Tracker Guide

An introduction to using Tracker software for analysis of video clips

UK Space Agency

The UK Space Agency is at the heart of UK efforts to explore and benefit from space. It is responsible for all strategic decisions on the UK civil space programme and provides a clear, single voice for UK space ambitions.

The Agency is responsible for ensuring that the UK retains and grows a strategic capability in the space-based systems, technologies, science and applications. It leads the UK's civil space programme in order to win sustainable economic growth, secure new scientific knowledge and provide benefits to all citizens.

ESA

From the beginnings of the 'space age', Europe has been actively involved in spaceflight. Today it launches satellites for Earth observation, navigation, telecommunications and astronomy, sends probes to the far reaches of the Solar System, and cooperates in the human exploration of space.

Space is a key asset for Europe, providing essential information needed by decision-makers to respond to global challenges. Space provides indispensable technologies and services, and increases our understanding of our planet and the Universe. Since 1975, the European Space Agency (ESA) has been shaping the development of this space capability.

By pooling the resources of 22 Member States, ESA undertakes programmes and activities far beyond the scope of any single European country, developing the launchers, spacecraft and ground facilities needed to keep Europe at the forefront of global space activities.

National Space Academy

Established in 2011 and led by the National Space Centre, the National Space Academy is now the UK's largest space education and skills development programme for secondary and further education. Its team includes some of the country's best science teachers, project scientists and engineers who deliver masterclasses and intensive teacher training for thousands of students and teachers across the UK every year. Internationally the Academy works extensively with the European Space Agency, the UAE Space Agency, and it also leads the UK's ongoing space education and skills development work with China.

Astro Academy Principia

A unique education programme developed by the UK's National Space Academy for the UK Space Agency and ESA (European Space Agency), Astro Academy: Principia uses a suite of demonstrations filmed by ESA astronaut Tim Peake aboard the ISS during his six month Principia mission to explore topics from secondary physics and chemistry curricula. The programme is made up of stand-alone teaching films, downloadable video clips, downloadable files that can be used with the free-to-use dynamical analysis software programme "Tracker", written teacher guides and links to more than 30 further teaching activities.

Principia

Tim's mission to the International Space Station, called 'Principia', used the unique environment of space to run experiments as well as try out new technologies for future human exploration missions. Tim was the first British ESA astronaut to visit the Space Station where he spent six months as part of the international crew.

Using Tracker Software to Analyse the Videos

Included in these teacher resources are Tracker (.trk) files and their associated videos that will allow you to display information such as displacement-time graphs for Tim's experiments using a free piece of software called Tracker.

This guide is not a full guide on how to use Tracker (a good comprehensive guide can be found here) but rather a quick guide on how to load up the tracker files and visually interrogate the data.

1) Download Tracker software

Tracker can be downloaded for us on Windows, Mac and Linux devices. Please go to http://physlets.org/tracker/ and select your download option from the top of the page.

2) Opening a Tracker file

The Tracker files are packaged up with their associated video. It is important that these two files remain in the same folder, and that the name of the video is NEVER changed, since it needs to be recognised by the Tracker software.

Notice how the associated video is kept with each Tracker file. When you double click on the file, the Tracker program will open, load the video and the associated data points (which have already been added to allow you to analyse the videos). NOTE: some of the files can take a long time to load, depending on the size of the video.
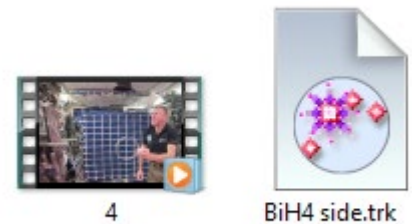
Once the file opens you will see a screen like the one below. The ball in the hoop has already been tracked – a frame by frame placement of a common point will allow the program to display data graphically. The files are set up to show one particular graph, but you can alter what is shown yourself.
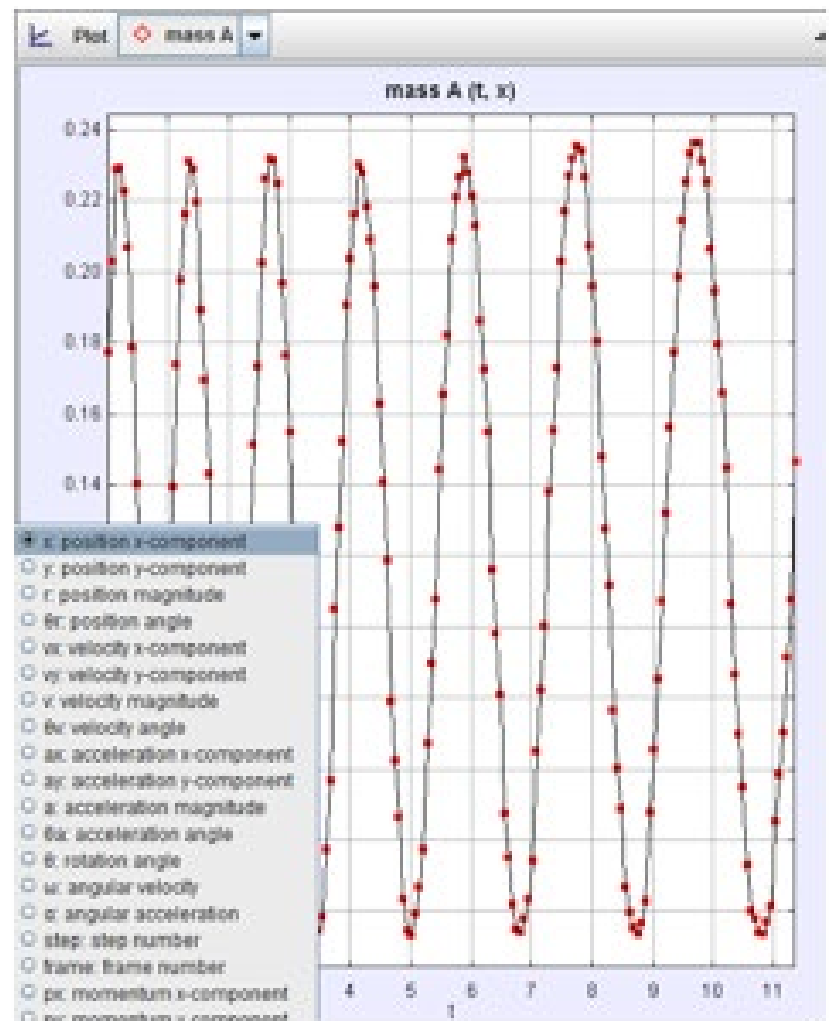
3) Changing what the graph displays

a) Which object to track:

Above the graph there is a drop
down menu that allows you
to select which (in the case of
multiple objects being tracked)
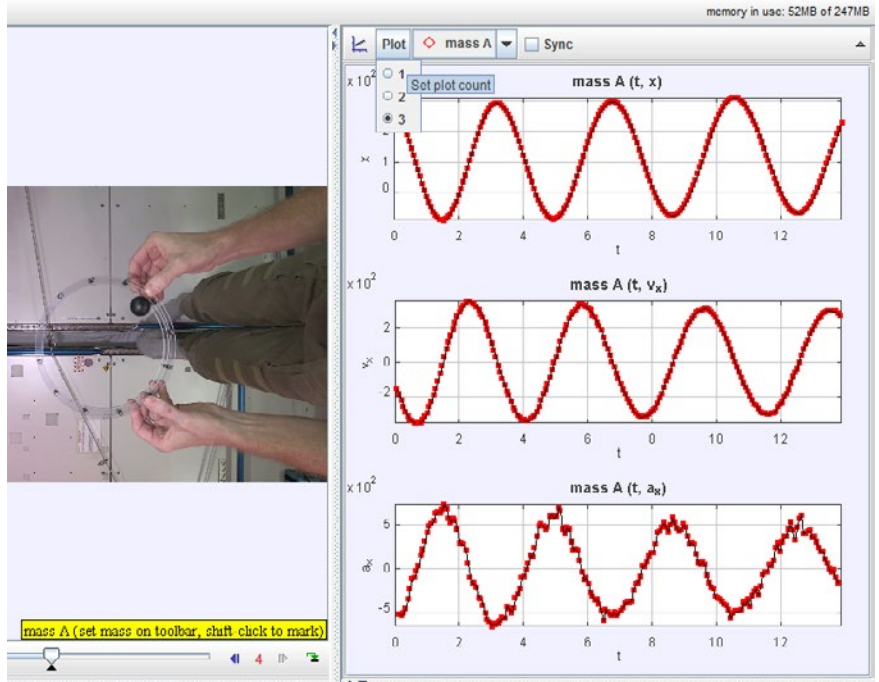object you want to display
data for.
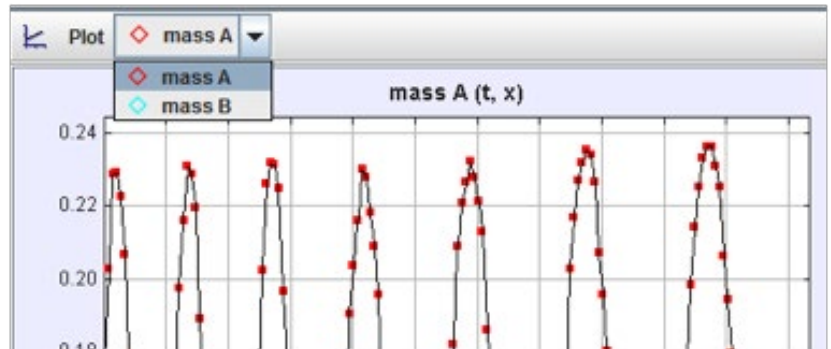
b) Changing the axes:

You can change what you want the
axes to show by clicking on the axis
label and selecting the value
of your choice from the menu.

c) Plotting multiple graphs to compare values:

To display two or even three graphs at the same time of different values, click on plot, select the number of graphs you wish to show, and then click on the values as before to change what each graph plots.

d) Comparing data from two bodies on the same graph – for example the two masses on the end of the oscillating spring:

To compare two objects, set up the graph to display the value you want, then right click in the graph area. From the menu select compare with, and select the object you want to plot on the same graph.