

RefBox 2016

Towards a benchmarking solution



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Summary

- Motivation
- Objectives
- System Architecture
- Control Interface
- Teams World State
- Audience Data Show
- Referee Data Show
- On going and Future Work

Motivation

- Rules have been changing over the past few years
- RefBox has been stable but has not evolved together with the rules
- Need for a inter team cooperation has been emerging
- Requirements for:
 - Better debugging tools
 - Information from both teams during the game
 - More realistic info for the audience
 - Effective benchmarking tools

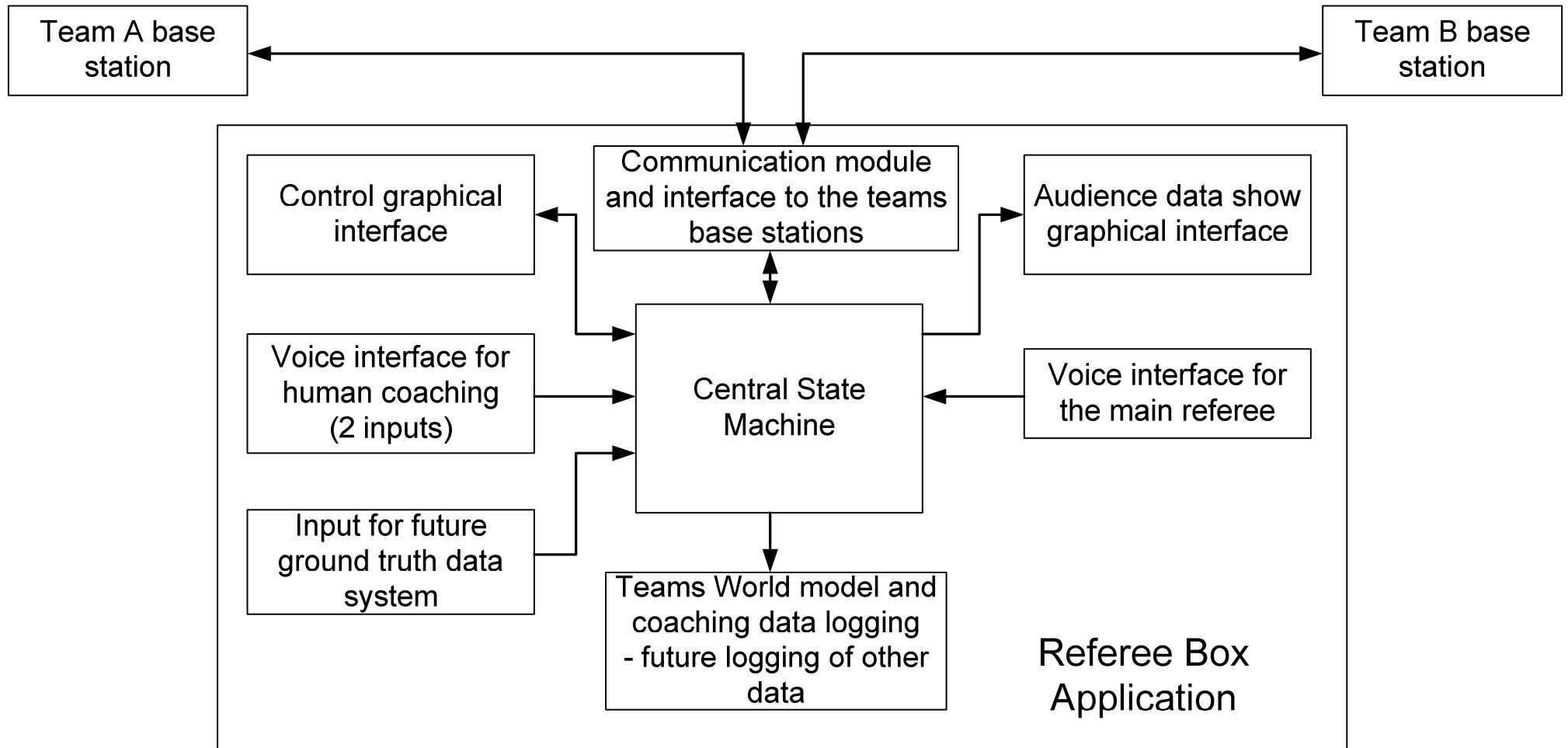
Objectives

- Create a platform independent application, written in Java.
- Support for fast action modes with interlock capabilities, depending on the game status,
- Prevent (as much as possible) human errors by the assistant referee
- Extension of the currently used protocol

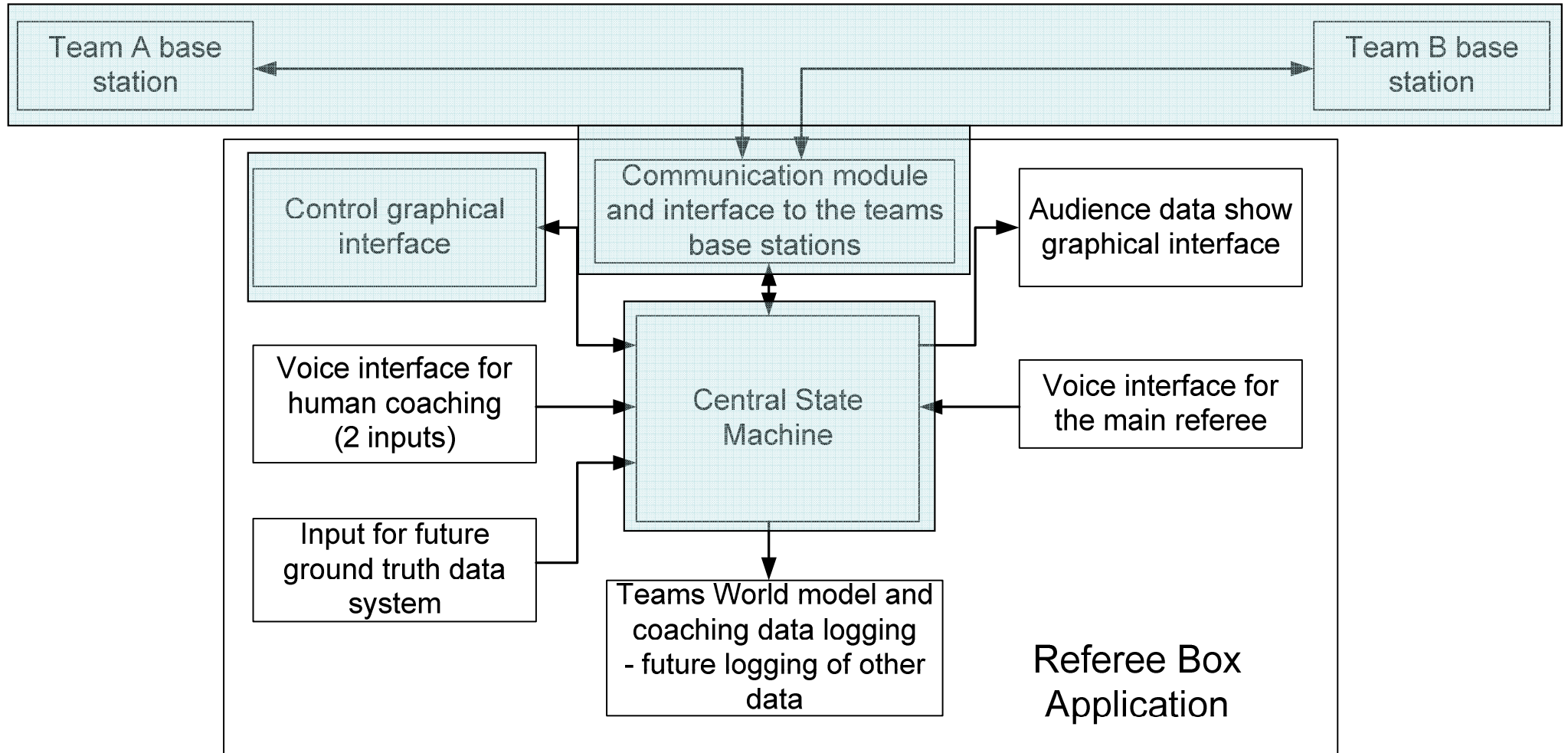
Objectives

- Extensive log data
- Easy configuration
- Remote audience data show and field referee data show
- Ready for voice interface for human coaching
- Teams world model gather and logging.
- Fully configurable and open source.

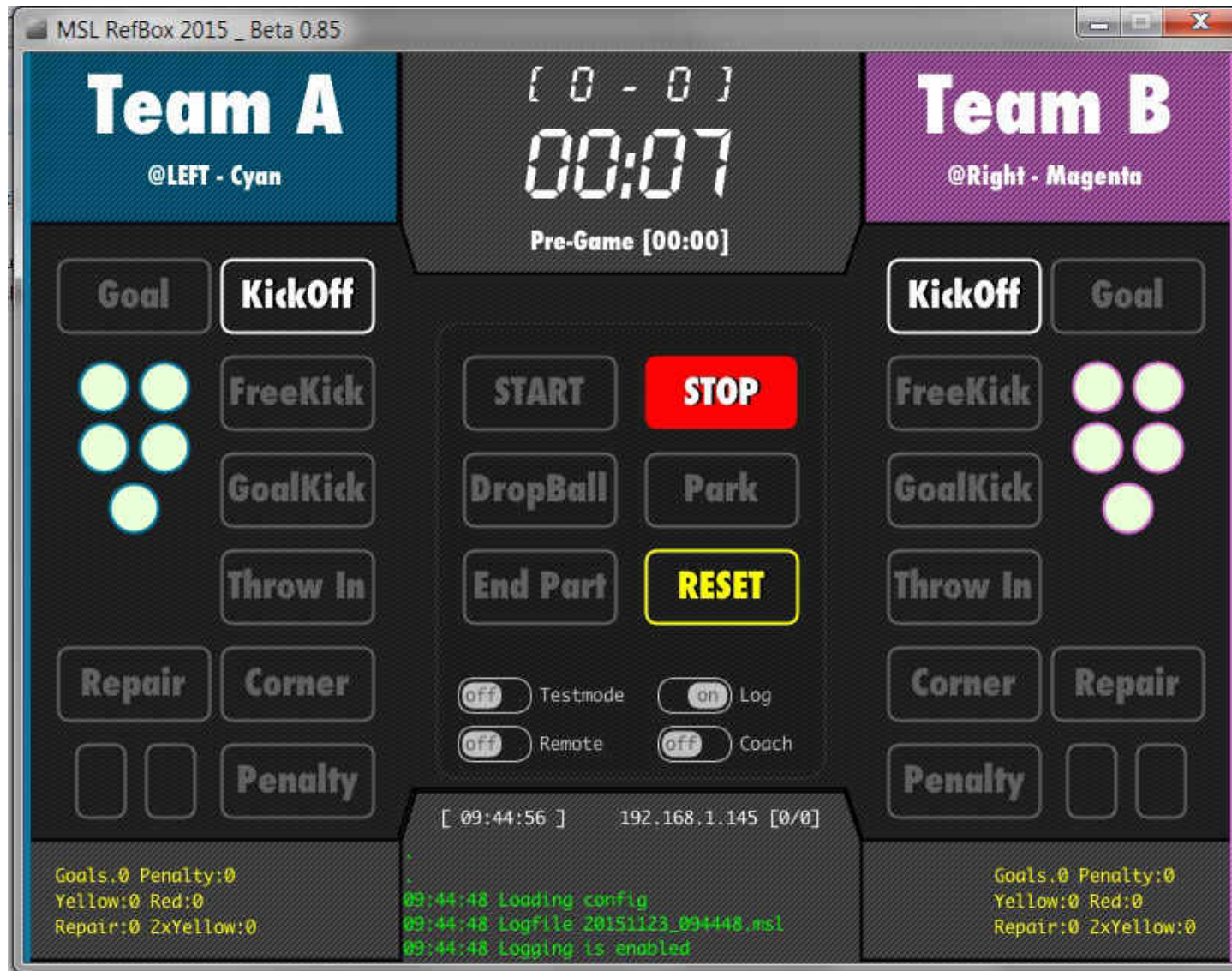
System Architecture



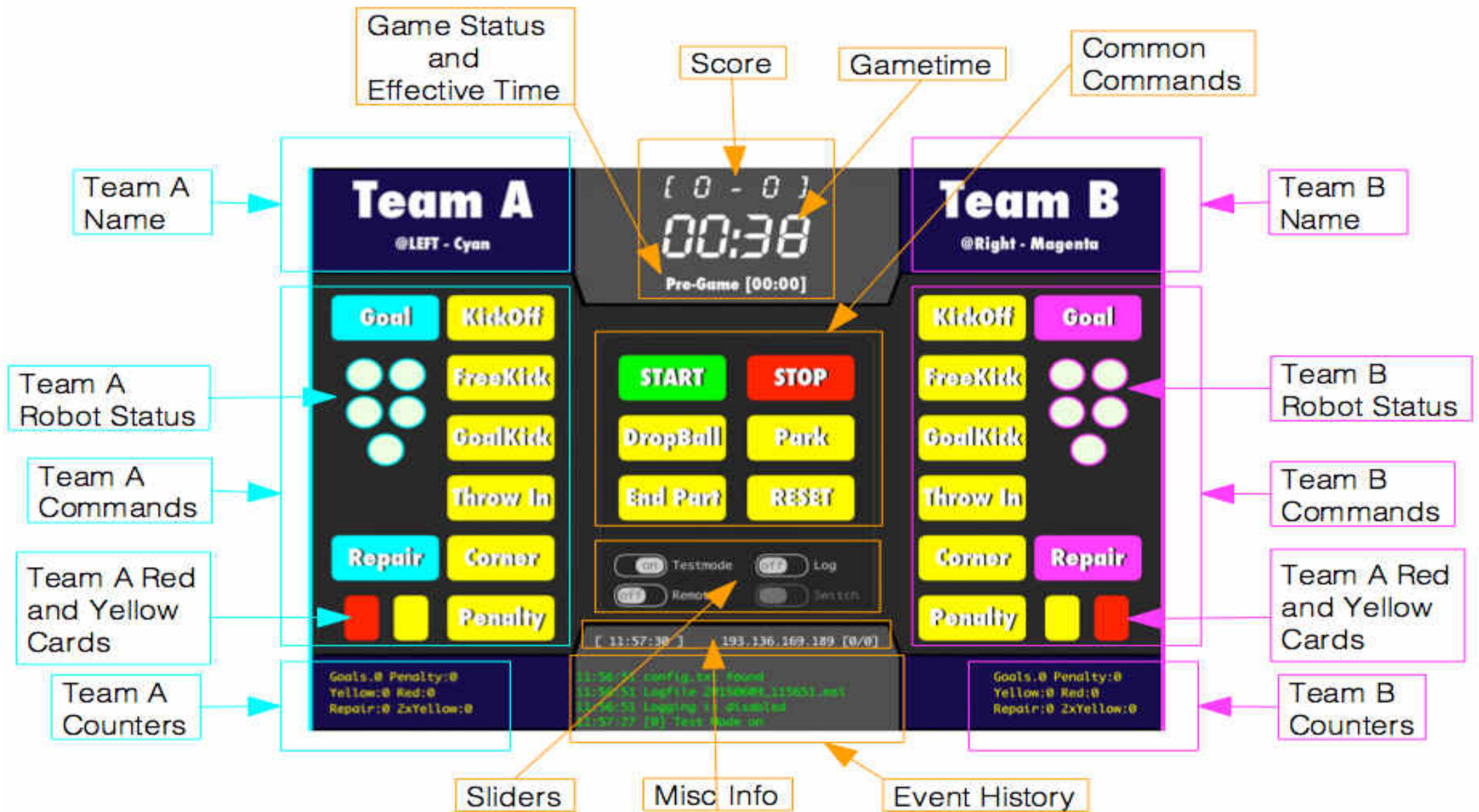
System Architecture



Control Interface



Control Interface



Control Interface



KickOff for Cyan

Control Interface

The image shows a control interface for a RoboCup MSL match. It features two main control panels for Team A (Cyan, @LEFT) and Team B (Magenta, @Right). The central scoreboard displays the score [0 - 0] and the time 00:15 in the 1st Half. A yellow arrow points from a 'Play ON' callout box to the 'START' button. The interface includes various action buttons such as Goal, KickOff, FreeKick, GoalKick, Throw In, Repair, Corner, and Penalty. There are also status indicators for Goals, Penalty, Yellow, Red, and Repair. The bottom of the interface shows a log of events.

Team A
@LEFT - Cyan

Team B
@Right - Magenta

[0 - 0]
00:15
1st Half [00:15]

Goal KickOff
FreeKick
GoalKick
Throw In
Repair Corner
Penalty

START STOP
DropBall Park
End Part RESET
Throw In
Corner Repair
Penalty

Testmode Log
Remote Coach

[10:55:01] 192.168.1.145 [0/0]

10:53:27 Loading config
10:53:27 Logfile 20151123_105327.msl
10:53:27 Logging is enabled
10:53:41 [Pre-Game] CYAN Kickoff
10:54:45 [1st Half] START

Goals:0 Penalty:0
Yellow:0 Red:0
Repair:0 2xYellow:0

Goals:0 Penalty:0
Yellow:0 Red:0
Repair:0 2xYellow:0

Play ON

Control Interface



Game Stopped

Effective game time

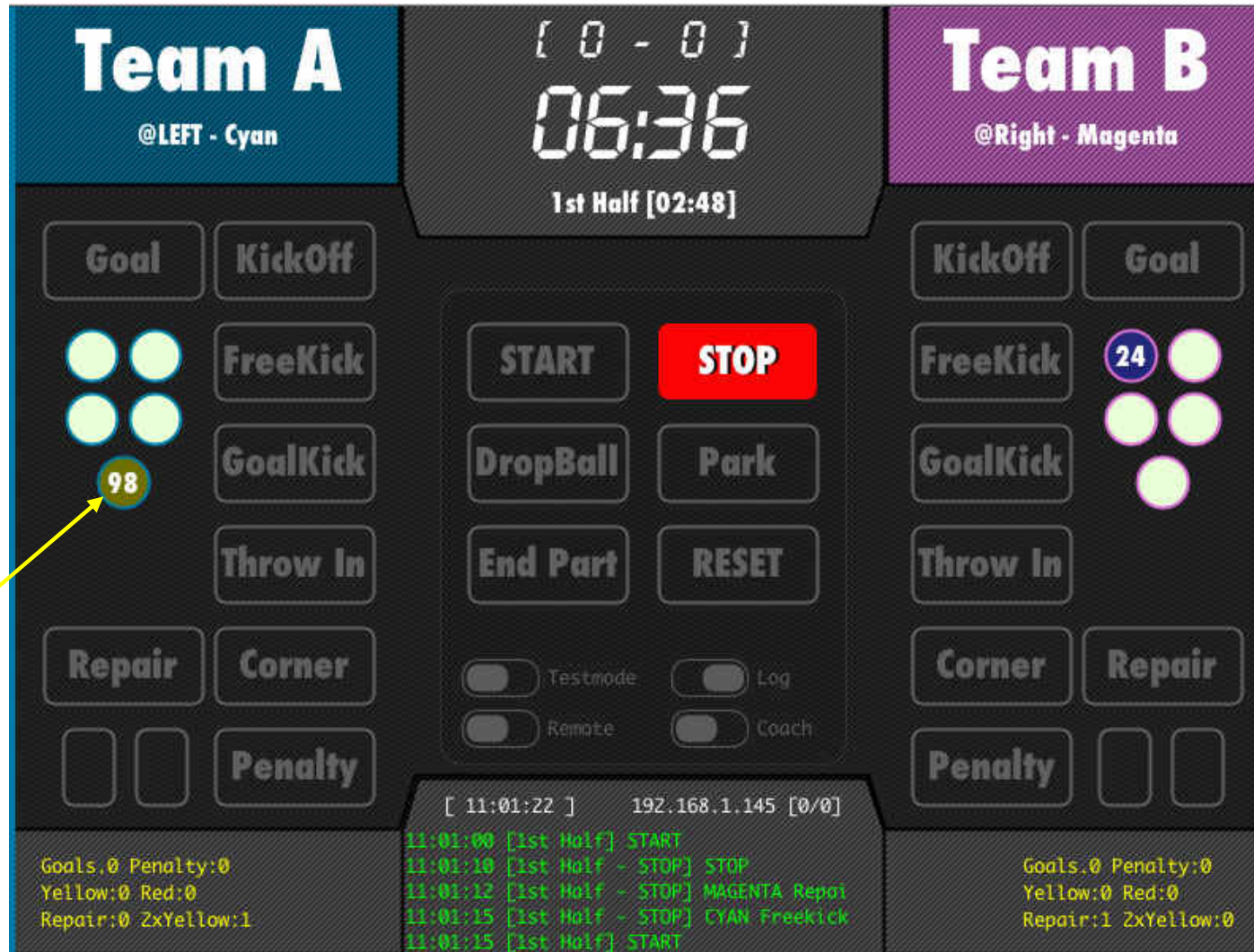
Control Interface

The interface is divided into three main sections: Team A (left, cyan), a central scoreboard, and Team B (right, magenta). The scoreboard shows a 0-0 tie at 04:58 in the 1st Half, with 01:20 remaining. Team A's controls include buttons for Goal, KickOff, FreeKick, GoalKick, Throw In, Repair, Corner, and Penalty, along with a yellow card indicator. Team B's controls include KickOff, Goal, FreeKick, GoalKick, Throw In, Corner, and Repair, along with a 26-second timer. The central area has START, STOP, DropBall, Park, End Part, and RESET buttons, plus Testmode, Log, Remote, and Coach toggles. A log at the bottom shows the sequence of events: 10:59:34 [1st Half] START, 10:59:36 [1st Half - STOP] STOP, 10:59:37 [1st Half - STOP] MAGENTA Repair, 10:59:39 [1st Half - STOP] CYAN Goalkick, and 10:59:40 [1st Half] START. Team A's stats are Goals:0, Penalty:0, Yellow:1, Red:0, Repair:0, 2xYellow:0. Team B's stats are Goals:0, Penalty:0, Yellow:0, Red:0, Repair:1, 2xYellow:0.

Yellow card given

Player out. 26 seconds remaining

Control Interface



Second yellow card
Player out for more 98 seconds

Control Interface

Team A
@LEFT - Cyan

Team B
@Right - Magenta

[2 - 2]
00:36
Overtime - 1st Half - STOP [00:21]

Goal KickOff
FreeKick
GoalKick
Throw In
Repair Corner
Penalty

START STOP
DropBall Park
End Part RESET

KickOff Goal
FreeKick
GoalKick
Throw In
Corner Repair
Penalty

[10:26:55] 192.168.1.145 [0/0]
10:26:44 [Overtime - 1st Half - STOP] ST
10:26:45 [Overtime - 1st Half - STOP] MA
10:26:46 [Overtime - 1st Half - STOP] CY
10:26:47 [Overtime - 1st Half] START
10:26:50 [Overtime - 1st Half - STOP] ST

Goals:2 Penalty:0
Yellow:0 Red:0
Repair:0 2xYellow:0

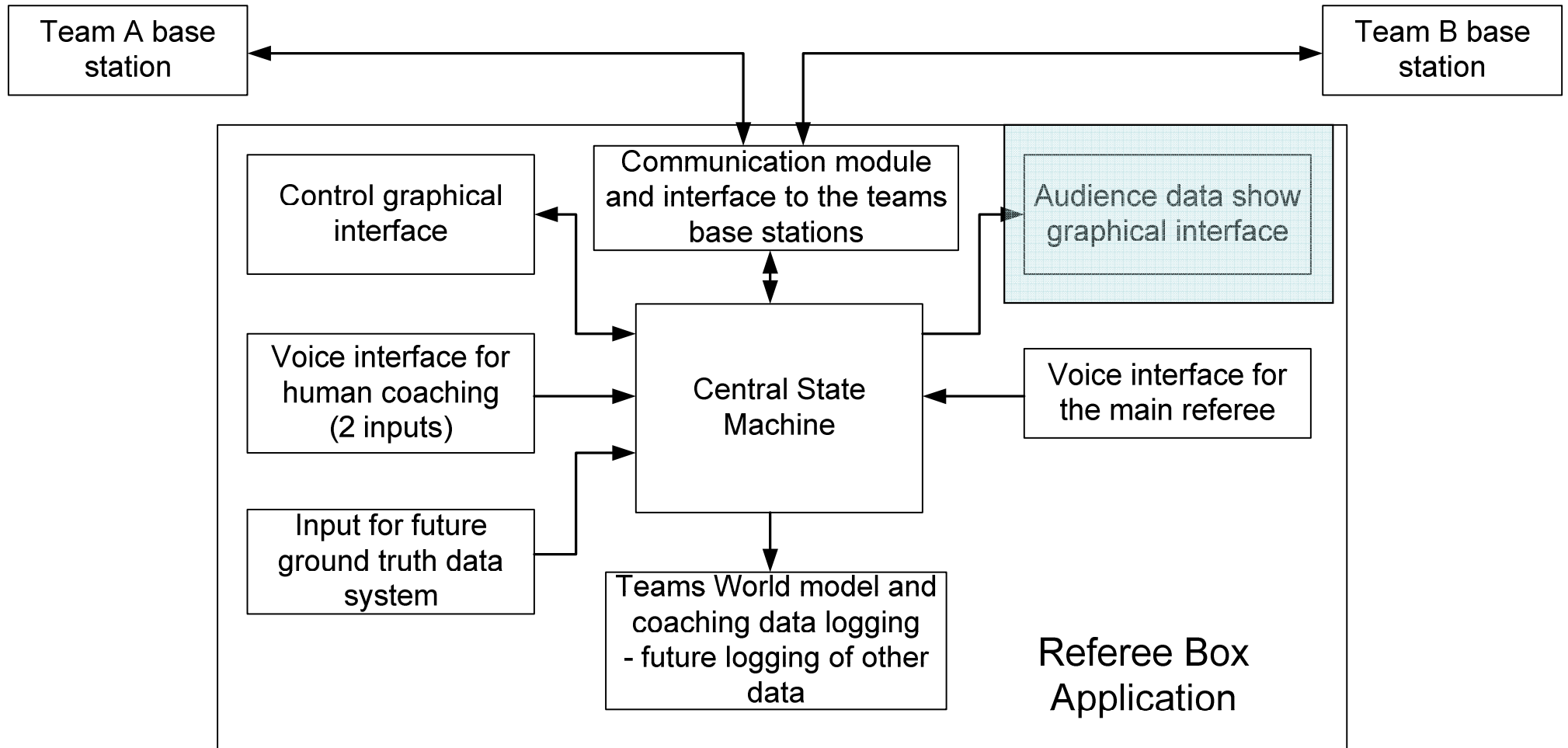
Goals:2 Penalty:0
Yellow:0 Red:0
Repair:0 2xYellow:0

Overtime after a draw

Teams World State

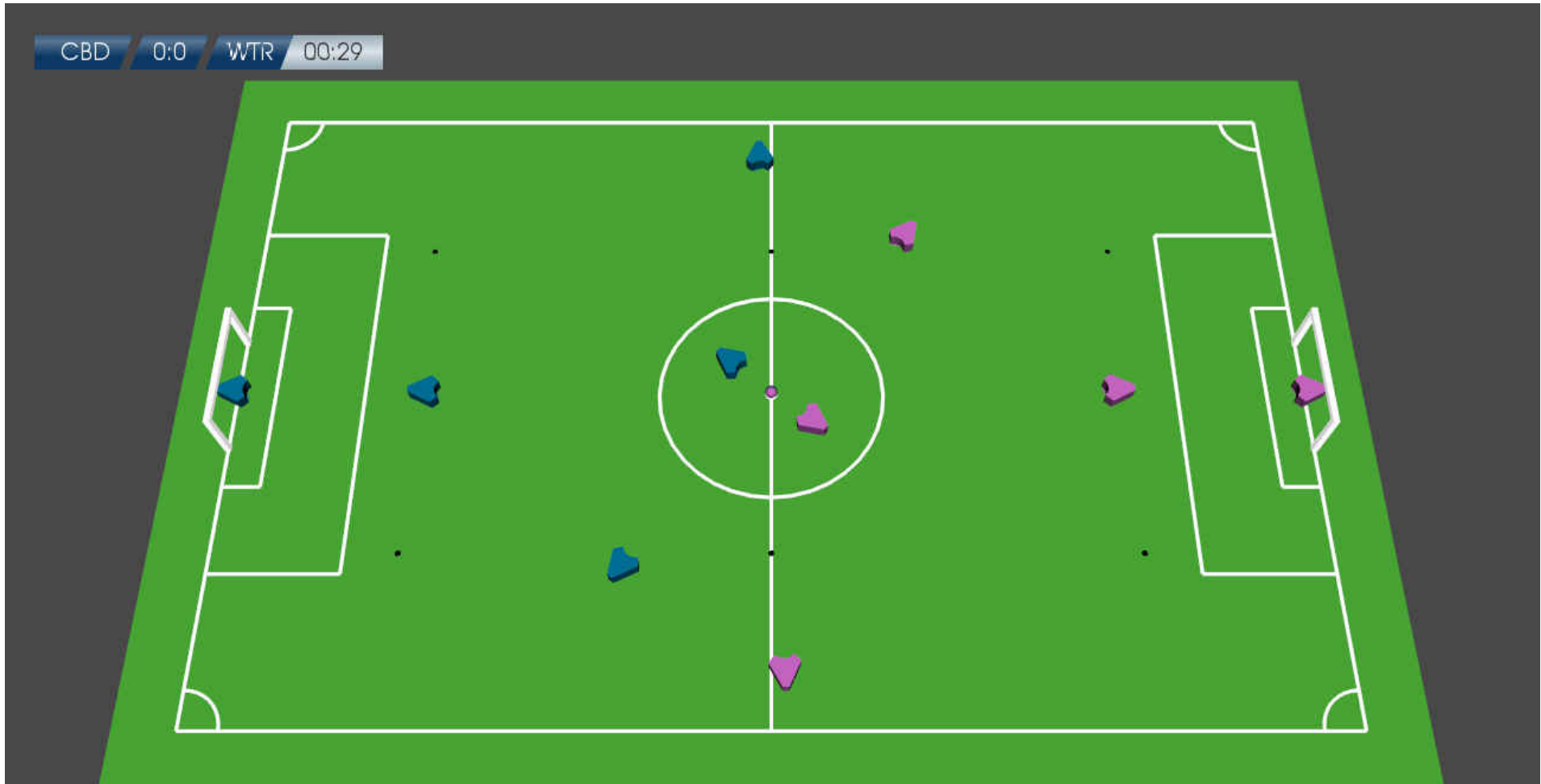
- During game, teams World State is requested on a periodic base
- This information is relayed to local storage and to the audience data show
- Information regarding all the states of the game is also stored
- All these information is deployed to both teams at the end of the game

Audience Data Show



Audience Data Show

Players shown according to their World State information




Audience Data Show



Game status shown according to RefBox data


Main referee Data Show



Gametime: 01:34 Effective: 00:33
Status: Game - 1st Half
Last CMD: STOP

TEAM A : 0

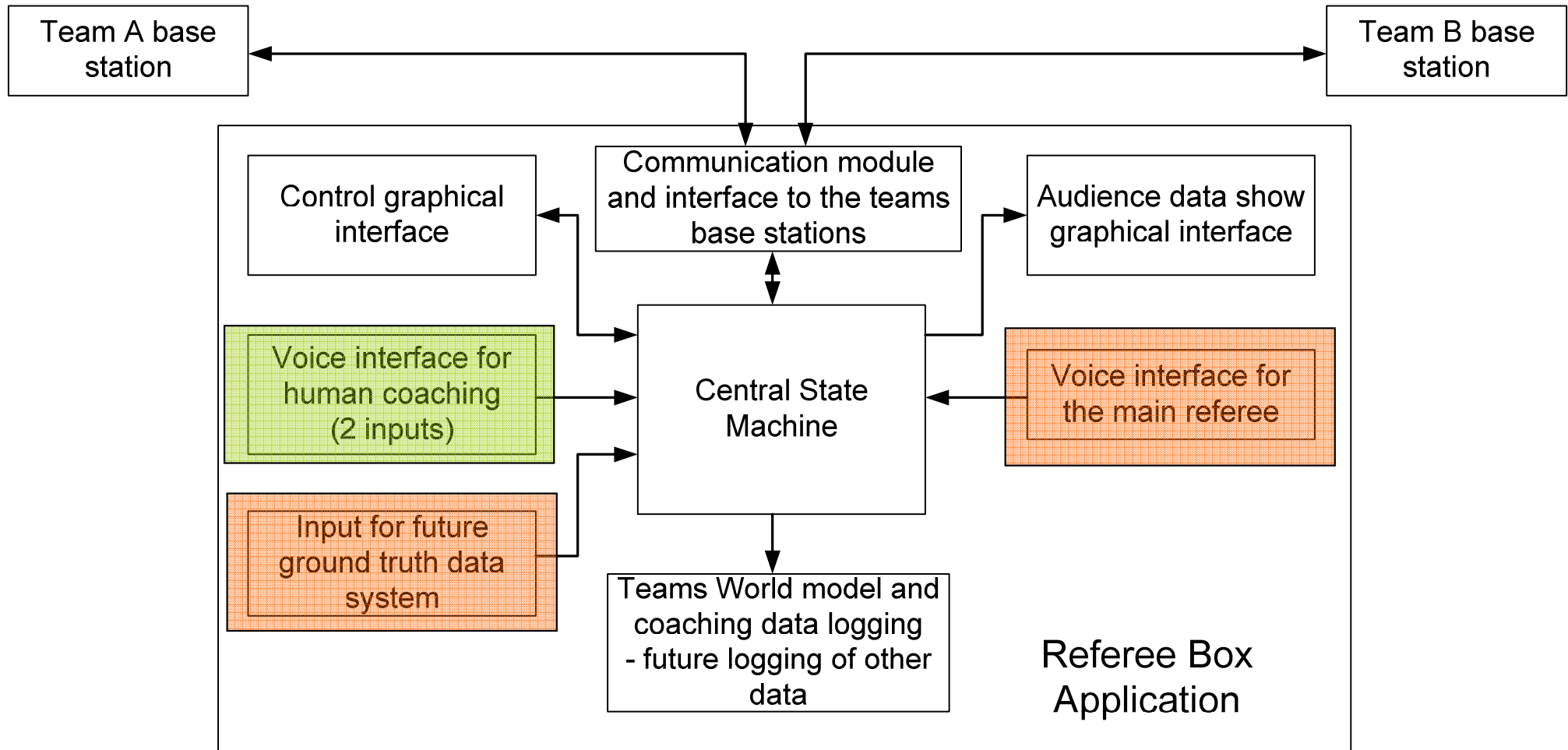
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R0 PLAY[0]
R1 PLAY[0]
R2 PLAY[0]
R3 PLAY[0]
R4 DBLYEL[97]
```



TEAM B : 2

```
R0 PLAY [0]
R0 REPAIR [18]
R0 PLAY [0]
R0 PLAY [0]
R0 PLAY [0]
```

On going and future Work



Thank you!