

SPORTS TRAINING

MODERN TRENDS

IN SPORTS

TRAINING

## OVERVIEW OF THIS PRESENTATION

- ❑ Sports – Fundamentals, fact and figures
- ❑ Technology – Fundamentals & benefits
- ❑ Sports Sciences and Sports Engineering
- ❑ Software's used in sports
- ❑ Cricket and technology
- ❑ Technology in Cricket umpiring
- ❑ Future technology in Cricket umpiring
- ❑ Conclusion

How many 'sport disciplines'  
are there in the world?



The word 'Sport' comes from the old French term 'desport' means "leisure".

Sport (or sports) - competitive activity.

- Health and fitness
- Name, fame and recognition
- To earn money and career opportunities
- Personality and character building
- Entertainment & satisfaction
- Relaxation, leisure, culture & tradition



# SPORTS

## Athletics

- Individual event except relay races
- Running, Jumping, throwing & sailing
- Commonly conducted in track, field and road

## Games

- Generally played between two teams and each team may have 1 to 11 or more players depending upon the game
- Generally games are played in terms of time or fixed score structure

## Other events

- Indigenous activities / games
- Martial arts
- Motor sports

## TOP 10 MOST POPULAR SPORTS IN THE WORLD\*

1. Soccer
2. Cricket
3. Basketball
4. Hockey
5. Tennis
6. Volleyball
7. Table tennis
8. Baseball
9. American Football / Rugby
10. Golf



\*Most watched,\* \*most played,\* or \*most revenue-generating\*

\*Sportology

## TOP 5 MOST POPULAR SPORTS IN INDIA\*

1. Cricket
2. Soccer
3. Field Hockey
4. Badminton
5. Tennis



\*Sportology

## Technology

Greek origin - 'tekhnologia' means 'systematic treatment'.

as the application of scientific knowledge for practical purposes, especially in industry.

In other words it is the branch of knowledge dealing with engineering or applied sciences.



Technology plays a critical role in modern day sports

Due to technology, significant change was observed in following areas

- ✓ Fitness
- ✓ Training
- ✓ Technique
- ✓ Tactics
- ✓ Strategies
- ✓ Feedback system
- ✓ Impartial decision making in officiating
- ✓ Updated statistics
- ✓ Creating of interest
- ✓ Attraction and involvement among spectators and
- ✓ Talent identification

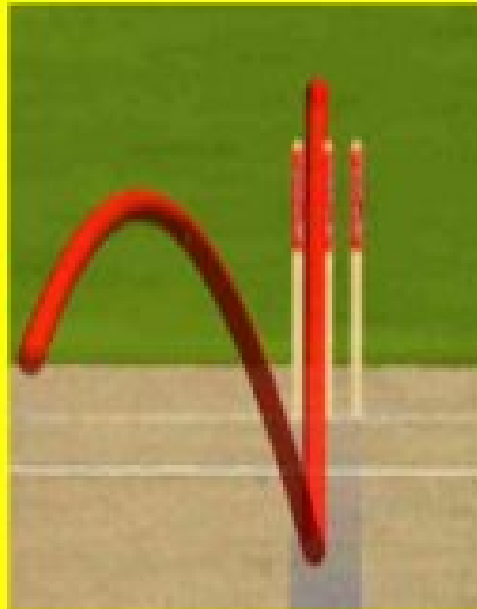
The usage of technology differs sport to sport.

The technological advancement in sports leads to

- enhancement the level of performance
- empower coaches and administrators
- enhance development pathway of talent athletes
- accelerated sports development
- better preparedness of athletes, teams, coaches & administrators

- Right decision is made - player/official relationships
- Officials have less pressure, due to technology

# Cricket

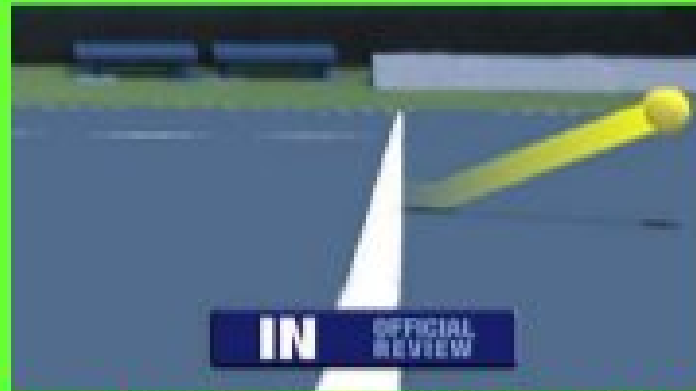


Hawk Eye technology has also been introduced into cricket as part of spectator entertainment.

## Goal-line technology in Football



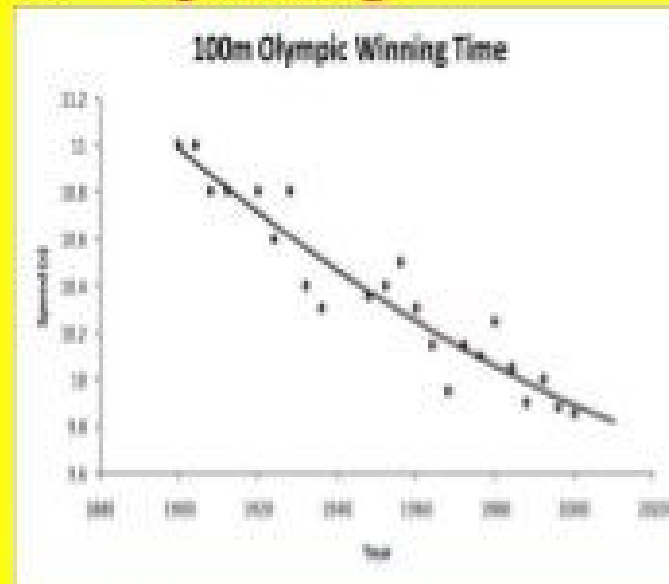
## Tennis



Court side cameras use infra red beams to capture the ball's motion.

Camera frames are analysed every second and can predict possible ball flight.

## Athletics – Sprinting



### Sports performance enhancement factors

•Training and Nutrition

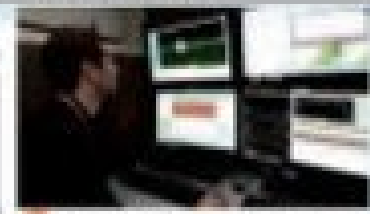
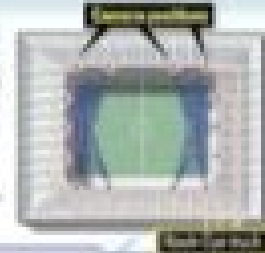
•Starting block, sportswear, spikes, synthetic surface, electronic timing, photo finish equipment

# THE FOOTBALL REVOLUTION: HOW IT WORKS

IT'S been a long time coming but on Sunday football changes forever. The Community Shield is the first game to feature the first Decision System (DS1), which will also be used at all Premier League grounds this season.



**1** The high-speed DS1 cameras track a number of the ball's movements in high-contrast conditions. They see all points of the pitch and track the ball when it is in that area. Images of the ball are processed at 200 frames per second.



**2** When the ball hits, cameras the size of a hand's palm capture a substantially smaller image. It has less than a centimetre and is a square millimetre. As the ball hits, the image has been rotated. The word 'Goal' flashes up on the pitch. A Goal-Cam technology monitors the system remotely to a bank of workstations.



**3** The computer workstation captures, tracks and the image can see it from a wide angle, and the information is sent to the big screen in the stadium within 20 seconds. The remote workstation also ensures graphics go to TV computers for broadcasting.



The 'Goal' that sportsbooks monitor that technology has been used in 2010, Frank Lampard's World Cup strike against Germany was a controversial decision. Who knows what might have happened then.

## KEY QUESTIONS ANSWERED

**When will it be used?** For every Premier League game. The Community Shield, FA Cup, England internationals, and FA Cup ties at Wembley with the technology will also use it. The Capital One Cup may benefit if clubs with the technology use it as well.

**How much does it cost?** £200,000 per ground, which the clubs are paying for, as well as a

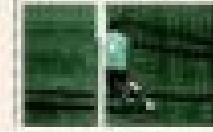
small annual cost for operations.

**Has it been tested?** Yes, there has been strict FIFA testing at each stadium. It has also been tested in matches at the Republic of Ireland, the Republic of Ireland, the Republic of Ireland, the Republic of Ireland, and the Club World Cup in Japan last year.

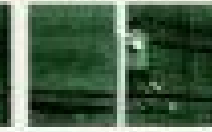
**How accurate is it?** It is a few centimetres – much better than the last decision for FIFA.

**Does the weather affect it?** No.

**What if players are blocking the view of the ball?** Using two high-speed cameras, which is in the width of the pitch, they can



erase players from the computer image. And it works even if the camera can only see some of the ball as the computer knows the shape of the rest of it.



**Does the referee need it?** No, all the top referees have been trained in the system.

**Will technology affect England's other leagues?** Yes, England are going to start. Holland are using it for occasional cup games but not for the Eredivisie. The Champions and Europa Leagues. FIFA are using it for the World Cup for next year's World Cup.

## Athletics - Javelin



The new rules stipulated that the centre of mass should be moved forward by 4 cm.

This helps to keep the nose down, reducing the lift on the javelin and cutting the distance it can travel.



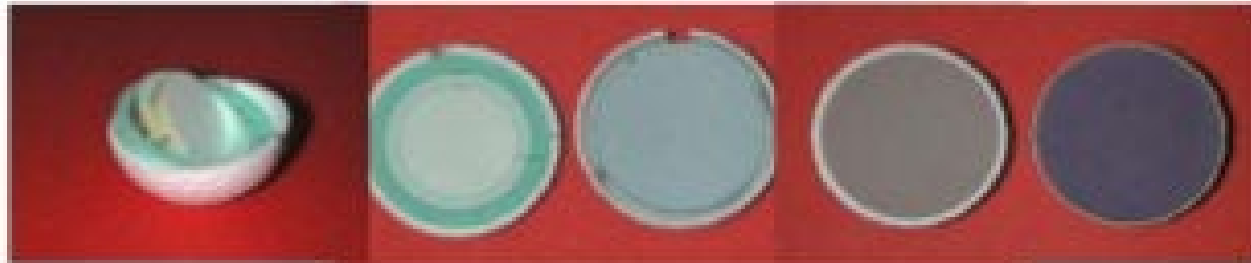


# Swimming

Swimming suits

- Jason Lezak's suit

# Golf



During impact the golf ball compresses by up to 10%.

Different construction and materials (e.g. polybutadiene, polyurethane, ionomer) are used to create balls with different properties (more spin or more distance).

Hence can optimise performance by selection of equipment to suit individual players (professional or amateur).

SPORTS  
SCENCES



SPORTS  
ENGINEERING

TECHNOLOGY

## SPORTS ENGINEERING

Sports engineering is field of division of engineering that focuses and involves in design, development and testing of sport equipment.

The equipment used by athletes has always gone through technological design and development based on current knowledge and understanding.

In sports engineering, presently focused are

- equipment designing and testing
- computational modeling
- field and lab experimenting & testing and so on.

## TOTAL NUMBER OF SPORT DISCIPLINES IN MAJOR EVENTS

Summer Olympics - 41

Winter Olympics - 17

Common Wealth Games – 22\*

Asian Games - 44

National Games - 33



National Sports Federation under  
Indian Olympic Association - 39

**Sports software helps to increase the performance of an individual player or the team by using the software such as**

- ❖ **Notational analysis software**
- ❖ **Motion analysis software**
- ❖ **Video analysis software**
- ❖ **Biomechanical analysis software**
- ❖ **Sports management software**
- ❖ **Fixtures software, etc.**

## SOFTWARES USED IN SPORTS

Sl. No	Name of the Software	Analysis	Link
1	Quantic Software	Sports Performance & Biomechanical Analysis	<a href="http://www.waquantic.com">http://www.waquantic.com</a>
2	Quantic Ball roll	Biomechanical Analysis	<a href="http://www.waquanticballroll.com/">http://www.waquanticballroll.com/</a>
3	Dartfish	Sports Performance & Biomechanical Analysis	<a href="http://www.wdartfish.com">http://www.wdartfish.com</a>
4	Etic Sports analysis	Sports Performance & Biomechanical Analysis	<a href="http://www.wetic-sports-analysis.com">http://www.wetic-sports-analysis.com</a>
5	Pro Zone	Match analysis software	<a href="http://www.wprozoneports.com">http://www.wprozoneports.com</a>
6	Arial Dynamics	Biomechanical Analysis	<a href="http://www.warialhel.com/">http://www.warialhel.com/</a>
7	Silicon Coach	Performance analysis	<a href="http://www.wsiliconcoach.com">http://www.wsiliconcoach.com</a>
8	The motion monitor	Biomechanical Analysis	<a href="http://www.wmotion.com/">http://www.wmotion.com/</a>
9	Master Coach	Match analysis software	<a href="http://www.wmastercoach.de/">http://www.wmastercoach.de/</a>
10	FootGim Ai	Match analysis software	<a href="http://www.wfootgim.com/">http://www.wfootgim.com/</a>
11	IBM Informatica	Performance analysis	<a href="http://www.winformatica.com/">http://www.winformatica.com/</a>
12	Scan ball	Notational analysis	<a href="http://www.wscanball.com/">http://www.wscanball.com/</a>
13	Match analyzer	Performance analysis	<a href="http://www.wmatchanalyzer.com/">http://www.wmatchanalyzer.com/</a>
14	Match analysis	Notational analysis	<a href="http://matchanalysis.com/">http://matchanalysis.com/</a>
15	Z Sports System Analysis	Notational analysis	<a href="http://www.wz-sport.com/">http://www.wz-sport.com/</a>
16	Sportrac	Performance analysis	<a href="http://sportrac.co.uk/">http://sportrac.co.uk/</a>
17	Digital Soccer	Notational analysis	<a href="http://digital-soccer.net/">http://digital-soccer.net/</a>
18	NAC Sport	Performance analysis	<a href="http://www.wnac-sport.com/en/">http://www.wnac-sport.com/en/</a>
19	Touchline data	Performance analysis	<a href="http://www.wtouchline.co.uk/">http://www.wtouchline.co.uk/</a>
20	Trakus	Performance analysis	<a href="http://www.wtrakus.com/">http://www.wtrakus.com/</a>

# SOFTWARE'S IN SPORTS

Software is basically a set of programme, which is designed to perform a well defined function.

- open or free source software
- paid software

Advantages of software

- Data can be stored and retrieved any time
- its saves time, energy & money
- its more accurate
- calculation is possible and
- user friendly



## Notational analysis systems

- Crickstat
- Rugbystat
- Rugby Maestro
- Squash Maestro
- Hockeystat
- Netballstat
- Baseballstat
- Soccerstat

- Live telecast of the matches, slow motion replays, field restriction, microphone near the wickets, camera at the stumps



- Indian Cricket League (ICL)
- Indian Premier League (IPL)

## TOP 10 TECHNOLOGICAL ADVANCEMENTS THAT CHANGED CRICKET FOREVER

1. Snickometer
2. Hot Spot
3. Hawk Eye (UDSC)
4. Pitch Vision
5. Spider Cam
6. Stump Camera
7. Ball Spin RPM/ Rev Counter
8. Speed Gun
9. Bowling Machine
10. LED Balls



## Use of technology in cricket umpiring

- Gentlemen game
- Pride in fair play
- Spirit of cricket



- ❑ Umpire ultimate authority
- ❑ No one could question the umpire's call.
- ❑ Questioning the umpire was "just not cricket".

But times have changed and so did the game of 'Gentleman'.

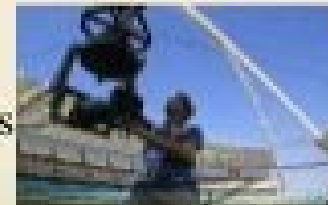
camera started magnifying pictures - mistakes of the umpires, doubts were raised over the accuracy of the umpire debates raged as to why the television eye cannot be used to assist the umpires in being more accurate.

- Decision review system (DRS) – 2009
- slow-motion replays
- super slow-motion replays
- ultra-motion replays
- stump microphone sound (at normal speed and slow motion)
- approved ball-tracking technology
- pitch mat generated by the ball-tracking technology
- hot spot footage

Today 30 to 40 cameras are used



- stump cam
- extreme slow motion cameras
- 3D
- high definition cameras



Due to technological advancement many device / system have come-up to make the game more attractive.

The game of cricket over the years has become extremely professional, with plenty at stake and therefore, the players and the spectators want the decisions to be as accurate as possible.

## •Unique sound system to indicate 'No ball'

- o foot fault
- o fast short high pitched deliveries
- o high full pitched balls
- o wicket keeper infringements
- o fielding restriction in limited over's cricket



Line fault using the line sensor technology as used in tennis for line faults for foot fault no ball and boundary.