7.2. Testing Configuration 1

# 7.2 Testing Configuration

All *simulations* are run with the configuration described in this *section*. The UAS used for the purposes is given by *model and control* (sec. **??**).

*UAS parameters:* An *UAS system* (tab. 7.2) is modeled after small scale toy model with maximal body radius 30 *cm*, maximal speed 4 *m.s*−1, weight 450 *g*., maximal flight duration 20 *min*, maximal turning rate 15 *deg.s*−1. The *body margin* is set to 0*.*3*m*; the *near-miss radius* is double of *body margin*; thus 0*.*6 *m*, the *well clear radius* is set to 5 *m*. Margins can be set to any value if they are complaint with condition (7.1).

0 *< bodyMargin* ≤ *nearMissRadius* ≤ *wellClearRadius* ≤ *gridDistance* (7.1)

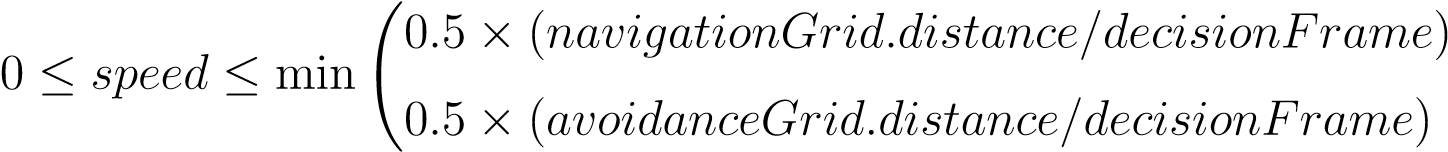
*Note. The safety margin* is broad term used to describe the *minimal distance* between UAS and *adversarial object*. The *Safety margin* is:

1. *Near miss radius* in case of *non-controlled airspace* or *emergency avoidance mode*.
2. *Well clear radius* in case of *controlled airspace* and *navigation mode*.

**Decision time:** Decision time can be set by the user to any positive non-zero value (7.2). The *Decision time* is equal 1 *s,* and *Decision frames* are synchronized.

*maxAlrogithmCalculationTime* ≤ *decisionTome* ≤∞ (7.2)

**Speed:** For *all movements* constant speed 1 *m.s*−1 is used. Speed can be changed to any value in a given boundary (7.3).

!

(7.3)

**Movement automaton:** The *movement set* is given in (tab. 7.1). The *movement* set contains horizontal, vertical, and, combined movements.

**Grids:** Used *Navigation grid parameters* are given in (tab. 7.3).Selected *Navigation Reach set* is *ACAS-like* with enabled horizontal/vertical separation. Used *Avoidance grid parameters* are given in (tab. 7.4). Selected *Avoidance Reach set* is *combined* because of high *coverage ratio*.

The user can define own grid parameters according to the *space discretization rules* (sec.

**??**) and chose own *reach set type* according to preference (sec. **??**).

2

Movement Roll Pitch Yaw

|  |  |  |  |
| --- | --- | --- | --- |
| Straight | 0◦ | 0◦ | 0◦ |
| Left | 0◦ | 15◦ | 0◦ |
| Right | 0◦ | −15◦ | 0◦ |
| Up | 0◦ | 0◦ | −15◦ |
| Down | 0◦ | 0◦ | 15◦ |
| UpLeft | 0◦ | 15◦ | −15◦ |
| UpRight | 0◦ | −15◦ | −15◦ |
| DownLeft | 0◦ | 15◦ | 15◦ |
| DownRight | 0◦ | −15◦ | 15◦ |

Table 7.1: Movement orientations.

UAS parameters

|  |  |
| --- | --- |
| speed | 1*ms*−1 |
| horizontal turning r. | 3*.*82*m* |
| vertical turning r. | 3*.*82*m* |
| body radius | 0*.*3*m* |
| near miss r. | 0*.*6*m* |
| well clear r. | 5*m* |

Table 7.2: *UAS* parameters.

Navigation Grid

|  |  |
| --- | --- |
| type | ACAS-like |
|  |  |

Table 7.3: *Navigation Space* parameters.

Coloring

Avoidance Grid

|  |  |
| --- | --- |
| type | combined |
| distance range | 0 − 10*m* |
|  |  |

Table 7.4: *Avoidance Space* parameters.

|  |  |  |
| --- | --- | --- |
| Airc. | Executed | Planned |
| UAS 1 | blue | red |
| UAS 2 | cyan | magenta |
| UAS 3 | green | yellow |
| UAS 4 | black | green |

Table 7.5: *UAS* coloring.

# Bibliography

3