Autonomous Robot Soccer

Planning for Passing in Robot Soccer

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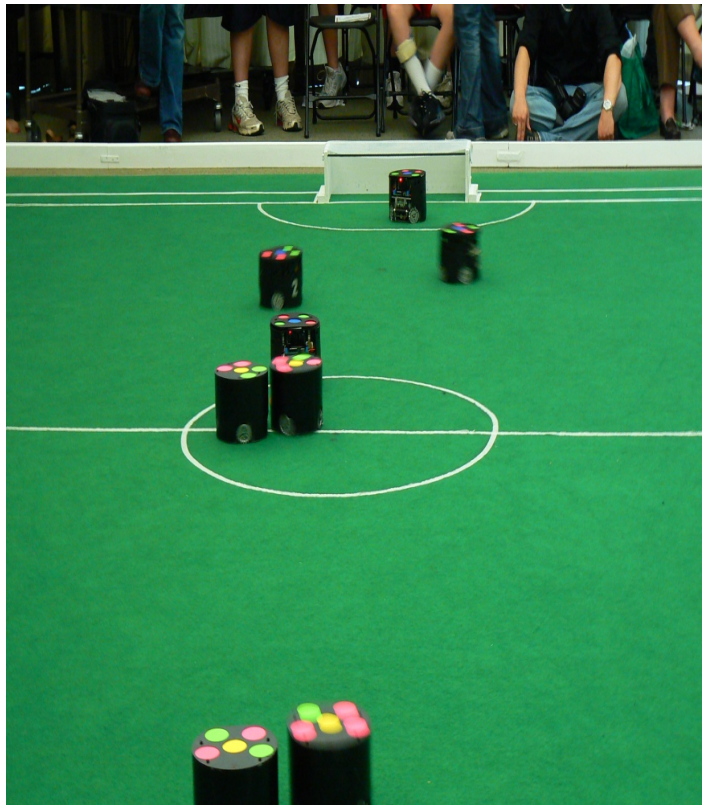
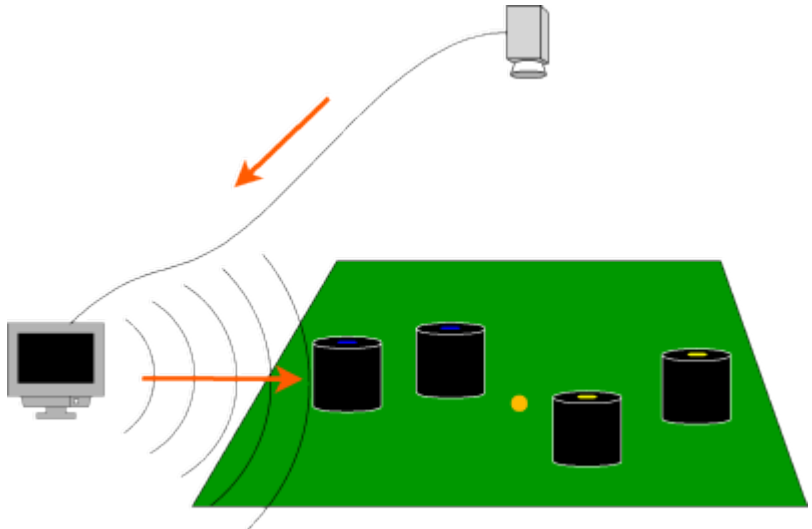
Overview of Small Size League (SSL)

- 5-on-5 fully autonomous robot soccer.
- Centralized control system with overhead vision.
- Ball speed much faster than robot speed (10m/s vs 1m/s) [todo: what is the robot speed?]





Problem Description

The current team uses a hierarchical behavior-based strategy which does not do “high-level” planning.

We did.... [todo]

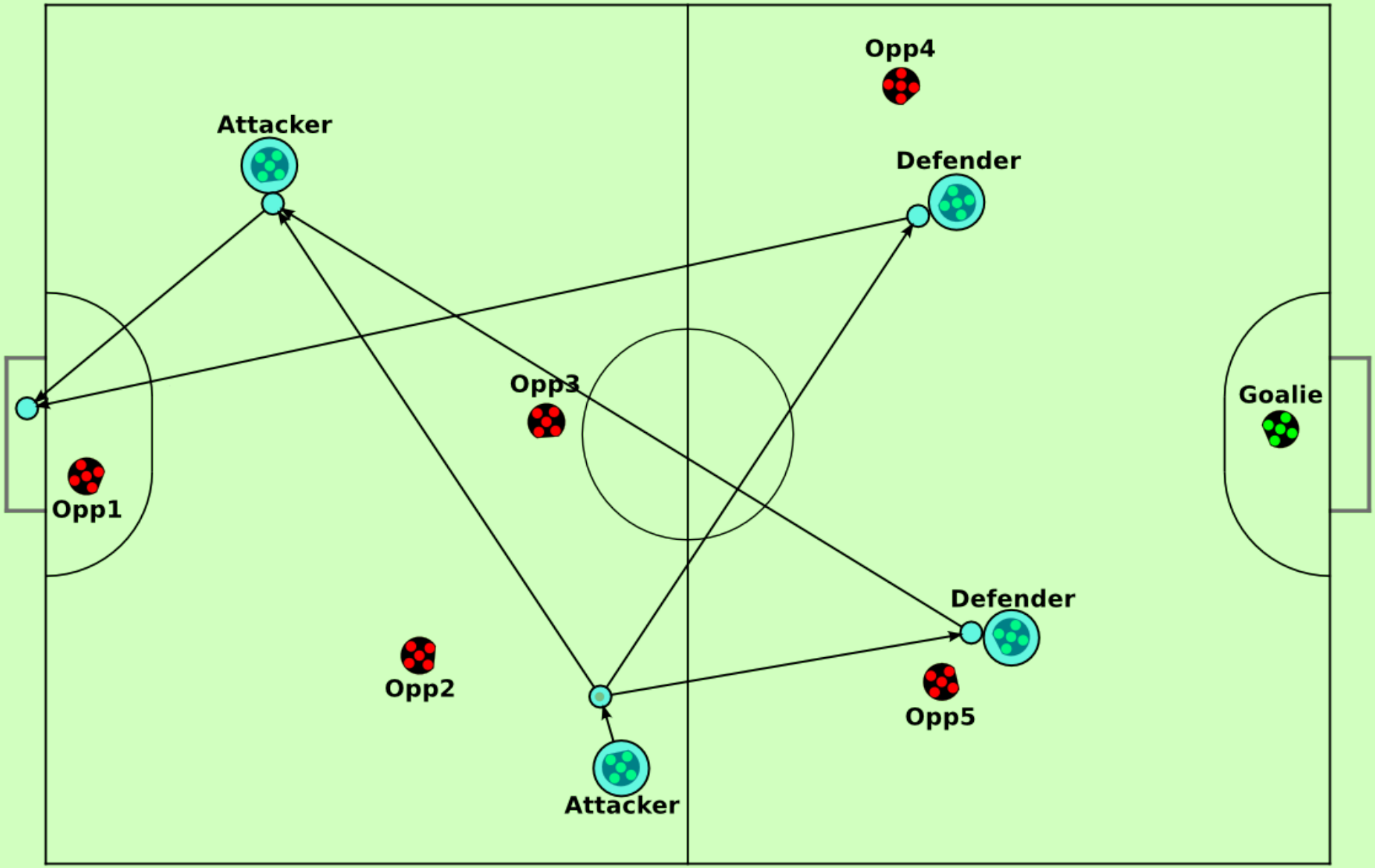
Our Approach

Four-step planning:

- Create graph structure of potential passes.
- Select a subset of the passes that are “best”.
- Run plans through an optimizer (nonlinear SQP).
- Choose the best plan and execute it.

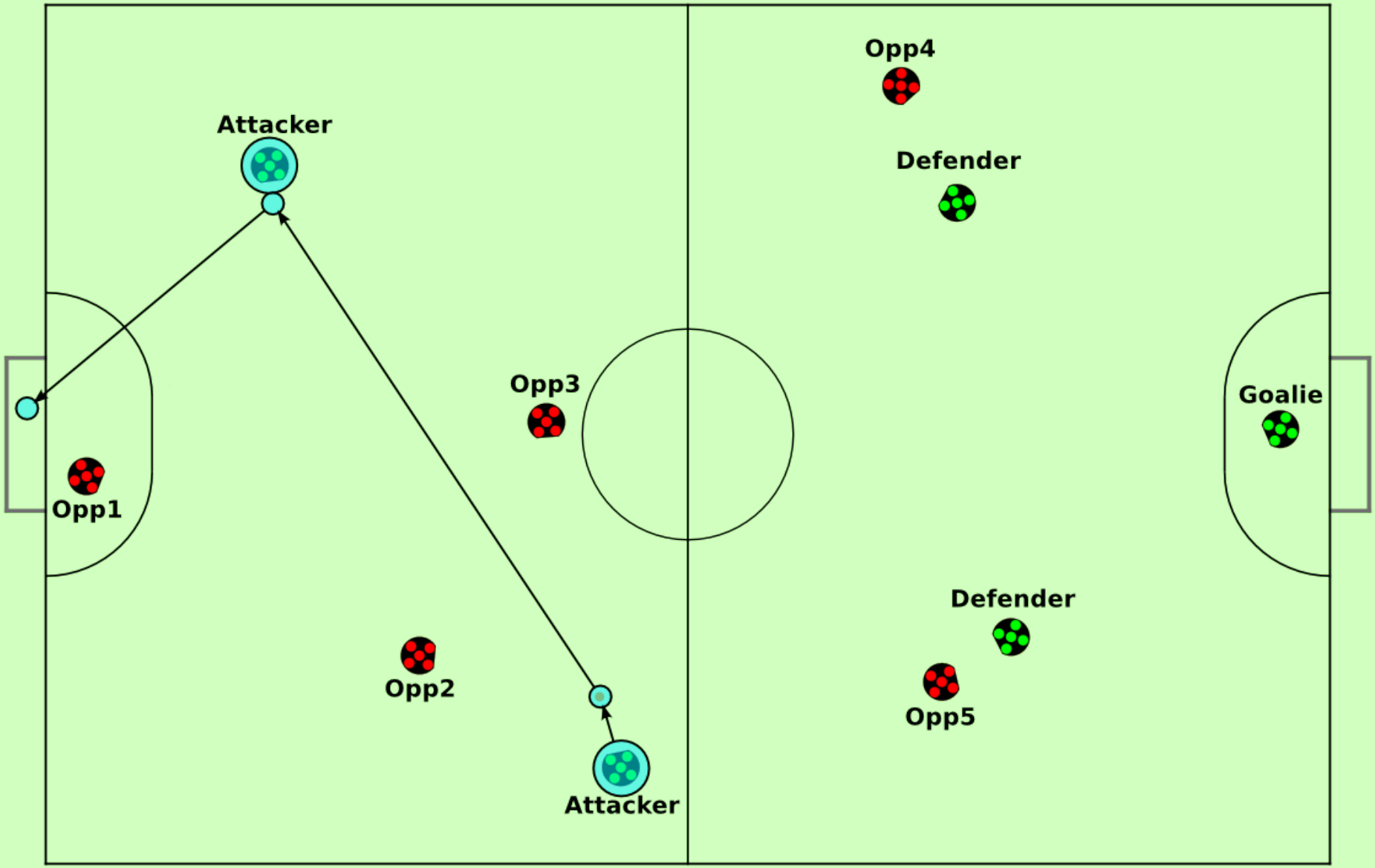
Step 1: Potential passes

Examples of feasible solutions:



Step 2: Feasible Subset

This pass would considered “good”:



Step 3: Optimization

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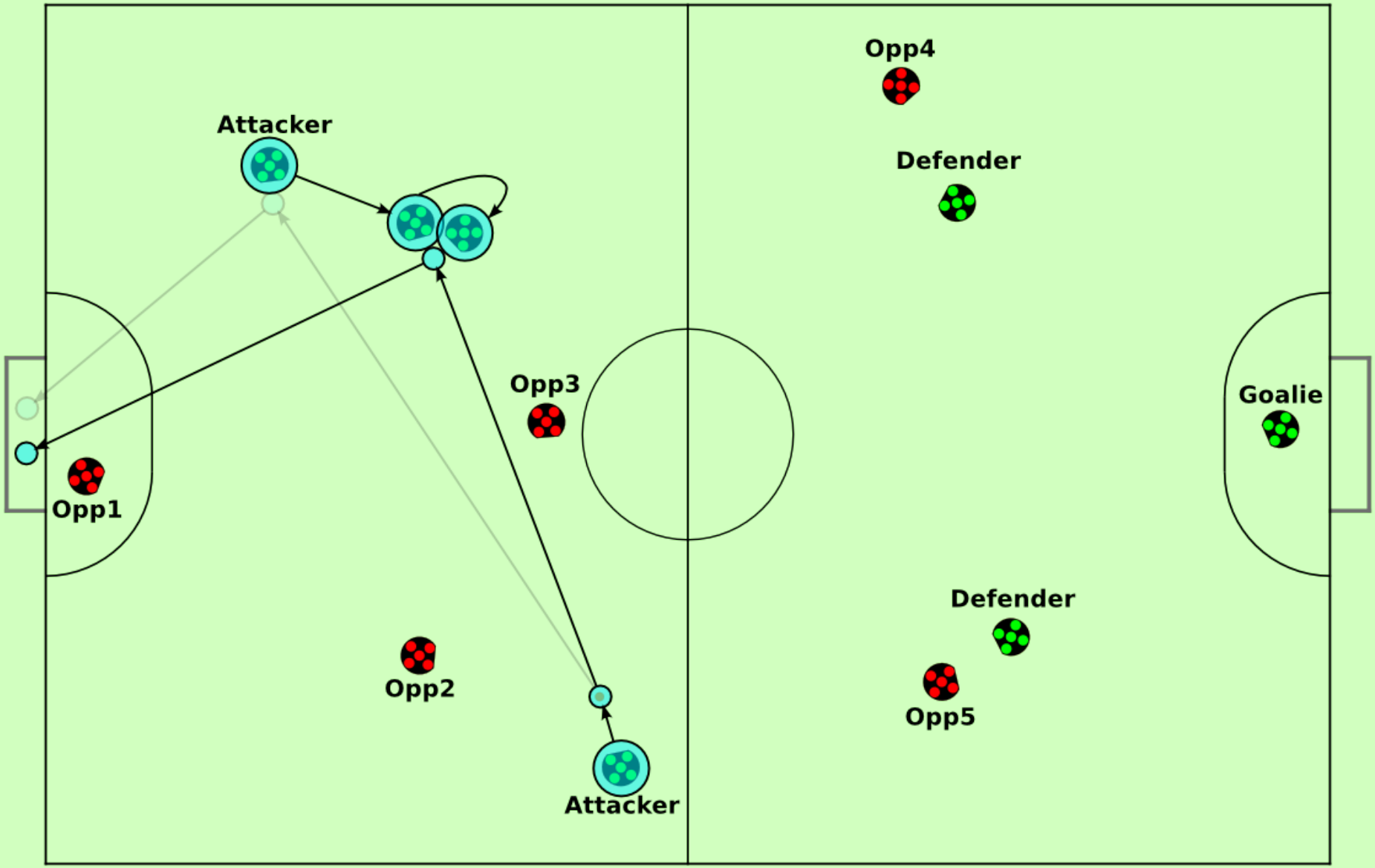

Details of optimization

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Results

Image of PassConfigs in our UI

Results

Video of execution of pass with static opponent.

Results

Video of execution with our old team as the opponent.

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