

# Birds near Wind turbines

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# EemsHaven Black Blade ZWEMT

- Black blade turbines 18 and 20
- Setup
  - 2 x WT-Bird®
  - Robin Radar MAX
  - 4 visual cameras
  - 5 thermal cameras
  - 9 microphones
    - 1 at ground level
    - 1 on each mast (to be installed)
    - 1 in each blade (to be installed)



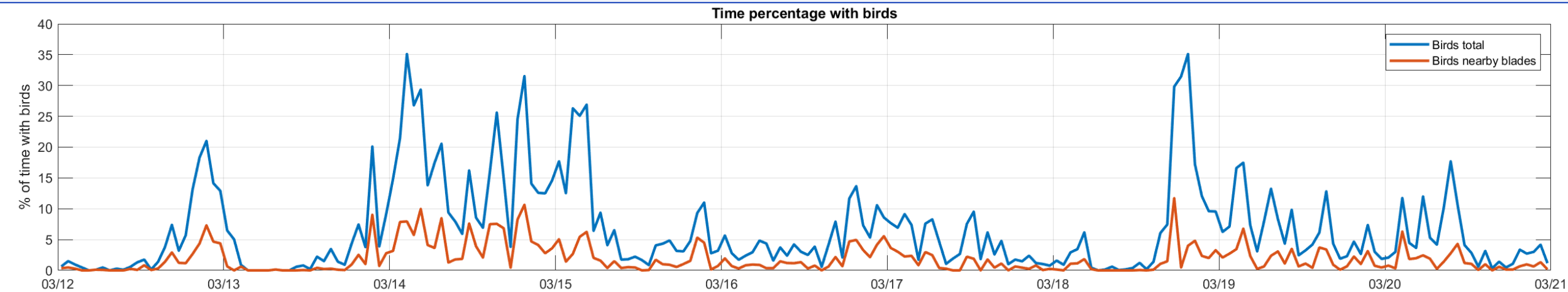
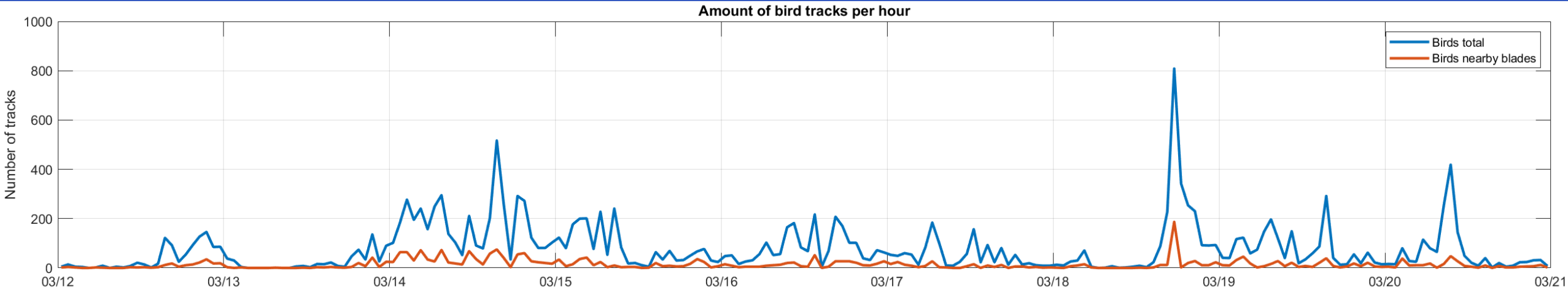
# WT-Bird Turbine 20 (Black blade)





# Statistics

Type	Amount of tracks
filtered tracks	116.441
bird tracks	16.839
bird tracks nearby blades	3.037



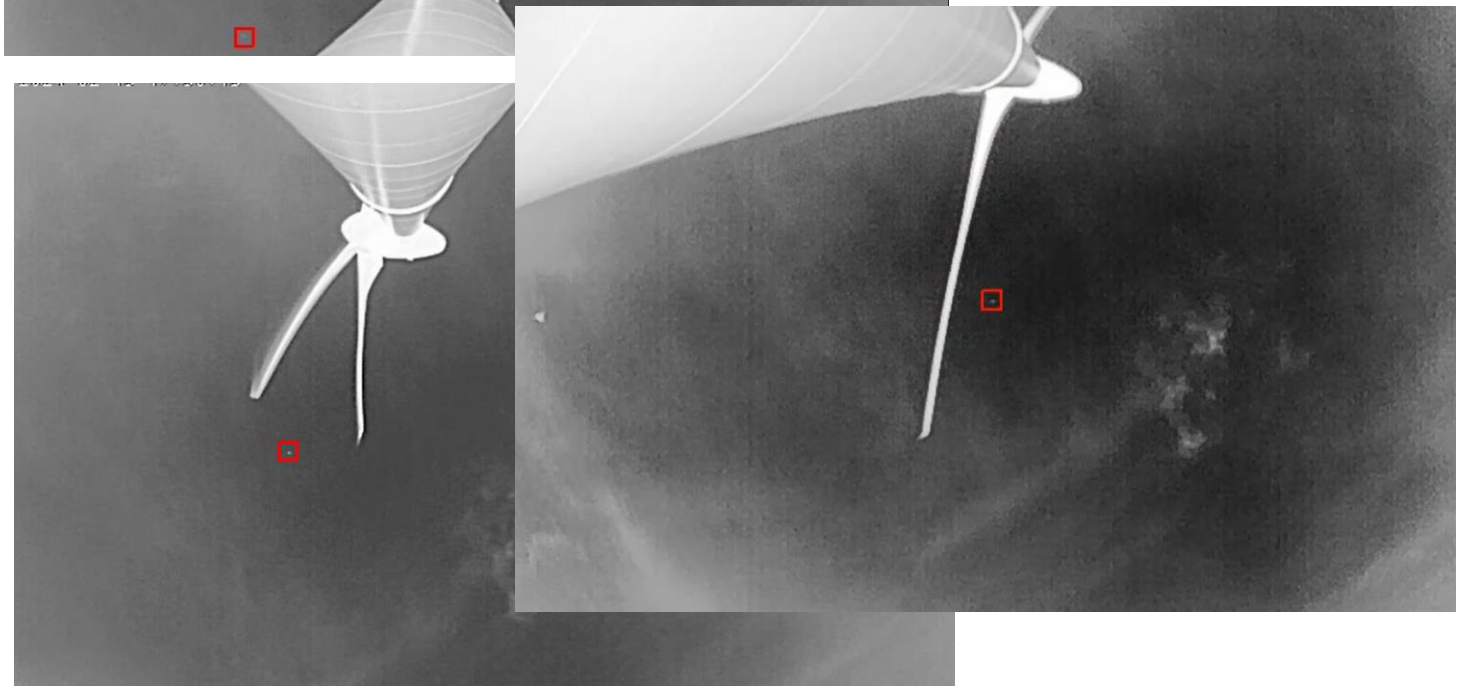
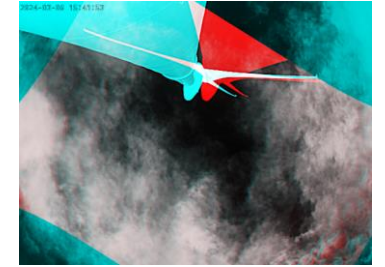
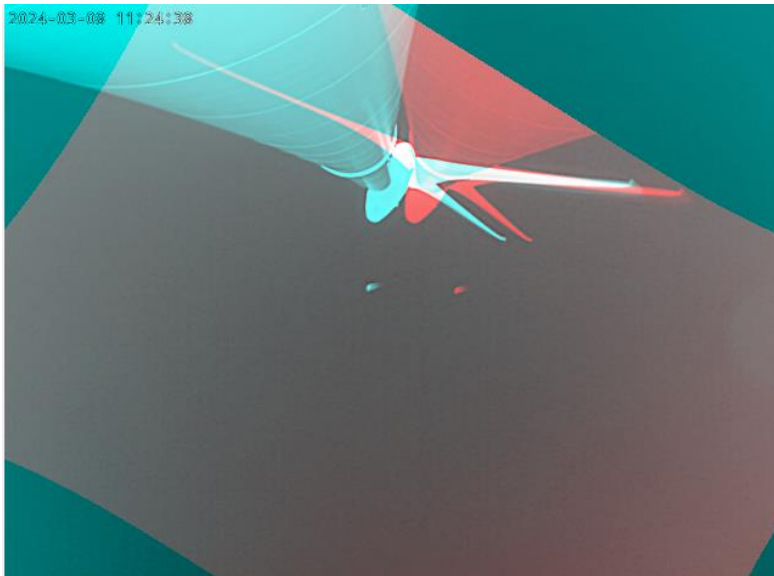
# Other ways to visualize the data

- One hour of data in an “intensity variation picture”



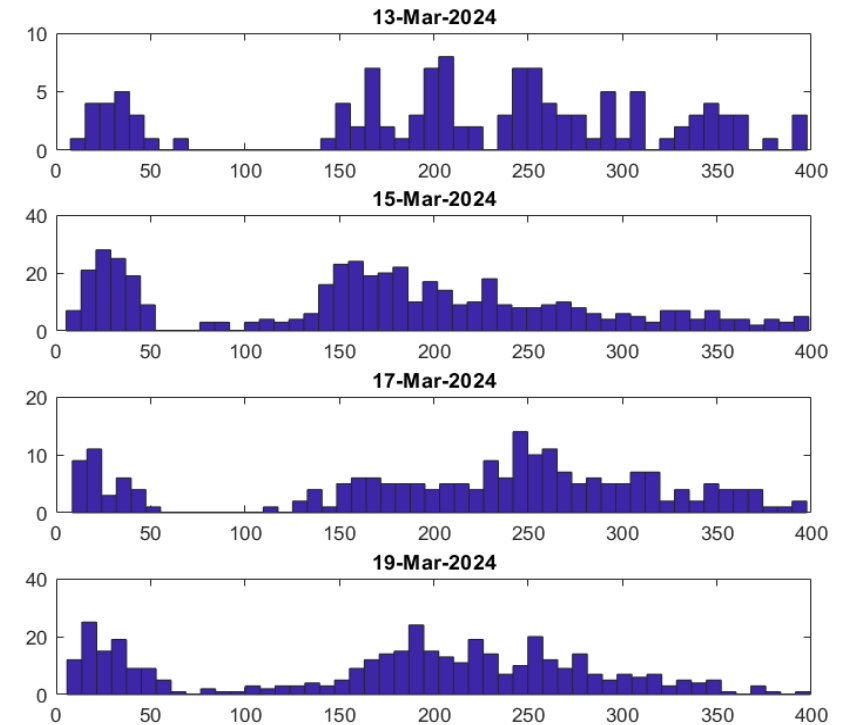
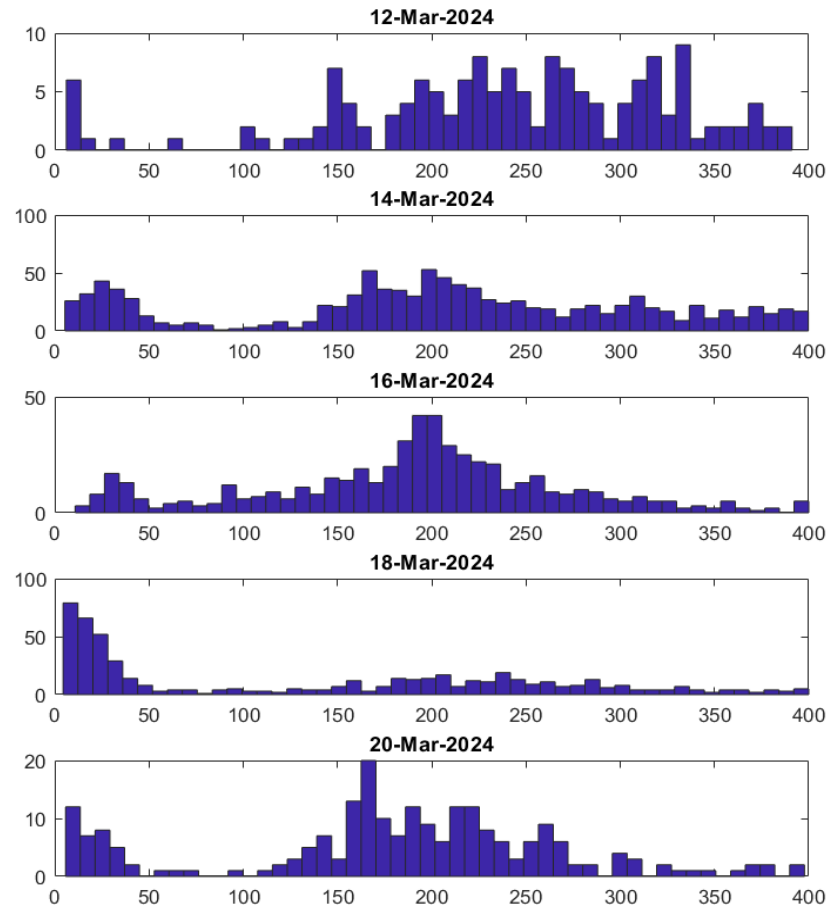
# 3D tracking

- Same bird visible on 3 cameras
- Overlay of 2 images to find shift in positions
- Align on clouds (infinity)
- Distance gives height position



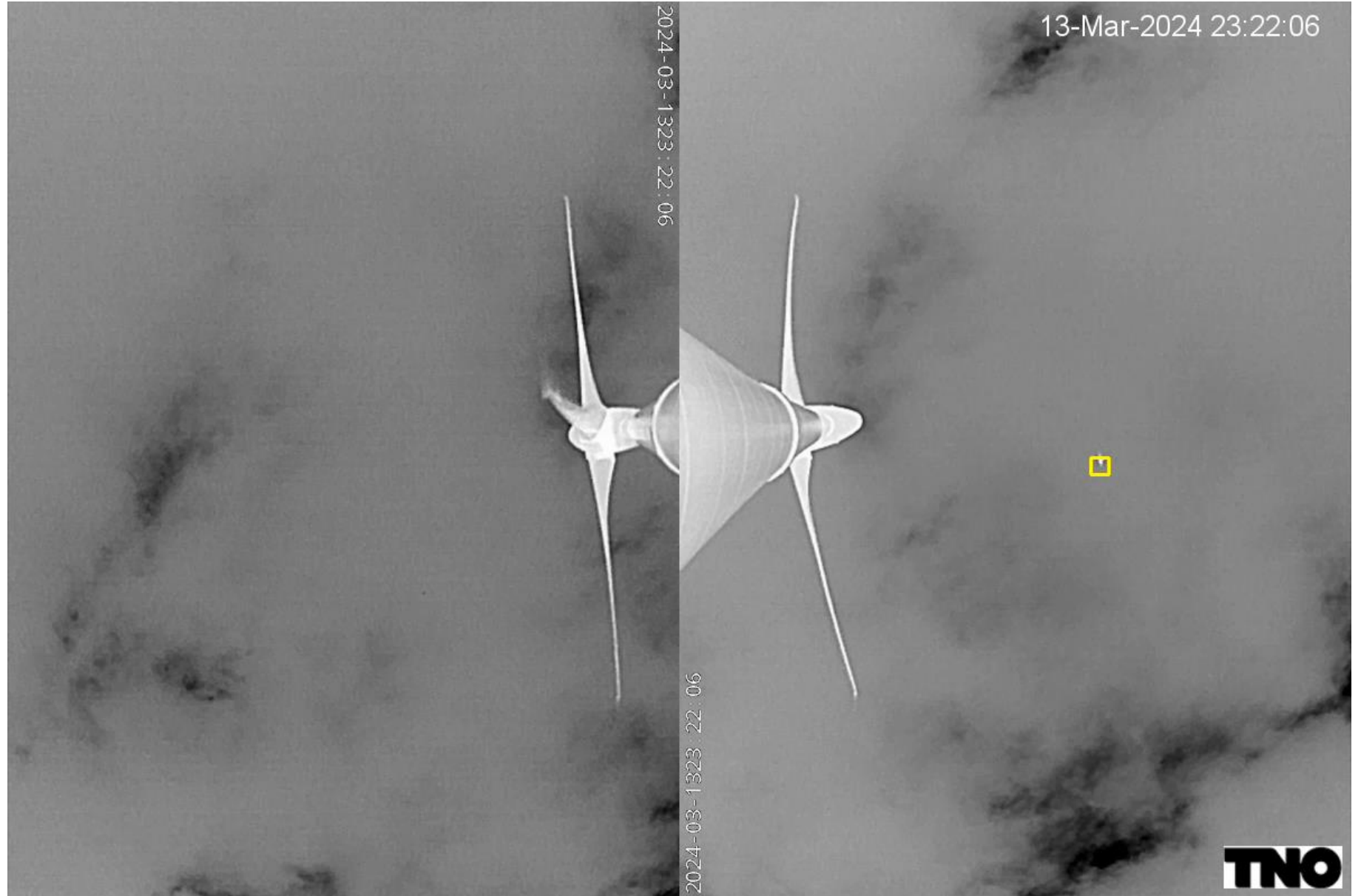
# Flight Height of birds

- Rotor height 60-140m



# Movies Tower

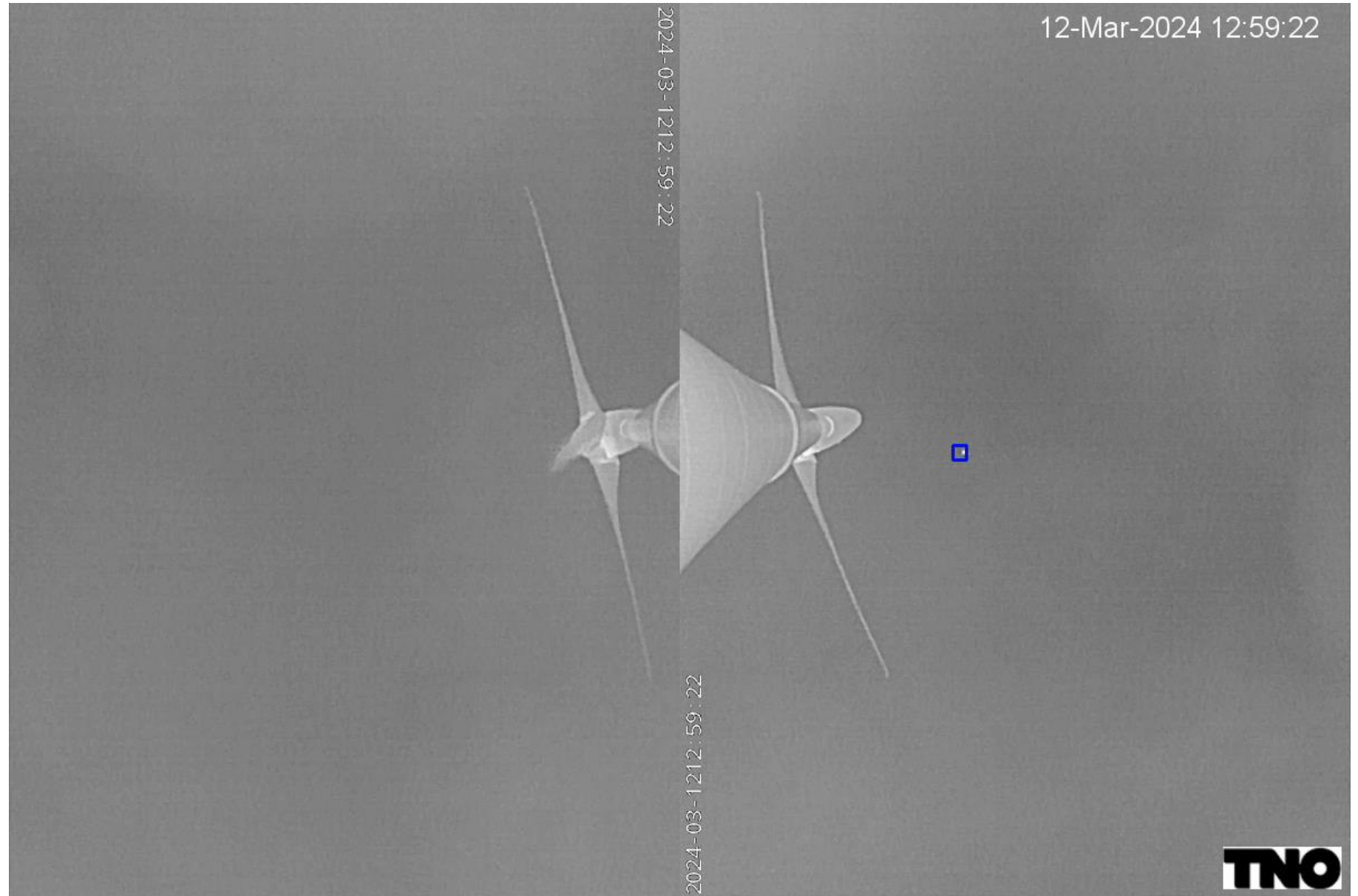
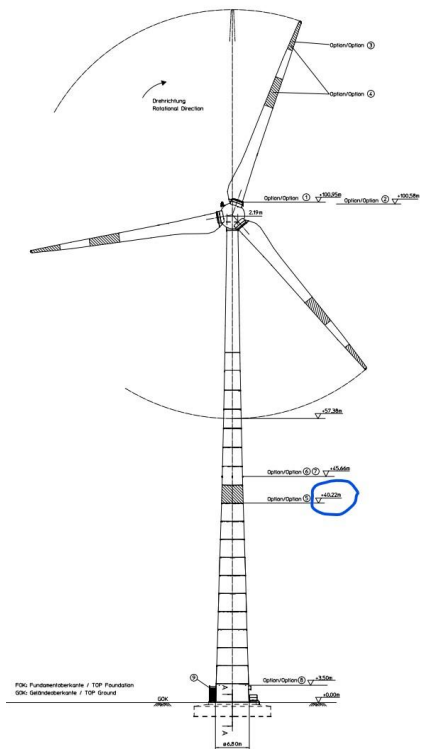
Tower visit at  
+/-20m height



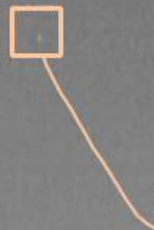
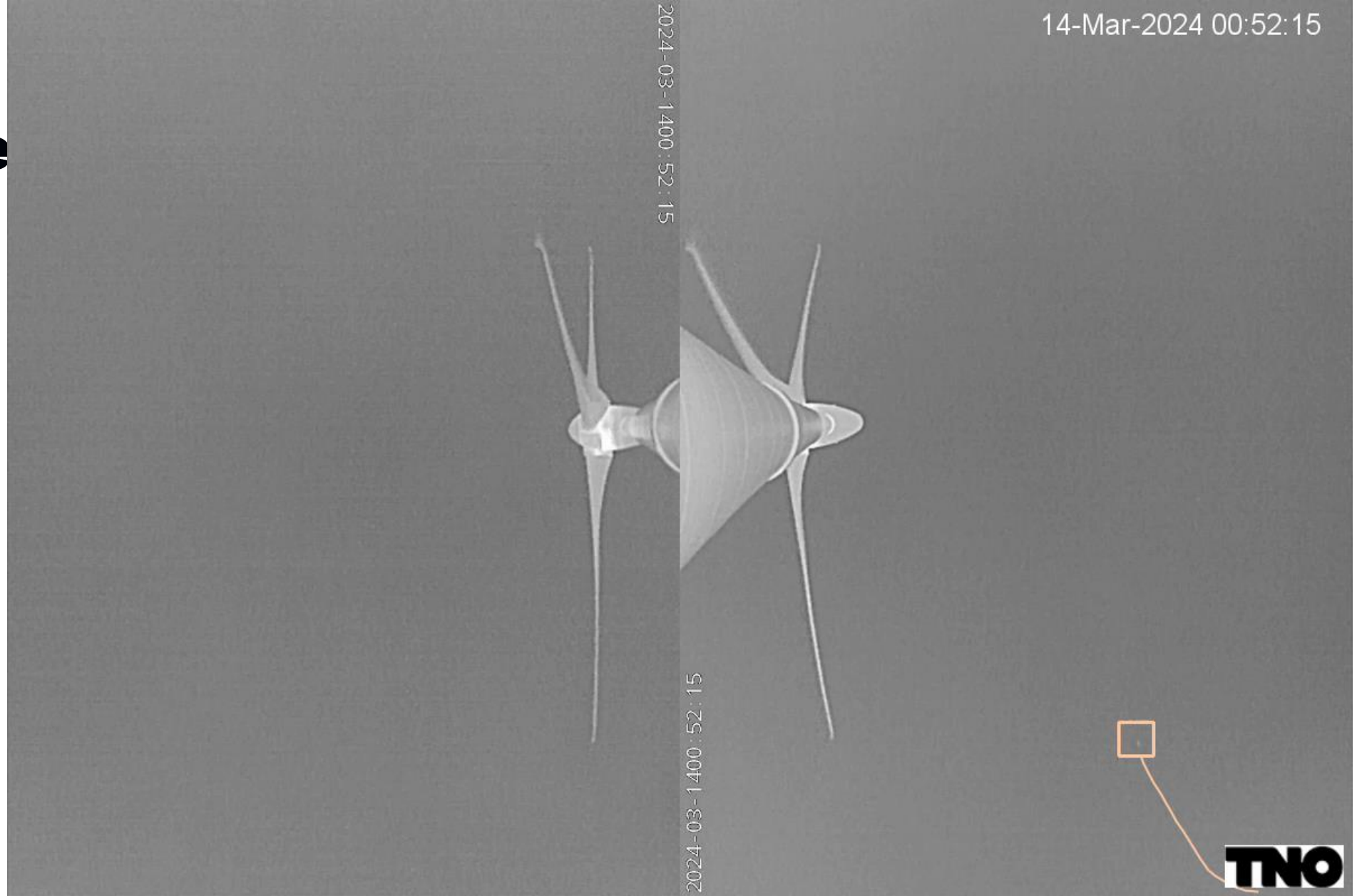


# Movies Resting

Ring at 40 m height

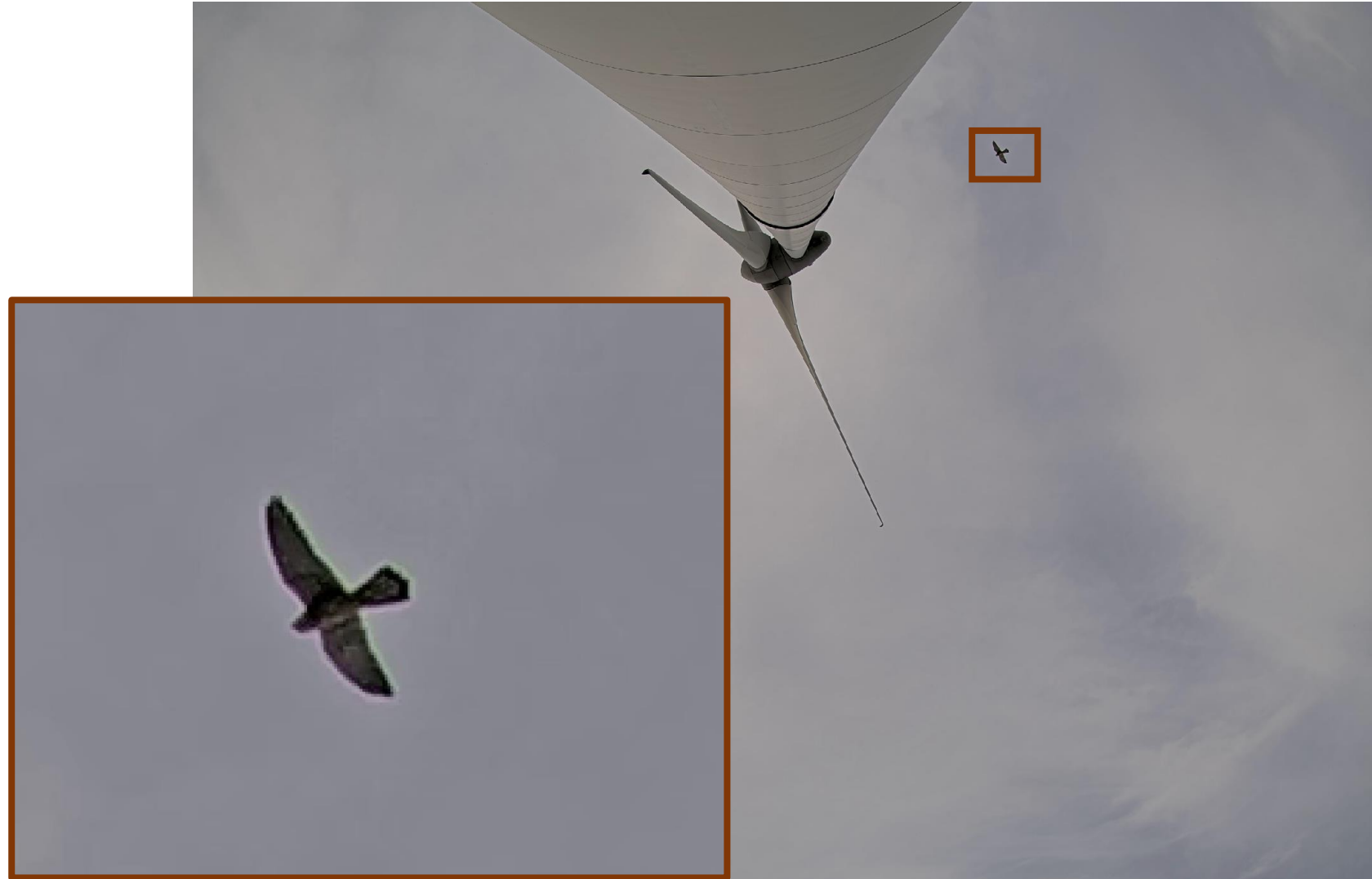


# Movies Avoidance



# Outlook/Options

- Summary
  - Behaviour of birds near turbines
  - “Statistics” of bird activity
  - Rotor avoidance indication
  - Interesting examples
- Add more camera's
  - Far field/higher resolution
  - Pan-Tilt-Zoom camera linked with specialize bird radar
  - Use AI for species recognition





Theme name

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