* Location: Both Natick and HYD
* Title: Hands-on Comparison for Path Planning Tools
* Background: Path planning is one of the quintessential part of any Autonomous System with capability to move, it's one the areas of interest for MathWorks. The goal of the project is to compare our existing tools and workflows to the ones provided by one of our main competitors (ROS NAV2). In the project it would be required to do a deep dive and acquire hands on knowledge of ROS NAV2 capabilities and then rate them in comparison to tools in Navigation toolbox.
* Background: Autonomous systems such as self-driving cars or robot manipulators navigate in their environment by planning a path or trajectory from point A to point B. There are various approaches for path planning and engineers choose an algorithm based on their use cases. Navigation Toolbox provide different path planning algorithms and we continue to invest in this area based on user requirements and trends from competitive tools.

The goal of this project is to compare our existing path planning tools and workflows with one of our main competitors (ROS NAV2). In the project it would be required to do a deep dive and acquire hands on knowledge of ROS NAV2 capabilities and then rate them in comparison to tools in Navigation toolbox. You would be working with the Development as well as Product Marketing leads to identify the gaps and differentiators in our product. The outcome of the project will reflect in our product strategy for path planning.

* Activities:
  + Identify metrics to benchmark the path planning workflow and algorithms
    - Build on list of “General Metrics” from Mihir (consult research papers that compare planners)
    - More critical: How we benchmark those metrics between NAV 2 and MATLAB
  + Setup your machine with ROS NAV 2 and compare the getting started process with our tools
    - Identify different types of users (New MATLAB Users, Existing MATLAB users, New Nav Toolbox users)
    - Reflect on ease-of-use of getting to a point where something is up and running
    - Decide if Week 5 stretch goal is viable
  + Theoretical comparison using the documentation for both products
    - Feature comparison + Ease-of-use of documentation
  + Work with Product Marketing to define a problem statement for the practical comparison
    - Describing what the “experiment” looks like
      * Map/environment
      * Type of robot
  + Run tests to compare different planners from ROS NAV2 and Navigation Toolbox based on identified metrics
    - Week 5 stretch goal: Compare planners for different robots (UAV, Manipulators, Ground Robots using different libraries such as OMPL, MoveIt)
  + Report out presentation with the Product Marketing Manager
* Skills: ROS, Python or C++, Linux, Presentation skills, Demo building, Robotics, Path planning.