1 Context
Truck freight is used for the bulk haulage of resources. The failure of a mobile asset carrying critical materials can have a significant flow-on cost for the fleet owner and client. Preventive maintenance can reduce the likelihood of these failures, but it also has a cost and reduces the availability of the fleet. How often should it be conducted to maximise the fleet’s productivity?

2 Problem Statement
The aim of the project is to optimise the preventive maintenance schedules for a fleet of remote operating vehicles using simulations and genetic algorithms.

3 Reliability Analysis
Maintenance records are analysed to create a dataset of historical failures and suspended measurements. Maximum likelihood estimation is conducted on the dataset to estimate reliability distributions for the components in the trucks. Components are grouped into subsystems in the model.

4 Simulation Model
The fleet of trucks is simulated completing journeys. Every time a journey is completed by a vehicle, the simulation checks whether it is due for maintenance based on the input trial maintenance schedule. Subsystems experience stochastic failures based on the reliability analysis.

5 Results
Genetic algorithm successfully optimised the maintenance schedule for the fleet of prime movers as modelled using their real maintenance data. Simulation was validated and verified. Fleet owners will be able to optimise maintenance planning for other mobile load haul assets using this process.