# QCHFM – Application Examples

This document presents concrete examples of how QCHFM (Quantum-Coherent Hybrid Flow Modeling) can be applied in practical environments. Each example emphasizes how the model handles uncertainty, adapts to turbulence, and improves prediction trust.

## Example 1: Mars Wind Forecasting

- Simulated wind patterns in Valles Marineris

- Confidence overlay showed unstable zones near canyon edges

- Potential use: safer drone landings and autonomous navigation

## Example 2: Aircraft Turbulence Routing

- Simulated jet stream with stochastic gust zones

- Confidence maps guided rerouting before hitting rough air

- Potential use: real-time turbulence avoidance for autopilot systems

## Example 3: Plasma Edge Instability

- Tokamak plasma modeled with heat-driven flow near boundary

- QCHFM highlighted regions where instabilities were likely

- Potential use: real-time alert system for fusion reactor safety

## Example 4: Capillary Blood Flow

- Modeled pulsatile flow in micro-vessels with branching

- Stochastic noise introduced near bifurcations showed where flow breakdowns may occur

- Potential use: drug targeting and clot risk prediction

## Summary

These examples show how QCHFM enhances standard fluid simulation by incorporating uncertainty modeling and trust metrics. It is useful anywhere fluid flow is chaotic, complex, or high-risk.