Motivations for starting on a new basis

Objectives
- Make link between scientific challenges and roadmap explicit
- Ensure that rules evolve along with robot capabilities
- Allow teams to plan their development
- Create a maintainable document

Status and validation process
- Current document (1st version, June 13th 2019)
  - For trustees: presented, no complains, but no formal answer
  - For the league: released but not presented, not voted upon
- Future updates
  - Vote on modifications (similar to rulebook)
Introduction
Short term: upcoming changes
Long term: event-triggered roadmap

Structure of the new roadmap

Scientific challenges
- Scientific context of the league
- Research contributions from the league
- Require a major update every 4 years

Short-Term: Upcoming changes
- Changes planned for the next 5 years

Long-term: event-triggered roadmap
- What are the remaining steps to win against humans?
- Metrics: how are improvements and performance measured
- Criteria required to take significant steps
Implemented for 2020

- Structural changes to the league
  - TeenSize now plays in Kid and Adult Division A/B
  - Combined teams
- Autonomous placement for all robots
- Humanoid Research Demonstration
- Technical Challenges
  - Kid: push-recovery → blindfolded robot challenge
  - High jump → Parkour challenge
Initially planned for 2020, but canceled

No implementation agreement in time
- Humanoid Open Competition
  - Discussed on Sunday June 28th, at 9:30am CEST

Voted out by the league
- Kick from moving ball: pass need to be performed by a robot
- Adult: push-recovery $\rightarrow$ standing-up

Discussion: How do we manage the upcoming changes?
- Mandatory league vote before adding something
- Can we revote on something that has been announced
Planned for 2021

- Being more explicit on network requirements
  - WiFi quality: minimal bandwidth, anywhere on the field
- Enforcing the rules more strictly
  - Monitoring bandwidth of each team
  - Robots not in play should not be able to send messages
- Discussion:
  - Should we postpone this change to 2021
  - Require significant development (any volunteer)
  - Risk that we set rules which can not be applied
Discussion: Height limits

- Concerns expressed
  - Adult: Lowering min height is taking a step back
  - Kid: Having 40cm and 1.2m high robots in the same league is difficult
  - This rule has major impact on both leagues, how can we vote on that?
    - More teams in Kid: unfair for Adult
Discussion: Next major update

- 2023 or 2024?
- What content?
## Metrics

### Motion metrics

- Peak speed, ball approach duration, Kick properties (distance, accuracy, ...)

### Perception metrics

- Ball-localization, self-localization, opponent recognition

### Gameplay metrics

- shots on goal, diving saves, nb robots on fields, Don’t Mess Up Period (DMUP)

### Requirements

- Compare **ground truth** (labeled video) with **robots prediction** (common protocol).
About criteria and rule implementation

**Shared success**
At least 3 teams need to fit a criterion to consider that the step is completed.

**Time to plan for participants and LOC**
When a step is completed, the associated change is triggered two years later.
Field dimensions and number of robots

Evolution planned

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<thead>
<tr>
<th>Robots</th>
<th>Kid</th>
<th>Adult</th>
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When is size increased?

- Peak speed: 20s to cross the field.
- Kick distance: at least half a field.
Discussion: Outdoor?

- Critical to increase field dimensions and number of players
- Gradual steps
  - Outdoor with a roof first
- Moving from artificial turf to real grass? Is it necessary?
- When/how can we plan it?
  - Include preliminary testing through technical challenges?
Handlers and game duration

Adult: path to remove the handlers

1. TC: Stand-Up (less than 10 seconds)
2. TC: Falling on hard ground

Once robot can properly fall and stand-up, handlers will be removed

Towards autonomy

- Once DMUP > 3 min: harsher penalties for pick-up and service
- When DMUP \( > \frac{\text{halfTimeDuration}}{2} \): increase half time duration:
  - Steps: 15, 20, 30, 45 minutes.
Gameplay rules

Mandatory throw-in
- Throw-in takes less than 10 seconds to be performed
- Ball cross at least quarter of field length, before stopping

Offside rule
- Satisfying self and opponent localization (RMSE < \( \frac{\text{fieldLength}}{50} \))
- At least 6 robots per team