# The Policy of the Drone

# 1 Planning Policy

This file contains the complete version of the Planning Policy, expressed in natural language as well as in IDP syntax.

## 1.1 In Natural Language

The drone has sufficient power
    AND the drone is not at home
    AND the drone is at ground height
    THEN the drone will lift.

The drone has sufficient power
    AND not all pictures are taken yet
    AND the drone is at ground height
    AND the drone is at home
    THEN the drone will lift.

The drone has sufficient power
    AND not all pictures are taken yet
    AND the current location does not have to be inspected (any more)
    AND the drone is at inspection height
    THEN the drone will lift.

The drone has sufficient power
    AND not all pictures are taken yet
    AND the current location does not have to be inspected (any more)
    AND the drone is at fly height
    AND the drone is not close to Restricted Area
    THEN the drone will move towards its current target.

The drone has sufficient power
 AND not all pictures are taken yet
 AND the current location does not have to be inspected (any more)
 AND the drone is at fly height
 AND the drone is close to Restricted Area
 THEN the drone will move away from the Restricted Area.

The drone has sufficient power
 AND not all pictures are taken yet
 AND the current location has to be inspected
 AND the drone is at inspection height
 THEN the drone will take a picture.

The drone has sufficient power
 AND not all pictures are taken yet
 AND the current location has to be inspected
 AND the drone is at fly height
 THEN the drone will lower.

The drone has sufficient power
 AND all pictures are taken
 AND the drone is not at home
 AND the drone is at inspection height
 THEN the drone will lift.

The drone has sufficient power
 AND all pictures are taken
 AND the drone is not at home
 AND the drone is at fly height
 AND the drone is not close to Restricted Area
 THEN the drone will move towards its current target.

The drone has sufficient power
 AND all pictures are taken
 AND the drone is not at home
 AND the drone is at fly height
 AND the drone is close to Restricted Area
 THEN the drone will move away from the Restricted Area.

The drone has sufficient power
 AND all pictures are taken
 AND the drone is at home
 AND the drone is at fly height
 THEN the drone will lower.

The drone has sufficient power
   AND all pictures are taken
   AND the drone is at home
   AND the drone is at inspection height
   THEN the drone will lower.

The drone has sufficient power
   AND all pictures are taken
   AND the drone is at home
   AND the drone is at ground height
   THEN the drone will do nothing.

The drone has low power
   AND the drone is not at home
   AND the drone is at ground height
   THEN the drone will lift.

The drone has low power
   AND the drone is not at home
   AND the drone is at inspection height
   THEN the drone will lift.

The drone has low power
   AND the drone is not at home
   AND the drone is at fly height
   AND the drone is not close to Restricted Area
   THEN the drone will move towards its current target.

The drone has low power
   AND the drone is not at home
   AND the drone is at fly height
   AND the drone is close to Restricted Area
   THEN the drone will move away from the Restricted Area.

The drone has low power
   AND the drone is at home
   AND the drone is at fly height
   THEN the drone will lower.

The drone has low power
   AND the drone is at home
   AND the drone is at inspection height
   THEN the drone will lower.

The drone has low power
    AND the drone is at home
    AND the drone is at ground height
    THEN the drone will do nothing.

The drone has critical power
    AND the drone is at fly height
    THEN the drone will lower.

The drone has critical power
    AND the drone is at inspection height
    THEN the drone will lower.

The drone has critical power
    AND the drone is at ground height
    THEN the drone will do nothing.

The drone is at restricted height
    THEN the drone will lower.

## 1.2 In IDP Syntax

∀t[Time]: Plan(t) = Lift
    ← AtNormalPower(t) ∧ ¬AtHome(t) ∧ AtGroundHeight(t).

∀t[Time]: Plan(t) = Lift
    ← AtNormalPower(t) ∧ ¬AllPicturesTaken(t) ∧ AtHome(t) ∧ AtGroundHeight(t).

∀t[Time]: Plan(t) = Lift
    ← AtNormalPower(t) ∧ ¬AllPicturesTaken(t) ∧ ¬AtInspectionToDo(t) ∧ AtInspectionHeight(t).

∀t[Time]: Plan(t) = MoveTowardsTarget
    ← AtNormalPower(t) ∧ ¬AllPicturesTaken(t) ∧ ¬AtInspectionToDo(t) ∧ AtFlyHeight(t) ∧ ¬CloseToRA(t).

∀t[Time]: Plan(t) = MoveAwayFromRA
    ← AtNormalPower(t) ∧ ¬AllPicturesTaken(t) ∧ ¬AtInspectionToDo(t) ∧ AtFlyHeight(t) ∧ CloseToRA(t).

∀t[Time]: Plan(t) = TakePicture
    ← AtNormalPower(t) ∧ ¬AllPicturesTaken(t) ∧ AtInspectionToDo(t) ∧ AtInspectionHeight(t).

∀t[Time]: Plan(t) = Lower
    ← AtNormalPower(t) ∧ ¬AllPicturesTaken(t) ∧ AtInspectionToDo(t) ∧ AtFlyHeight(t).

∀t[Time]: Plan(t) = Lift
    ← AtNormalPower(t) ∧ AllPicturesTaken(t) ∧ ¬AtHome(t) ∧ AtInspectionHeight(t).

∀t[Time]: Plan(t) = MoveTowardsTarget
    ← AtNormalPower(t) ∧ AllPicturesTaken(t) ∧ ¬AtHome(t) ∧ AtFlyHeight(t) ∧ ¬CloseToRA(t).

∀t[Time]: Plan(t) = MoveAwayFromRA
    ← AtNormalPower(t) ∧ AllPicturesTaken(t) ∧ ¬AtHome(t) ∧ AtFlyHeight(t) ∧ CloseToRA(t).

∀t[Time]: Plan(t) = Lower
    ← AtNormalPower(t) ∧ AllPicturesTaken(t) ∧ AtHome(t) ∧ AtFlyHeight(t).

∀t[Time]: Plan(t) = Lower
  ← AtNormalPower(t) ∧ AllPicturesTaken(t) ∧ AtHome(t) ∧ AtInspectionHeight(t).

∀t[Time]: Plan(t) = NoOp
  ← AtNormalPower(t) ∧ AllPicturesTaken(t) ∧ AtHome(t) ∧ AtGroundHeight(t).

∀t[Time]: Plan(t) = Lift
  ← AtLowPower(t) ∧ ¬AtHome(t) ∧ AtGroundHeight(t).

∀t[Time]: Plan(t) = Lift
  ← AtLowPower(t) ∧ ¬AtHome(t) ∧ AtInspectionHeight(t).

∀t[Time]: Plan(t) = MoveTowardsTarget
  ← AtLowPower(t) ∧ ¬AtHome(t) ∧ AtFlyHeight(t) ∧ ¬CloseToRA(t).

∀t[Time]: Plan(t) = MoveAwayFromRA
  ← AtLowPower(t) ∧ ¬AtHome(t) ∧ AtFlyHeight(t) ∧ CloseToRA(t).

∀t[Time]: Plan(t) = Lower
  ← AtLowPower(t) ∧ AtHome(t) ∧ AtFlyHeight(t).

∀t[Time]: Plan(t) = Lower
  ← AtLowPower(t) ∧ AtHome(t) ∧ AtInspectionHeight(t).

∀t[Time]: Plan(t) = NoOp
  ← AtLowPower(t) ∧ AtHome(t) ∧ AtGroundHeight(t).

∀t[Time]: Plan(t) = Lower
  ← AtCriticalPower(t) ∧ AtFlyHeight(t).

∀t[Time]: Plan(t) = Lower
  ← AtCriticalPower(t) ∧ AtInspectionHeight(t).

$\forall$t[Time]: Plan(t) = NoOp
    $\leftarrow$ AtCriticalPower(t) $\land$ AtGroundHeight(t).

$\forall$t[Time]: Plan(t) = Lower
    $\leftarrow$ AtRestrictedHeight(t).

# 2 Target Policy

This section contains the complete version of the Target Policy, expressed in natural language as well as in IDP syntax.

## 2.1 In Natural Language

The drone has sufficient power
  AND not all pictures are taken yet
  THEN the target is the closest inspection location still to inspect.

The drone has sufficient power
  AND all pictures are taken
  THEN the target is Home.

The drone has low power
  THEN the target is Home.

The drone has critical power
  THEN the target is the current location.

## 2.2 In IDP Syntax

$\forall$t[Time]: Target(t) = ClosestInspectionLocationToDo(t)
  $\leftarrow\neg$AllPicturesTaken(t) $\wedge$ AtNormalPower(t).

$\forall$t[Time]: Target(t) = Home
  $\leftarrow$AllPicturesTaken(t) $\wedge$ AtNormalPower(t).

$\forall$t[Time]: Target(t) = Home
  $\leftarrow$AtLowPower(t).

$\forall$t[Time]: Target(t) = Curr_Location(t)
  $\leftarrow$AtCriticalPower(t).