Introduction
The RRT (Rapidly-exploring Random Tree) use a stochastic search over the body-centered frame of reference, and explores the configuration space by rapidly “growing” a tree, which consists of way points and satisfies the dynamic constraints of the vehicles. As the further improved algorithm of RRT, the RRT* can optimize solution path by adding the “cost review” after tree extending.
On the other hand, the original RRT experiences the bottleneck of complicated iteration and it becomes worse in RRT*. We develop hardware architecture for RRT* to exploit its parallel potential and realize the acceleration:

- The “tree extension” and “cost review” are separated as independent processes and executed in parallel, unlike the original sequential execution.

- For the complicated vertex inserting operation, pipelined Kd-tree constructor is designed for fast Kd-tree rebuilding when new vertex generated.

- To speed up the near neighbor search, the vertexes are stored in separate Kd-trees and search processes can be carried out concurrently.