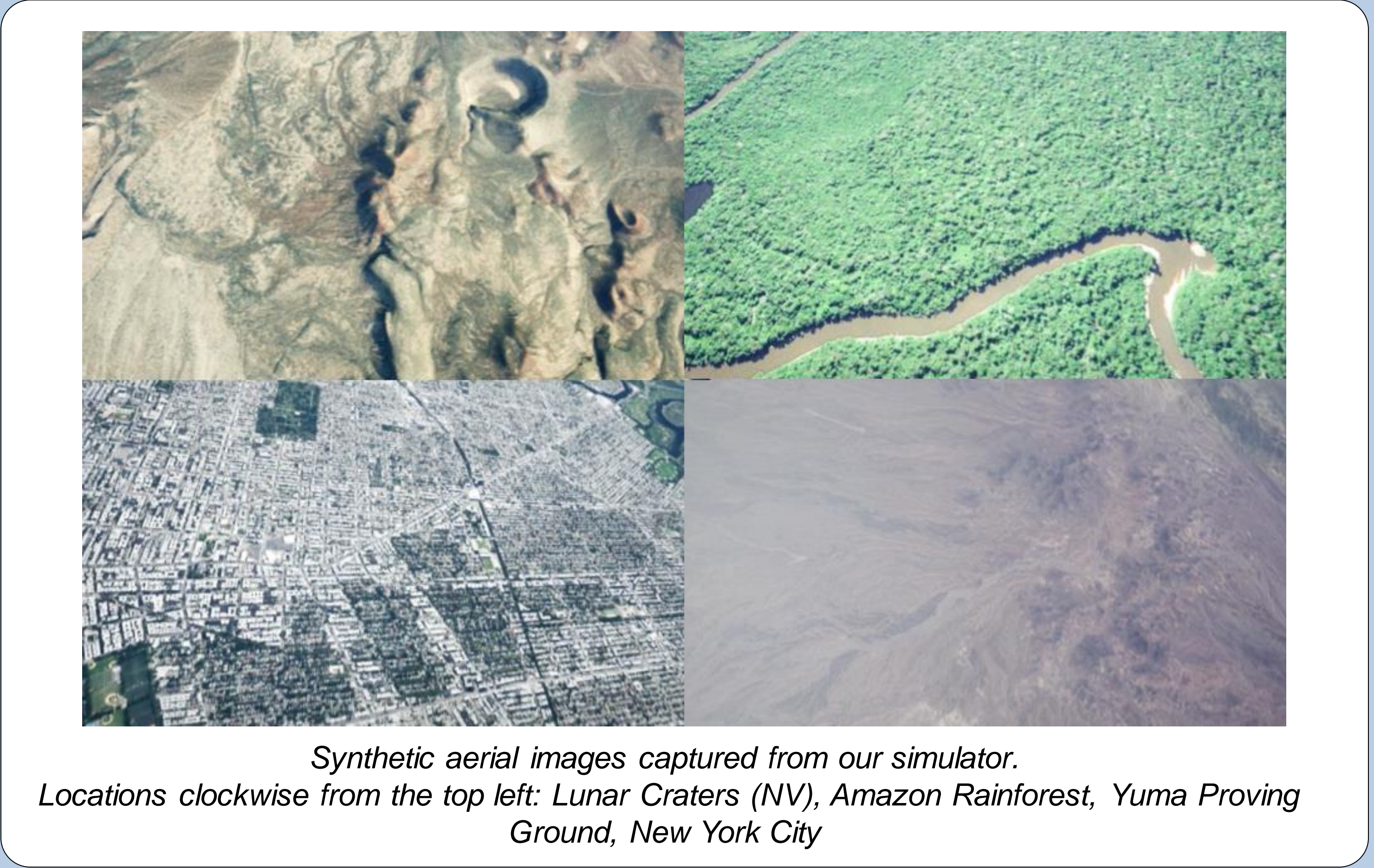
Abstract

In the military, supplies are critical, and a common method for delivering supplies is via parafoil parachutes, guided by the GPS. However, signals from GPS satellites can often suffer from disruption, due to jamming or environmental factors. The goal of our project, in conjunction with DEVCOM-SC, is to develop a machine learning navigation solution using aerial image data, as a reliable GPS alternative. A previous MQP developed an initial neural network and determined generating more data was a crucial next step. To obtain a large quantity of labeled aerial images, we first created a virtual simulator for parachute drops. After collecting data using our simulator, we were able to apply a variety of preprocessing methods to the images and test different neural network structures to predict changes in parachute location.



Performance Evaluation

Single or multi?	Preprocessing		Testing Error	
	Equalized	Activation Function	RMSE	Percent Error
Single	None	ReLU	25.607	0.489
Multi	None	ReLU	25.664	0.484
Single	Pairwise	ReLU	18.540	0.262
Multi	Pairwise	ReLU	18.673	0.291
Single	Pairwise	GELU	18.370	0.261
Multi	Pairwise	GELU	18.510	0.283
Single	Pairwise	Leaky ReLU	17.952	0.257
Multi	Pairwise	Leaky ReLU	17.528	0.264



Cross Validation of Best Network

Percent Error = 30.19%
 Root Mean Squared Error = 18.175

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 Approved by DEVCOM-SC for public release.

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