Sports & Technology

New Jersey Institute of Technology
STS 325: Sports, Technology, and Society
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Argument:

Advancements in technology have not only benefited athletes and sporting professions, but also made sports more enjoyable to watch and play.
Worst Referee Calls

If we have any questionable calls tonight, we blame them on the dog.
Maradona’s Hand of God

1986 World Cup (Semifinals)
Argentina vs England
Argentina wins the game 2-1
Lampard’s disallowed goal

2010 World Cup (Round of 16)

England vs Germany (1-4)

FIFA introduces Goal line technology for 2014 FIFA World Cup
Denkinger Missed Call

1985 World Series Game 6

St. Louis Cardinals leading Kansas City Royals series 3-2

Cardinal winning 1-0, Bottom of the 9th this happens

Royals win the game 2-1, and the world series the following day.

"That's a good thing. So I'm all for review. And if they had it back then, probably nobody would ever know my name."
Phantom Touchdown

1998 New York Jets vs Seattle Seahawks

Vinny Testaverde tries to run it in

Never reaches the goal line

Refs call it a touchdown

Jets win 32-31
AI Referee Negatives

- Glitches.
  - Nearly every new invention goes through numerous glitches before it is perfected.

- Loss of human ref excitement.
  - A refs call can cause a sort of excitement towards the players, coaches or fans.

- Loss of jobs.
  - Being a referee is a profession for many people. Amateur or professional.
AI Referee’s Positives

- 2002 Lakers vs Kings series.
  - Rigged
  - Refs were gambling
  - Lakers shot way more free throws

- Consistent calls
  - Human eye vs AI
  - Human judgement vs AI
Robotic Referees

Football / Soccer
- Goal line determination
- Clarify what a catch is
- Off side line

Baseball
- More accurate strike zone
- Sensor Base
- Fair or foul

Sports
- Non bias refs
- No double standards
- No favoritism
- Video Replay System
- Tracking System

Sports Used In
- Tennis
- Cricket
- Baseball
- Volleyball
- Rugby
- Snooker
- Badminton
WORLD CUP GOAL LINE TECH
Makes Every Millimeter Count

All 12 World Cup Stadiums have technology that includes:

- **14** high-speed cameras per stadium
- **7** high-speed cameras per goal
- **5mm** goal detection accuracy

Every 2 milliseconds, the position of ball is measured.

In less than a second, an encrypted signal is sent to the referee’s smartwatch indicating goal.

Up to 500 image sequences captured per camera, per second.
- Powered by Amazon Web Services
- Installed in all 30 parks in 2015
- Combination of two tracking systems
#34 Bryce Harper

**Hitting Metrics**

- **Exit Velocity**: 109.0 [MPH]
- **Launch Angle**: 22 [DEG]
- **Projected Distance**: 451 [FT]

[Link](https://v637g.app.goo.gl/psGnnVvoRQgeybMK8)
Impact:

- Most teams in the 2018 playoffs are in the top 8 statistically oriented organizations of the MLB.
- Astros used modernized statistics to acquire most of its pitching staff.
- Used to decide how to pitch to each batter.
Technological Progress in Sports Equipment

Lighter  More Protective  Sweat absorbing  Performance Enhancing

Stronger and Flexible
Equipment Progress
…. Helps Records Progress

https://www.ted.com/talks/david_epstein_are_athletes_really_getting_faster_better_stronger
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