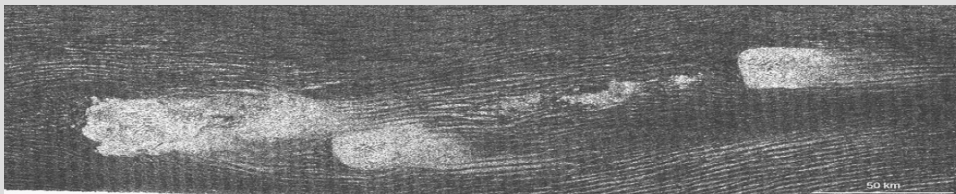# Titan Wind Analysis using Lagrangian Coherent Structures
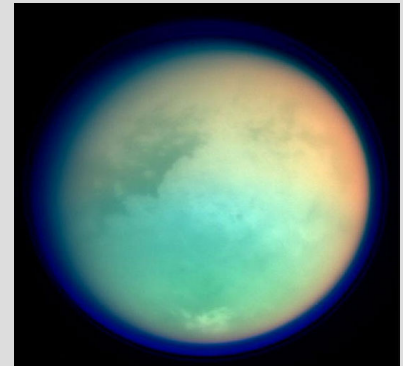
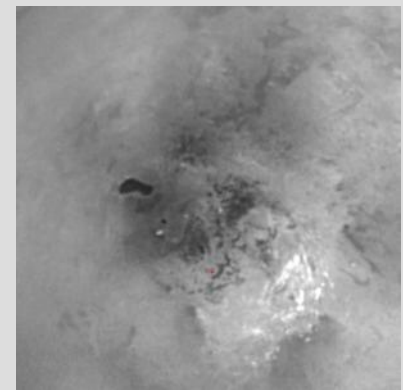Simon Coppack & Ronald Fung

The Problem

- What is the optimal location to release the aerobot in Titan's atmosphere?
  - Total surface area covered
  - Specific landmarks of interest
- How much control is needed for the aerobot to reach landmarks of interest which are otherwise inaccessible? How do we minimize the control effort?
- How robust are these predictions if the real wind profile encountered deviates from our wind model?

Cryovolcano (32 N, 133 W)

Hydrocarbon Lakes (North and South Poles)

50 km

Sand dunes (at the equator)
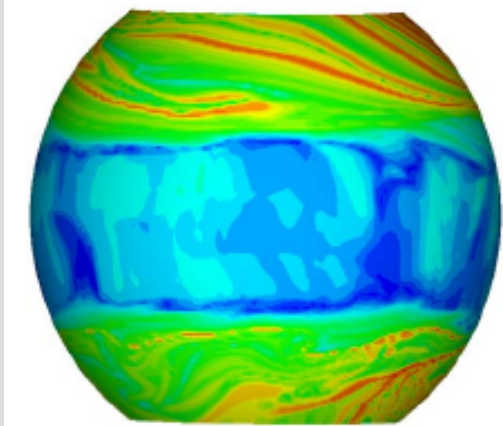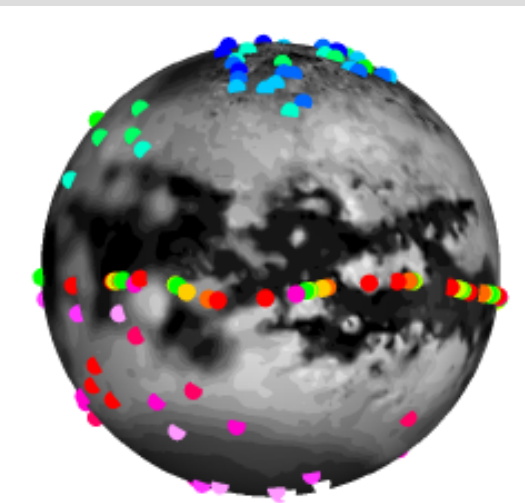
Plan of Action

Figure 21: Frame 1, t=0

Figure 18: Frame 200, t=16 titan days, 256 earth days

- Three different wind models
- Try different seasons
- Use LCS to identify regions in which control is most necessary
- Use 3D drifter plots – look at moving between trajectories
- Eventual aim to use finite-horizon analysis to provide useful strategies for an aerobot to traverse the atmosphere of Titan
- Robustness defined as ability for strategies to be useful in various competing wind models