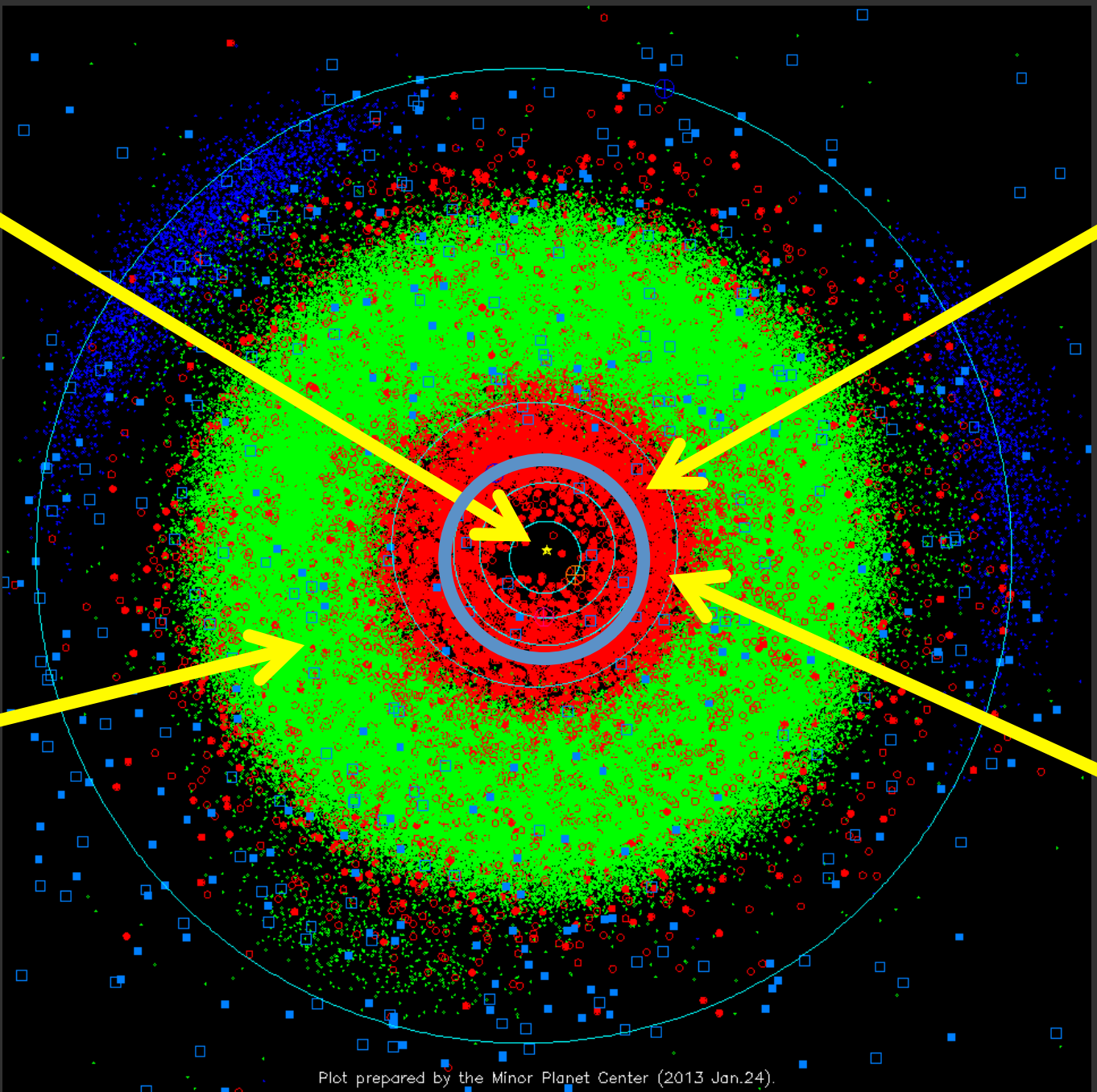


# **Rapid response ARTN observations of Near Earth Objects**

David E. Trilling  
Northern Arizona University

# What is a Near Earth Object?

Earth's orbit    Near Earth asteroids



Sun

Main belt asteroids

Plot prepared by the Minor Planet Center (2013 Jan.24).

# What do we want to know?

- Orbit
- Size
- Shape
- Composition
- Rotation state
- Other physical properties (binary? Etc.)

# Why do we want to know?

- Science:
  - Nearest neighbors in the Solar System
  - Source regions somewhere else
- Planetary defense

# Discovery properties (2018)

- About 2000 NEOs discovered in 2017
- Mostly  $V < 21$
- Mostly in the northern hemisphere

## Important:

- Can fade fast – day(s)
- Orbits uncertain (object lost) if not recovered

# Robotic telescope needs (2018)

- 1 Astrometry  $V < 21$  (or 22)  
wide field (1 deg), clear or VR filter
- 2 Photometry/colors  $V < 21$  (or 22)  
medium field (10 arcmin), standard filters
- 3 Photometry for lightcurves  $V < 21$  (or 22)  
medium field (10 arcmin), clear or VR filter
- 4 Spectroscopy  $V < 21$  (or 22)  
R of 50-100 is plenty
- 5 Rapid response: Hours/day/days

# Robotic telescope needs (2022)

All the same, but at  $V < 24$  in the south [LSST]



# Robotic telescope needs (2018)

- 1 Astrometry  $V < 21$  (or 22)  
wide field (1 deg), clear or VR filter
- 2 Photometry/colors  $V < 21$  (or 22)  
medium field (10 arcmin), standard filters
- 3 Photometry for lightcurves  $V < 21$  (or 22)  
medium field (10 arcmin), clear or VR filter
- 4 Spectroscopy  $V < 21$  (or 22)  
R of 50-100 is plenty
- 5 Rapid response: Hours/day/days