New Sections - Structure check + Intro

# 6.4 Reach Set Approximation

## 6.4.1 Trajectory Set Approximation of Reach Set

## 6.4.2 Distinctive Properties of the Trajectories

## 6.4.3 Heuristic Trajectory Tree Building

## 6.4.4 Coverage-Maximizing Reach Set Approximation

## 6.4.5 Turn-Minimizing Reach Set Approximation

## 6.4.6 ACAS-X like Reach Set Approximation

## 6.4.7 Combined Reach Set Approximation - Tree Merge

# 6.5 Situation Representation in the Avoidance Grid

## 6.5.1 Obstacles

## 6.5.2 Intruders

## 6.5.3 Constraints

## 6.5.4 Data fusion

# 6.6 Avoidance Concept

## 6.6.1 Avoidance Grid Run

## 6.6.2 Mission Control Run

## 6.6.3 Computation Complexity

# 6.7 UTM Prototype Implementation

## 6.7.1 UTM Architecture

## 6.7.2 Handling Head-on Approach

## 6.7.3 Handling Converging Maneuver

## 6.7.4 Handling Overtake Maneuver

## 6.7.5 Position Notification Implementation

## 6.7.6 Collision Case Implementation

# 6.8 UTM Directives Implementation on UAS

## 6.8.1 Rule Engine Architecture

## 6.8.2 Rule Engine Setup

Appendixes – structure check + Intro ??

# A Complementary Definitions

# B Simplified Framework Conceptual Scheme

# C Movement Automaton Theory

## C.1 Specialization of Hybrid Automaton

## C.2 Formal Movement Automaton Definition

## C.3 Segmented Movement Automaton

## C.4 Reference Trajectory Generator

# D Intruder Probabilistic Models

## D.1 Linear Intersection

## D.2 Body-volume Intersection

## D.3 Maneuverability Uncertainty Intersection

# E Conflict Resolution Schemes

## E.1 Cooperative Conflict Resolution

## E.2 Non-Cooperative Conflict Resolution

# F Additional UTM functionality

## F.1 Weather Case

## F.2 Rule: Detect Collision Cases

## F.3 Rule: Resolve Collision Case

## F.4 Rule: Close Collision Cases

## F.5 Rule: Head on Approach

## F.6 Rule: Converging Maneuver

## F.7 Rule: Overtake

## F.8 Rule: Right Plane Heading

## F.9 Rule: Enforce safety margin

# G Approach Guidelines

## G.1 Guideline - Grid Size Calculation

## G.2 Guideline - Safety Margin Calculation