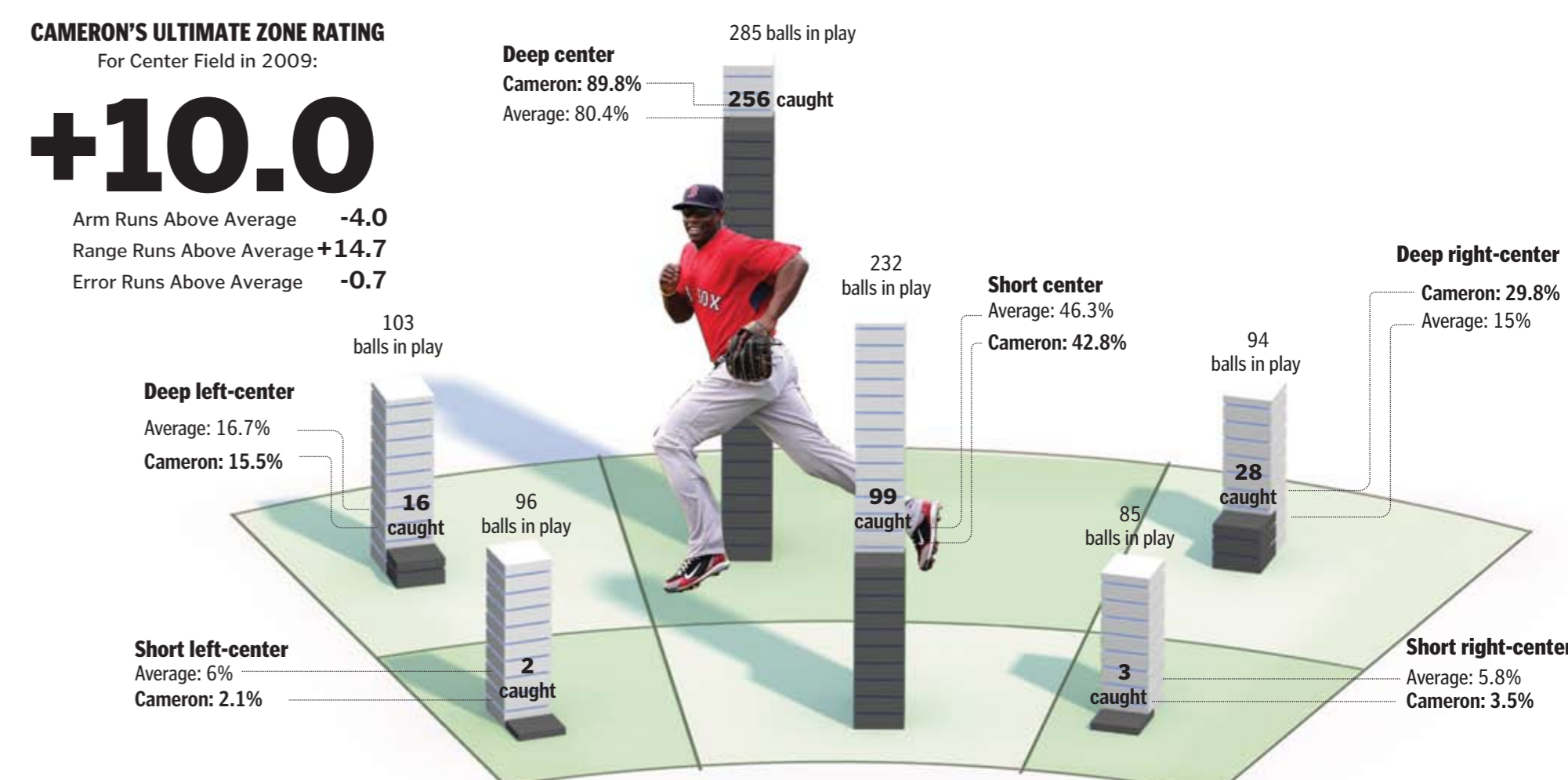
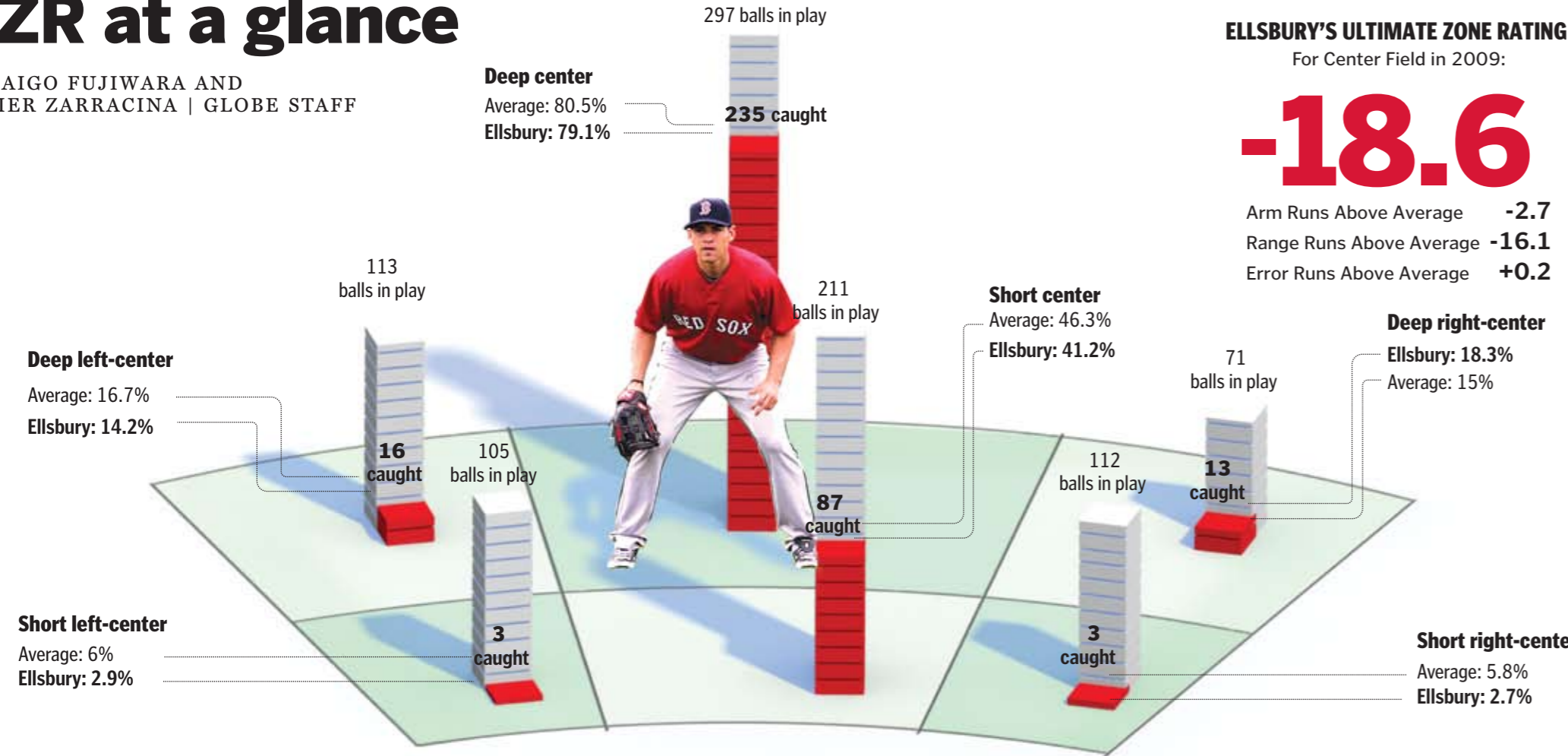


# UZR at a glance

BY DAIGO FUJIWARA AND JAVIER ZARRACINA | GLOBE STAFF



While numbers are used to measure almost every aspect of hitting and pitching, quantifying defensive skills may be one of the last frontiers of baseball statistics.

## ERRORS DON'T TELL THE WHOLE STORY...

Errors have been tracked as a defensive statistic since the beginning of professional baseball, but do not completely reflect the defensive skills of a fielder.

For example, a ball hit out of an infielder's reach is scored a **hit**.

But if a more athletic infielder reaches a ball in the same spot, and fails to field it cleanly, he is charged with an **error**.

## ENTER ULTIMATE ZONE RATING

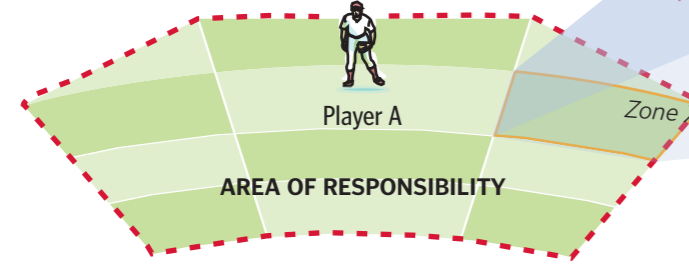
Developed by Mitchel Lichtman, **Ultimate Zone Rating (UZR)** is a value of the number of runs a fielder saves or costs his team, compared to the average player at his position.

An average defensive player's UZR is zero. Positive numbers show the player fields his position better than average, while a worse-than-average player earns a negative number.

Here is how a UZR is calculated:

### 1. Zones

An area of responsibility is assigned to each position. The area is further divided into zones. Every ball in play is assigned to a zone.



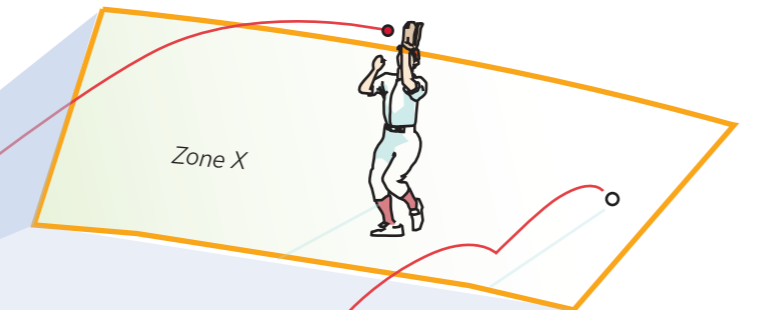
### 2. Out conversion rate

The number of outs made in each zone by a fielder is divided by all the balls hit in that zone.

20 balls were hit to Zone X. Player A turns 15 of them into outs.



Out conversion rate:  
 $15/20 = .750$



### 3. Determine baseline

The out conversion rate is calculated for Zone X for every player in every major league park.

500 balls were hit to Zone X league-wide, resulting in 333 outs. Zone X's league-wide out conversion rate:  
 $333/500 = .666$

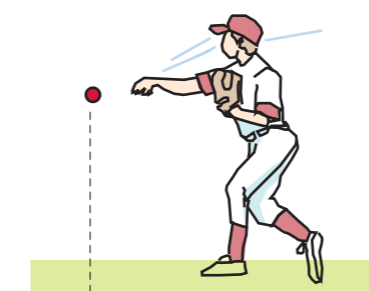
### 4. Compare

The major league average is subtracted from Player A's result.

$$.750 - .666 = +.084$$

### 5. Extra outs

The difference between Player A's out conversion rate and the league's is multiplied by the number of balls hit to Player A in Zone X.



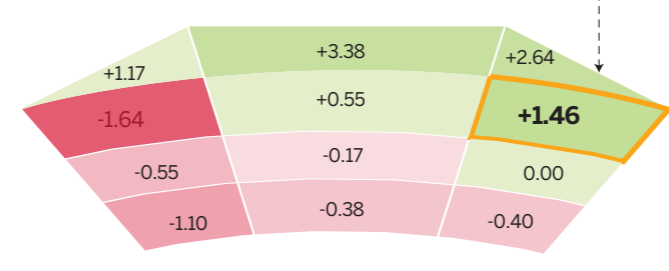
$$+.084 \times 20 = +1.68$$

### 6. Convert to runs

Hits and outs to each zone are assigned a run value. As an example, hits in Zone X are worth 0.59 runs and outs are worth -0.28 runs.

Each extra out saves  $0.59 - (-0.28) = 0.87$  runs. Multiply Player A's extra outs by the run value of each hit.

$$+1.68 \times 0.87 = +1.46$$



### 7. Add the zones

The runs saved or cost for all zones in Player A's area are added for Player A's total.

$$+1.46 + 3.50 = +4.96$$

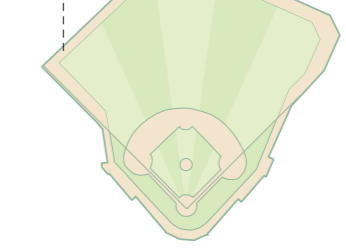
### 8. Adjusting for situations

The ballpark's shape, the number of outs and runners, pitchers' tendencies, and the speed of the batted ball are examples of factors that are used to adjust the runs number.

Adjusted number for Player A:

$$+4.96 + 0.24 = +5.20$$

Fenway Park is one of the trickiest fields to adjust for because of the Green Monster.



### 9. Errors

An error rate, which is compared to the other fielders playing the same position, is converted to runs.

Player A made fewer errors than average, saving his team another 0.4 runs

$$+5.20 + 0.4 = +5.60$$



### 10. Extra plays

Double plays by infielders and assists by outfielders are likewise converted to runs.

Player A's outfield assists were below average, costing his team 1.4 runs

$$+5.60 - 1.90 = +3.7$$

