

## ***J65 - Celbridge Observatory***

I've been an amateur astronomer since I was old enough to look up to the skies. All my years of stargazing were rewarded recently when I received an observatory code from the International Astronomical Union Minor Planet Center (IAU MPC). Luckily enough the observatory code was much shorter – J65.

As of spring 2006, there are just over 1200 recognised observatories worldwide. Prior to 2006, there were two coded observatories in Ireland – Armagh (981) and Dunsink (982). I'm especially delighted as J65 is the first amateur observatory in Ireland.

### ***Journey's Start***

Having recently acquired the financial ability to invest in my lifelong hobby, I made a key decision that my primary goal was to try and provide 'real' science data that would make a difference. I set about doing the research and quickly discovered that astrometry was well within my reach and was an important source of data for professionals.

Astrometry is the precise measurement of the position and motion of astronomical objects. Recent astrometric measurements of the moons of Pluto have helped the New Horizons mission plan the correct movement of the probe. Of wider public concern have been measurements predicting the close approach of asteroids with Earth. Luckily, refined data shows the risk of known object impacts with Earth is pretty much zero. But then there are lots of unknown objects out there...

### ***Equipment***

I decided that if I was going to carry out astrometric measurements, I would need a high standard of equipment to give good science data. It was clear that the major initial investment was going to be the mount. It had to be capable of carrying a heavy payload, slew this equipment around the sky easily and track objects accurately. I eventually decided on the Astro-Physics 1200 GTO mount. It fulfilled all my criteria and luckily there was a two-year waiting list that gave me plenty of time to save up.

I invested in a cheap CCD camera when the mount arrived in 2005. I started to learn how to image celestial objects which, like anything else in this hobby, is not as easy as it seems. For example, my idea of 'accurate polar alignment' was way short of that required for unguided imaging and I had to learn how to drift align. That in turn involved learning how to use a suite of fairly complex software programmes... Needless to say, it took me about a year to get my skills to a level where I could confidently image faint stars and galaxies such that looked like, well, faint stars and galaxies.



### ***The Minor Planet Center***

The next step was more an accident than a goal. I had started to research asteroids and came across the Minor Planet Center web site. Here I learned how to generate ephemerides for asteroids I was interested in. One of the fields you complete is your location – you can type in your co-ordinates or simply your observatory code. Typing in latitude and longitude values every time I wanted to generate an ephemeris was becoming tedious. So I had a look around the MPC website and came across the method for obtaining an observatory code.

Essentially, you observe a minimum of two (preferably three) asteroids over a number of nights. You then analyse the images and determine the location of your chosen object. The data is collated into the form required by the MPC and sent to them by email along with the geographical location of your setup. The MPC reviews the observations and provided they meet their criteria, you are issued an observatory code for that specific location.

### ***The Plan***

So, now I had method sorted, it was time to get a plan in place. It wasn't too difficult to find six targets of varying magnitudes within my imaging capability. Also, they were reasonably far apart and were sufficiently high up in the sky. I chose six to make sure that if I had to cut the run short because of weather, I would hopefully still have three targets imaged.

The next available clear night, I put the plan into operation. I set up the scope and found the first target. I took a few images that I quickly analysed to make sure the target was present, and when satisfied, I moved onto the next target.

At the end of the evening I managed to image all six targets. I then 'plate solved' the images. This is matching your image to the known star field and then determining exactly where the target is located - this is done with software.

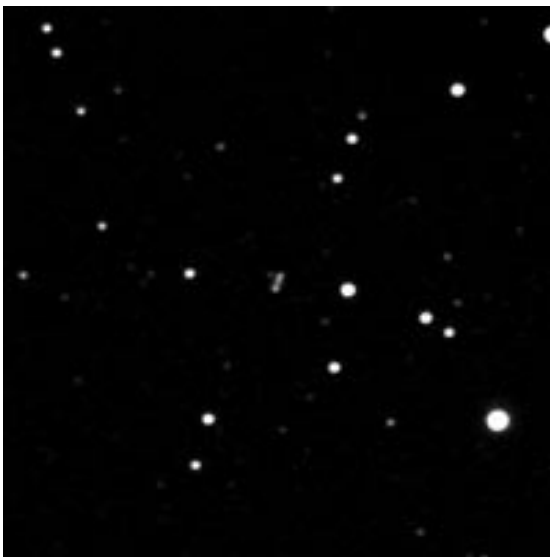
The next clear evening was some days away but the MPC do not required your observing nights to be consecutive – lucky for us in Ireland. When the skies eventually cleared, I repeated the previous exercise but the weather wasn't being

very cooperative. The process took a lot longer this time because of sporadic cloud. Eventually, I had sufficient images of reasonable quality.

Once solved, I found that only four targets out of the six were of sufficient quality. I set about formatting the data and checking it against MPC ephemerides (just to make sure).

Eventually I had the data ready to go, but now I had to follow the MPC format. This was trickier than I thought. I sought the advice of the Minor Planet bulletin board members and with a lot of help, eventually had the data in the correct format – well, pretty much.

Before hitting the send button though, I checked the data one more time and then, closing my eyes and crossing my fingers, sent the mail to the MPC.



One of the targets - MPL 1888

### ***Journey's End***

I was told that I might have to wait more than a week to hear anything back. To say I was surprised when I got a reply an hour later was an understatement. Even more of a surprise was that the MPC had issued me with an observatory code.

Well, I was absolutely delighted as you can imagine. J65 Celbridge Observatory was now officially recognised. As an added bonus, I was informed by the MPC a few hours later that this was the first Irish Amateur observatory to be recognised.

Since receiving the observatory code, I have continued to carry out astrometric measurements as often as the weather permits. Obtaining clear images of sufficient quality to permit accurate astrometric data is not as easy as it might sound. However, by choosing targets carefully meaningful data can be obtained. Choosing objects of sufficient brightness and high enough in the sky are the key parameters.

### ***Next Steps***

I would hope that 2006 will bring me closer to my goal of photometry. As well as purchasing the imaging and filter equipment, I also need to choose a new OTA. But like anything else, there will need to be compromises since the equipment is quite expensive. Certainly the imager is probably the most important item at the moment so the OTA may have to wait until 2007. I would hope to eventually land a 14" or 16" aperture OTA to enable me to choose the dimmer objects and go deeper than my current setup allows.

### ***Can you do it?***

There are many amateurs in Ireland now who have a keen desire to image the night sky. Some are content to produce images they can share with the community and their friends. There are a smaller number of amateurs who are keen to do real science with their equipment. In order to take part, whilst an observatory code is not a requisite, it is certainly a benefit in allowing external authorities ratify the quality of your data.

Some amateurs might feel that they cannot achieve this objective. My advice would be that you don't know until you try – give it a go.

**Dave McDonald**  
**J65 – Celbridge Observatory**  
[www.astroshack.net](http://www.astroshack.net)  
[dmc dona@eircom.net](mailto:dmc dona@eircom.net)