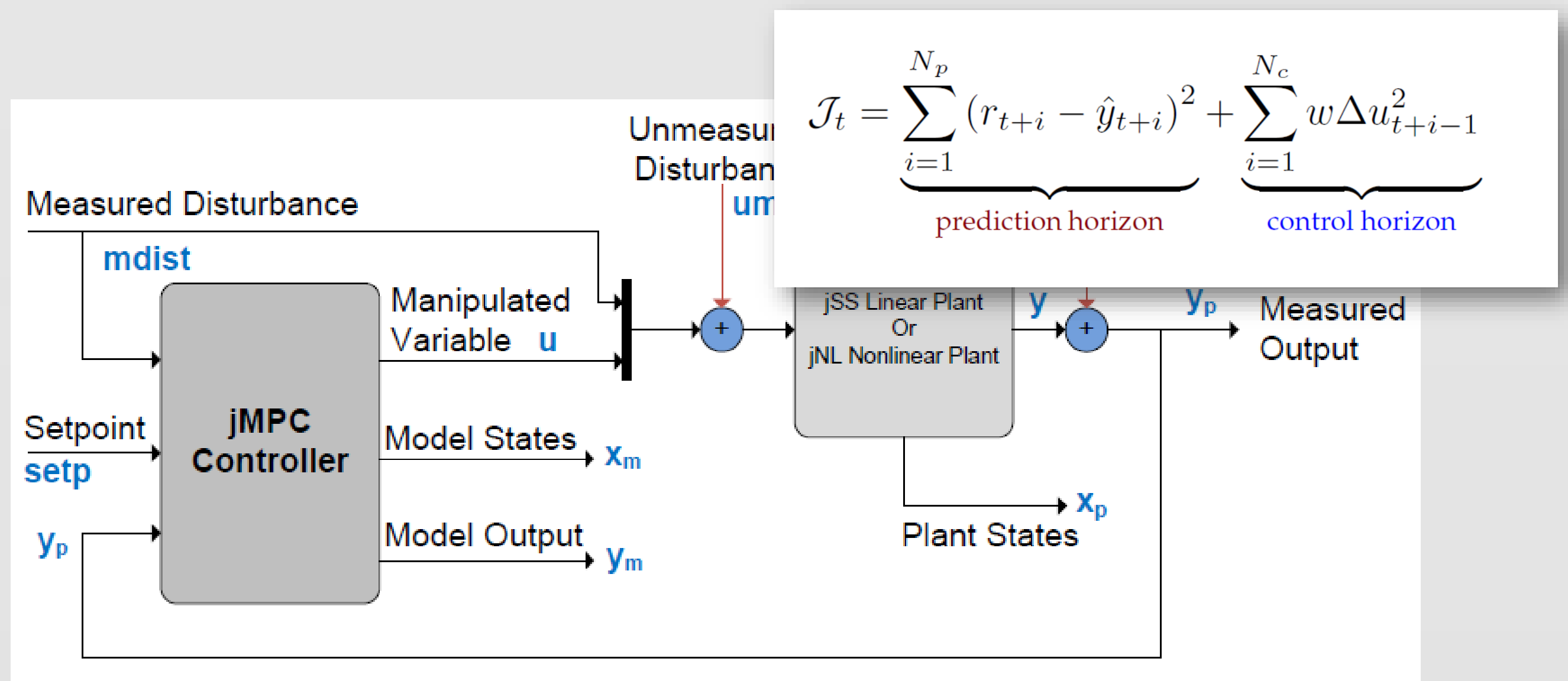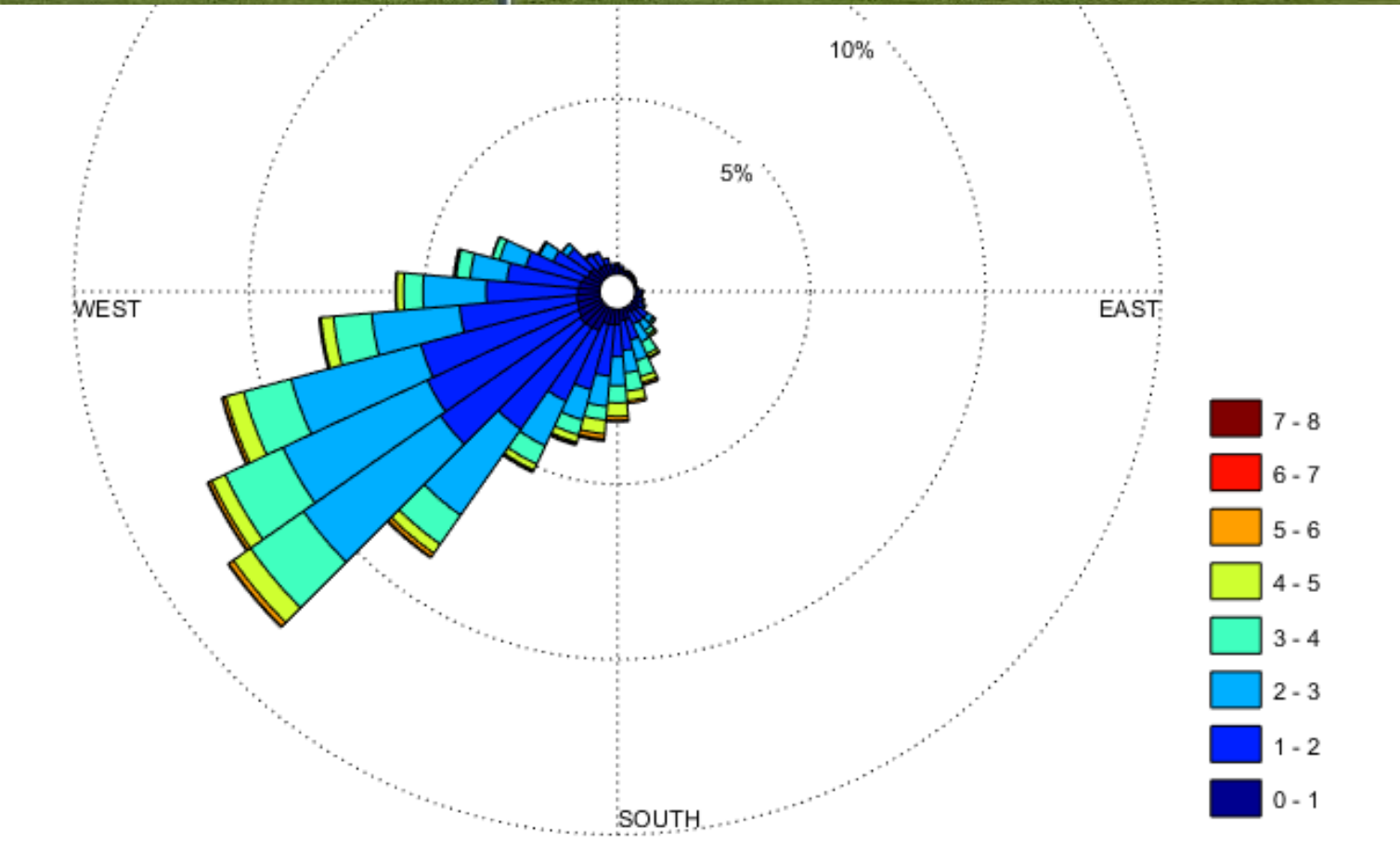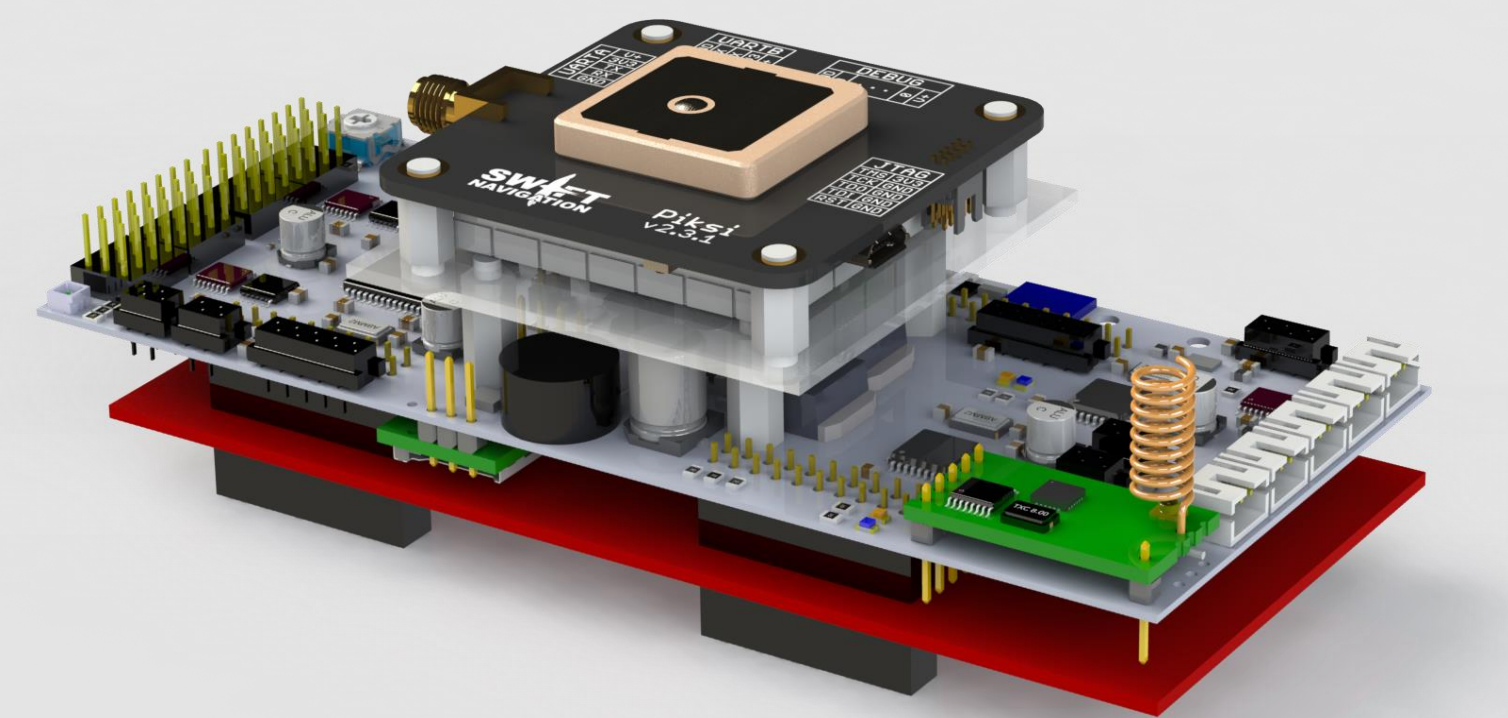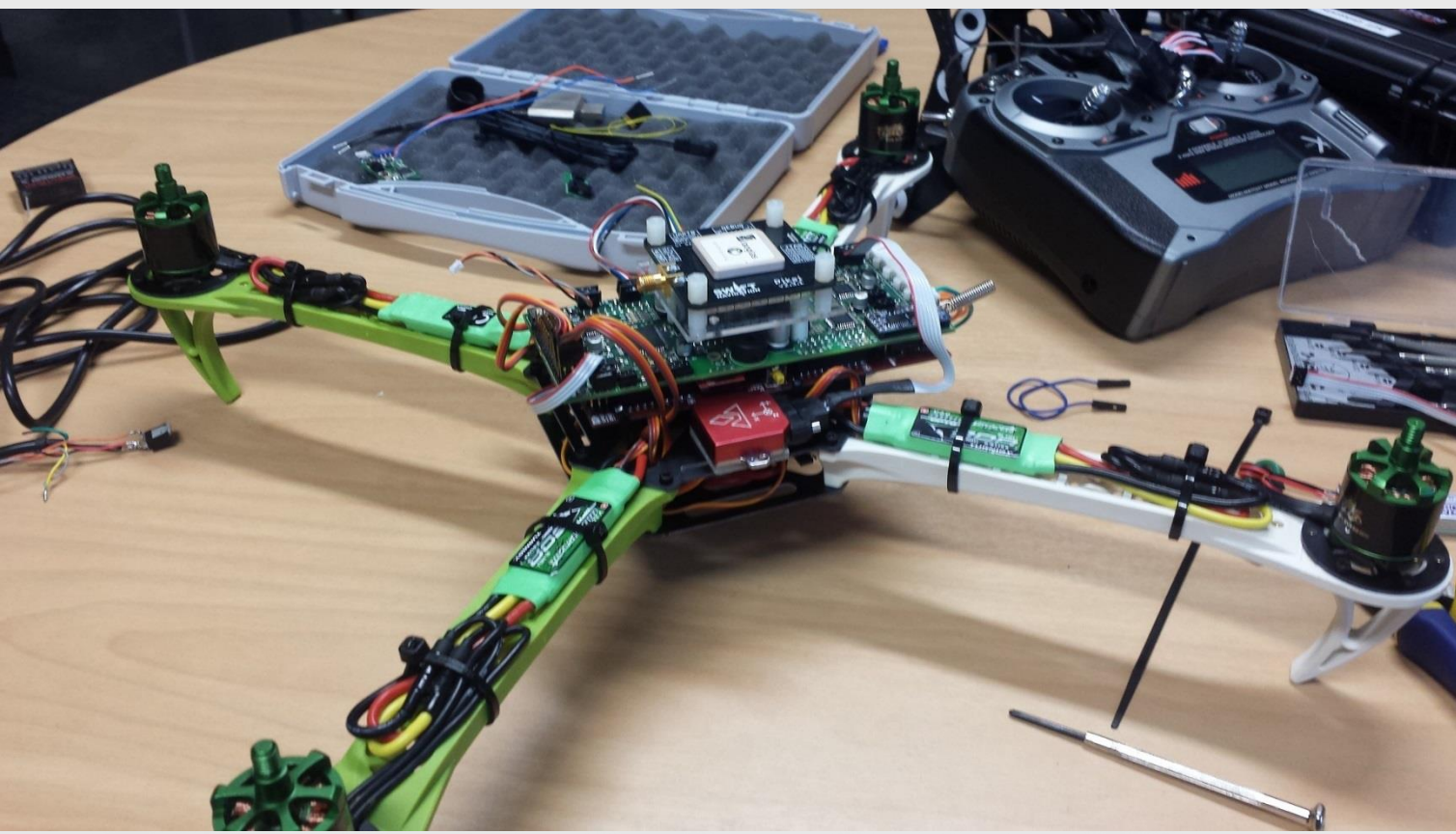# AUT

Robust Predictive Control of Aerial Platforms

UAVs or drones are more than just toys. They can be used for search & rescue, surveying marine mammals, monitoring of awkwardly placed equipment, or asset management of things like power lines.

However to perform these tasks, we need an agile craft with a high level of control and autonomy, as well as robustness to external disturbances such as wind.

We are developing a *Robust Embedded Model Predictive Controller*

$$\mathcal{J}_t = \sum_{i=1}^{N_p} (r_{t+i} - \hat{y}_{t+i})^2 + \sum_{i=1}^{N_c} w\Delta u_{t+i-1}^2$$

$\underbrace{}_{\text{prediction horizon}}$ $\underbrace{}_{\text{control horizon}}$

The best and most robust control is one where we take local environmental weather conditions into account.

For that we need a portable weather station, which is used to generate local forecasts suitable for tailored disturbance rejection models.
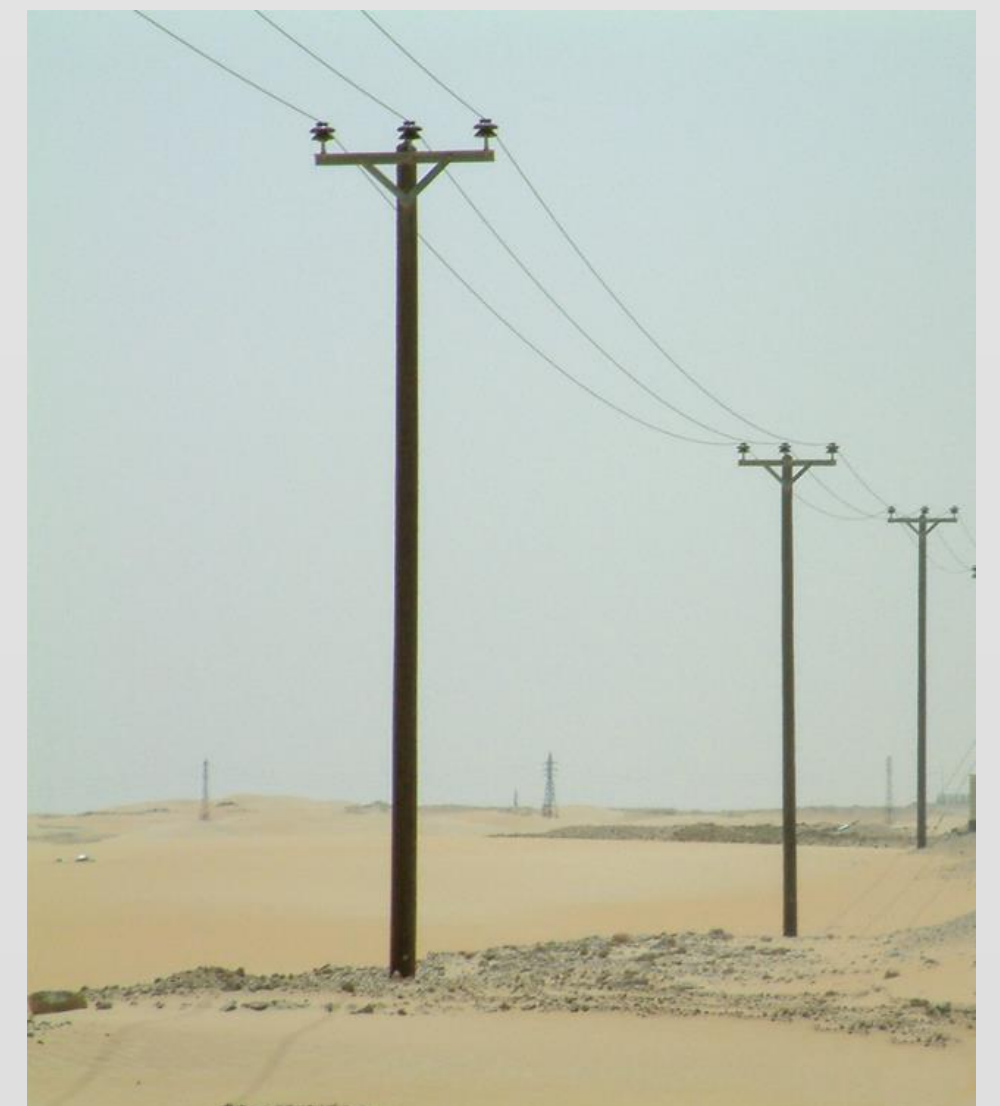
The ability of MPC to honour constraints means that we can fly safely around power lines for asset inspection.

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