



Astronomy

The Scale of Our Galaxy

Narrator

But despite this wealth of data, despite radio and infra-red, despite pictures to drool over, there still remains a problem.

Adriaan Blaauw, New Leiden Observatory and the Kapteyn Institute

One thing that we have been pretty uncertain about is the scale of our galaxy. Let us say we do know that the centre of the galaxy is perhaps 8,000 parsecs away from the Sun, but perhaps it's 6,000 or perhaps it is 10,000. We want to do better, and now you ask what are the means we have to measure distances in the galaxy?

Narrator

Our image of the sky from one side of the Sun is slightly different to that from the other side. Stars closer to us should seem to move with respect to more distant objects but because even nearby stars are so far away, this shift hugely exaggerated here, is very difficult to observe from the Earth because of atmospheric effects, but freed from the Earth a satellite could perhaps be used to determine the distances to the stars more accurately than could ever previously have been dreamed possible. Over a four year mission through the 1990's a satellite called *Hipparcos* has accurately measured the positions and distances of more than a hundred thousand stars. It's a tiny fraction of the hundred thousand million stars in the entire Milky Way, but it's an important fraction for they are our Sun's closest neighbours.

Gerry Gilmore, Institute of Astronomy, Cambridge University

Hipparcos is remarkable, it's revolutionising all our understanding of our local watering hole, and much beyond. It's allowing us for the first time to be sure how old things are, where they are, and then we can go on from there to find out why they are.

Adriaan Blaauw, New Leiden Observatory and the Kapteyn Institute

And here you see the importance of the *Hipparcos* satellite. It has measured the distances again of a large number of these valuable stars so we now have the distance scale within the galaxy and outside the galaxy, we have now fixed it, we have put it on a firm base.

Narrator

Hipparcos has created a new 3-D world of the skies, a true route map to the stars but, incredibly, astronomers are already putting forward plans to go one better, a sort of *Hipparcos* 2, tentatively named *Gaia*. With an accuracy one hundred times better than even *Hipparcos*, the new satellite would measure the distances and motions of nearly a billion stars throughout the entire Milky Way.

Adriaan Blaauw, New Leiden Observatory and the Kapteyn Institute

Whereas we now have from *Hipparcos* 120,000 stars we will have comparable or even better data from millions and millions of stars.