# Enhanced Objective Function for Drone Simulation

The **objective function** can be expanded to incorporate:

1. **Weighting Detections by Confidence or Area**:
   * Detections can be weighted to emphasize high-confidence areas or critical zones.
   * W\_i​: Weight assigned to detections by drone I .

The enhanced objective function evaluates the detection probability of drones while accounting for penalties on missed detections and assigning weights to critical zones or confidence levels. It is defined as follows:

Objective Function:  
 Φ = (Σ\_{i=1}^{n} W\_i ⋅ D\_i) / (Σ\_{i=1}^{n} T\_i) - α ⋅ Σ\_{i=1}^{n} M\_i  
  
Where:  
 • W\_i: Weight assigned to the detections by drone i, based on critical zones or confidence levels.  
 • D\_i: Number of successful oil detections by drone i.  
 • T\_i: Total detection attempts made by drone i.  
 • M\_i: Number of missed detections by drone i.  
 • n: Total number of drones.  
 • α: Penalty coefficient for missed detections.  
 • Φ: The overall objective value to optimize.  
  
The goal is to maximize Φ by improving detection efficiency while penalizing inefficiencies such as missed detections.