Surveying the BMX-I dish using photogrammetry

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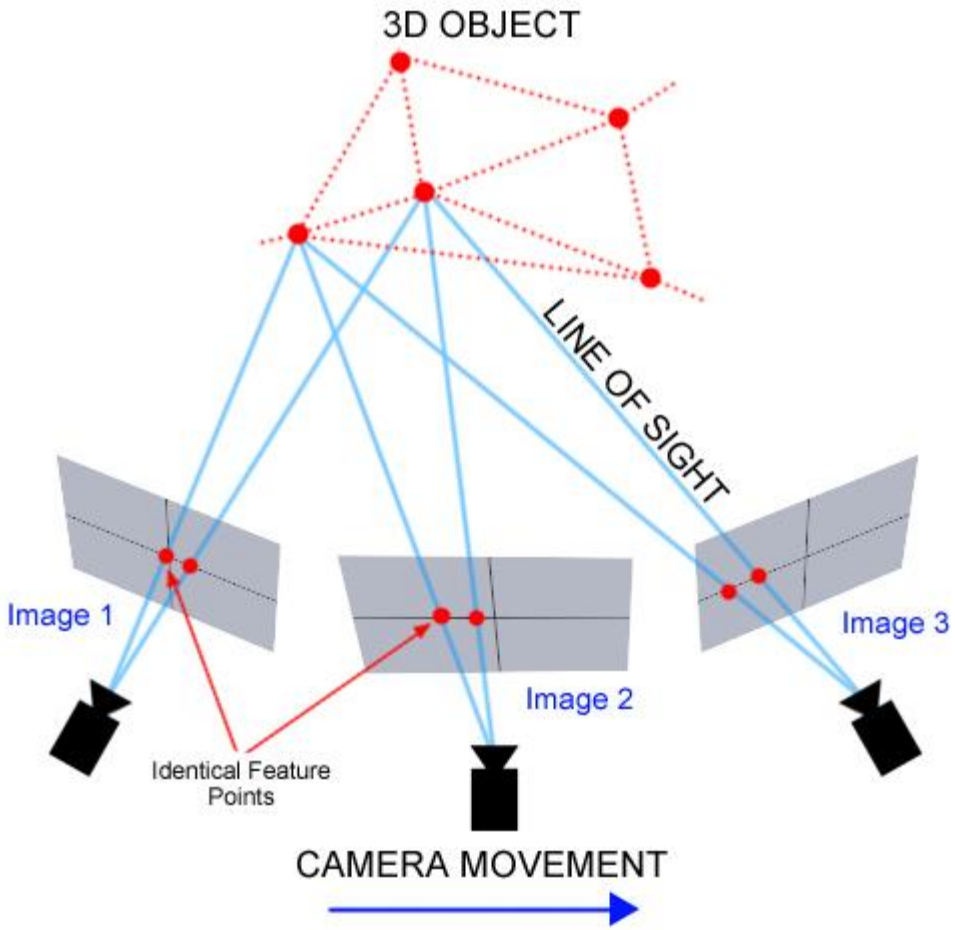
Photogrammetry is the use of photography in surveying and mapping to measure distances between objects.

Take various photos at a fixed radial distance (in all directions) around the dish

Allows us to create a 3D model of the dish to be observed in a CAD program

Has some pretty intense applications.



The software to create model: Agisoft PhotoScan

1. Take the set of photos
2. Import to PhotoScan
3. Align the photos through triangulation
4. Generate point cloud
5. Generate dense point cloud
6. Create mesh
7. Create texture

PhotoScan Cost

Currently running 30 day free trial of pro version

License Type	Professional Edition	Standard Edition
Stand-Alone	$3,499	$179
Educational	$549	$59

Caveat: Educational license prohibits all commercial uses of the software.

The difficulties with this method

- High accuracy for model requires excessively long render time
- Photogrammetry software has problems with smooth, reflective, transparent and symmetrical objects
- Requires even lighting
- Solutions:
  - Align photos by hand
  - Place targets on dish
  - Cover dish in various colors of tape
  - Put dish in front of a green screen to eliminate background
    - Or, mask each photo by hand in PhotoShop
  - Keep camera on fixed position and rotate dish - by hand or by rotating plate

The software to interpret model: Rhinoceros 3D

A commercial 3D computer graphics and CAD application software.

Rhinoceros geometry is based on the NURBS mathematical model.

Non-uniform rational Basis-spline focuses on producing mathematically precise representation of curves and freeform surfaces in computer graphics (as opposed to polygon mesh-based applications).

Rhino 3D Version 5 Cost

Currently running 90 day free trial.

Mac	$495
Windows	$995

Is it a method worth pursuing?

Probably our best bet.

More details to come.