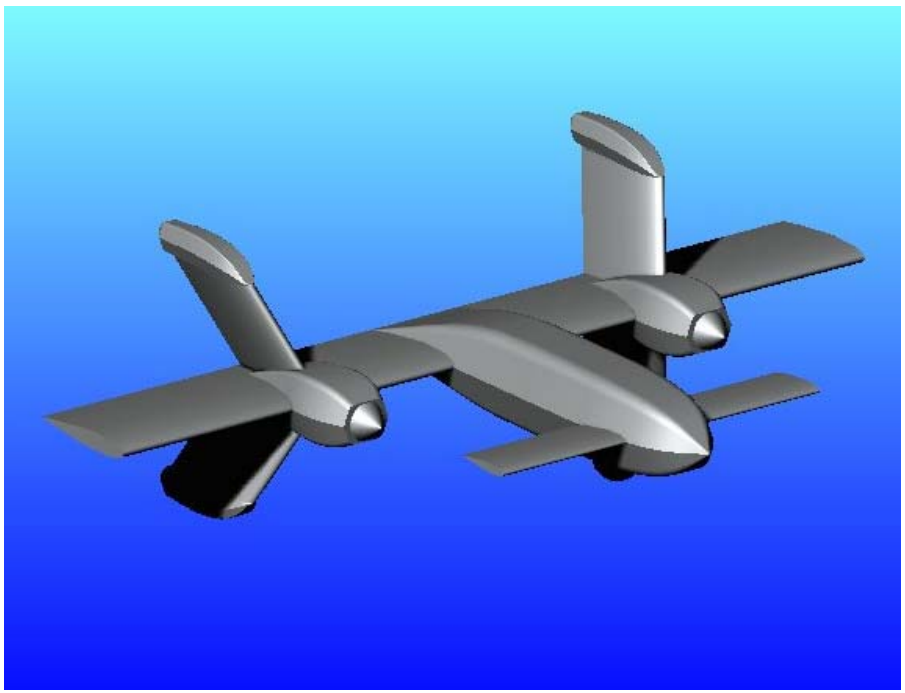
# T-Wing VTOL UAV: Technology Demonstrator

**Dr Hugh Stone, (University of Sydney)**

**Gary Clarke, (Sonacom, Pty Ltd)**

## Project Mission:

***To research and develop the technologies required for a family of tail-sitter Unmanned Air Vehicles (UAVs)***



### VTOL OPERATIONAL ADVANTAGES - Sea

- Ship VTOL
- Supports helicopter operations
- Sonar buoy / SUS deployment
- Signal relay platform
- Over-the-horizon data gathering

### VTOL OPERATIONAL ADVANTAGES - Land

- No runway required
- Wide area surveillance
- Can protect vital assets
- Hover and monitor target area
- Supports surveillance operations
- Sensor/Weapon payload

# Research Program and Goals

## Specific Research Goals:

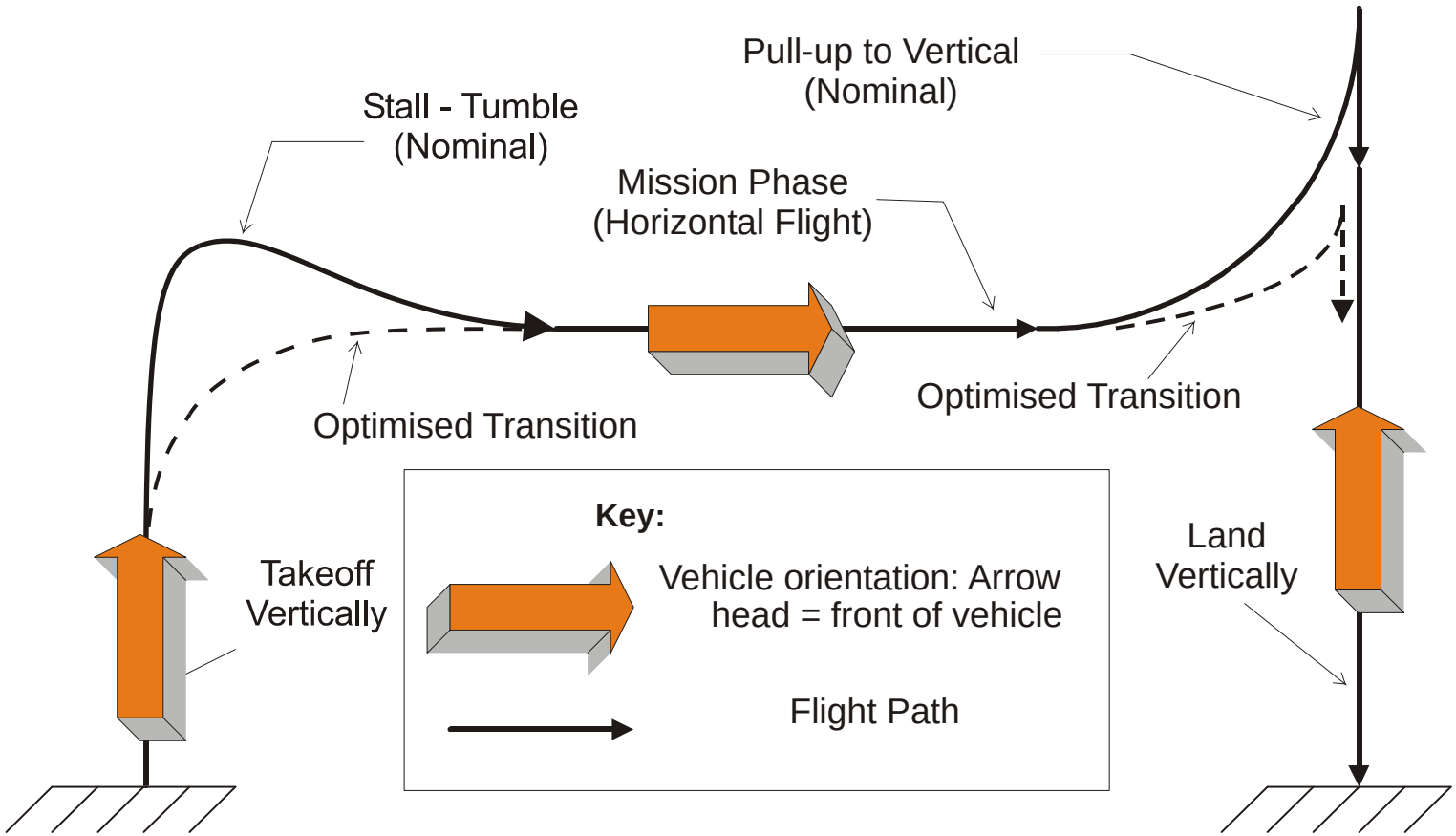
- Demonstrate autonomous hover operation in windy conditions;
- Perform transition maneuvers between horizontal and vertical flight;
- Demonstrate full autonomous flight from take-off to landing;

- Confirm theoretical aerodynamic predictions for hover controllability;
- Develop high fidelity simulations of vehicle dynamics;
- Use high level rapid prototyping tools to design and implement controllers.

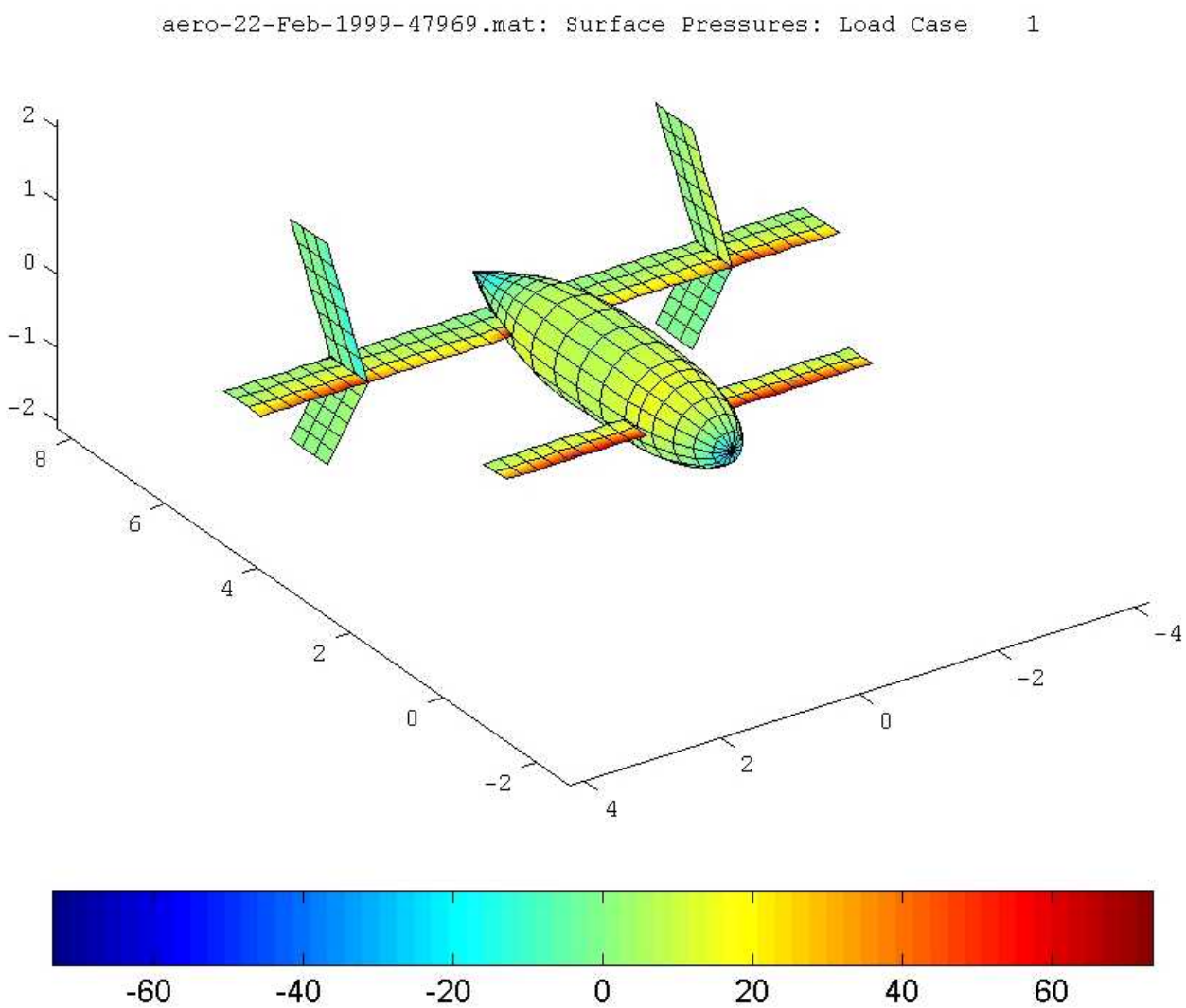
## Accomplishments:

- Vehicle finished - Feb 2000;
- Second airframe finished and structurally tested - October 2000;
- First manual hover flight – December 2000;
- Real time flight simulation developed - Jan 2001 (and ongoing);
- Successful autonomous “flight” on test-stand using high level control design techniques - October 2001.
- First hover flight imminent, under automatic control, October 2001.

# T-Wing: Typical Flight Profile



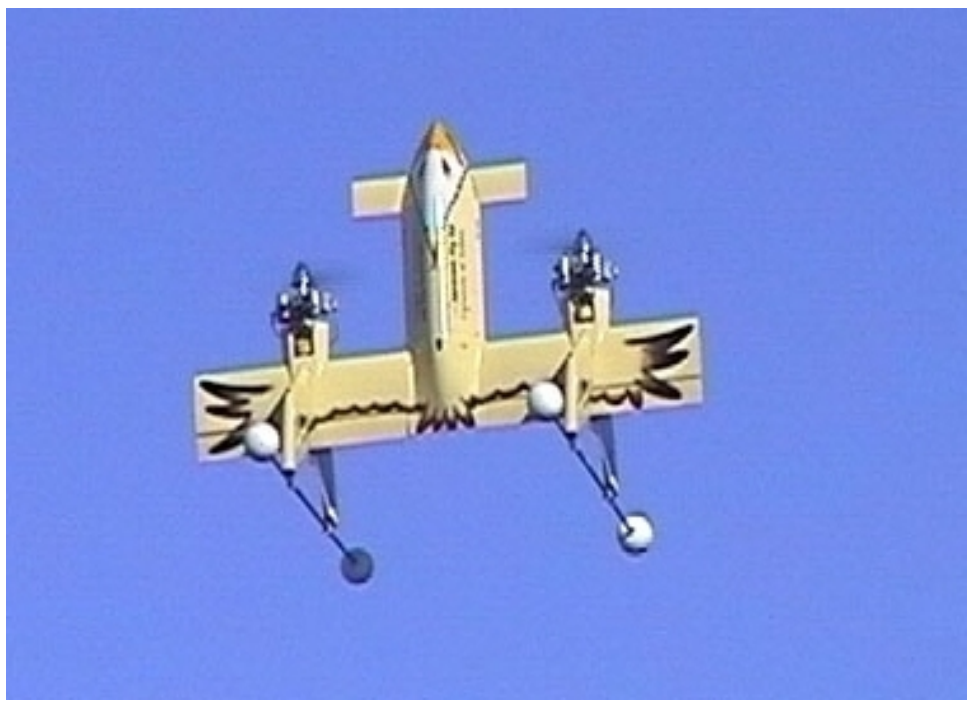
# T-Wing: Aerodynamic Panel Method Model



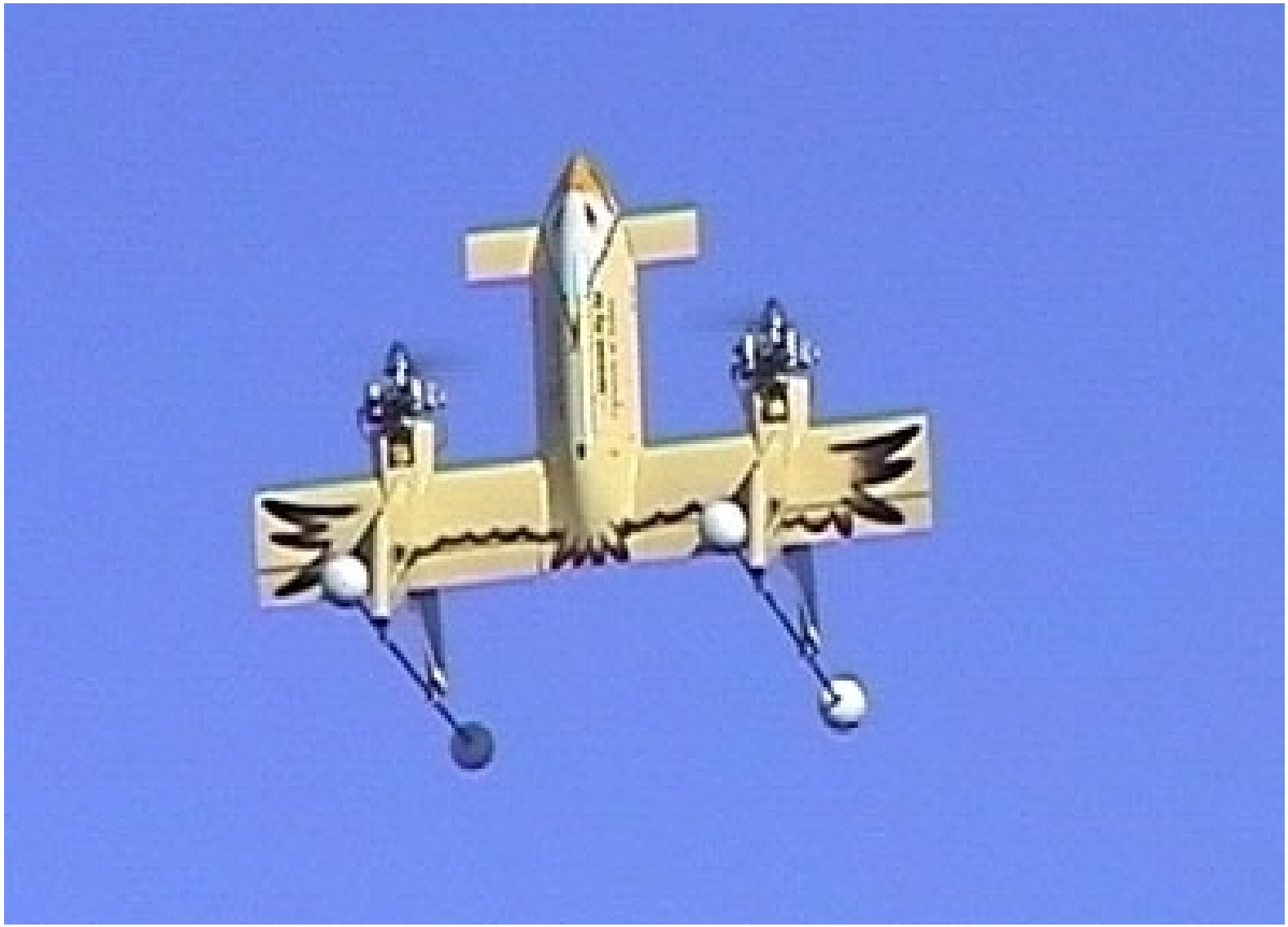
**First Hover-Mode Flight with Automatic Controllers: October 2001.**

**(Wind is 10-15 knots from the right).**

**First Full Autonomous Hover Mode Flight: September 2002.**



# First Autonomous Vertical Flight: September 2002



# T-Wing: Real-Time Flight Simulation