

# A Facility for Communication: A New Website for the International Asteroid Warning Network

A Report to the IAWN Steering Committee

Gerbs (James) Bauer, UMD


With significant contributions by E. Warner, T. Farnham, T.  
Spahr, and NASA PDCO

# IAWN Website at UMD

- UMD is the home of the NASA Planetary Data System's Small Bodies Node – responsible for data concerning Asteroids and Comets.
- As of January, 2017, UMD began oversight of the Minor Planet Center as a sub-node of the SBN. Regular, unfettered communications with the MPC and quality assurance are key factors of this relationship.
- NEO Sciences LLC CEO, Tim Spahr, a founding member of the IAWN Steering Committee now also has a sub-award with the SBN to help in overseeing the MPC and in managing the IAWN activity.
- The SBN already participates in worldwide distribution of data and international agreements with, for example, ESA and its PSA.
- UMD has experience organizing data collection and distribution for worldwide observing campaigns, including observations of C/2013 A1 Siding Spring, the Mars close-approaching comet, the upcoming close approach of comet 46P/Wirtanen, and recently the October 12, 2017 close approach of 2012 TC4, in part for IAWN.

2012tc4.astro.umd.edu

PSAA - The SBN PDS4 Wiki OPUS - Data ...S Rings Node Apple iCloud Yahoo Bing Google Wikipedia Twitter LinkedIn The Weather Channel



# The 2012 TC4 Observing Campaign

**Campaign Home page**

- Current Status
- 2017 Apparition
- Physical Properties
- Observations
- Orbit
- Observing Geometry
- History
- Media
- Gallery
- Project

**RELATED LINKS**

- Planetary Defense Coordination Office
- NASA PDS: Small Bodies Node
- Minor Planet Center (MPC)
- International Asteroid Warning Network
- Center for Near Earth Object Studies

**OBSERVING CAMPAIGNS**

- The Comet Wirtanen Campaign
- 4P Coma Morphology Campaign
- Amateur Observers Program

**Contact Us**

## Introduction

Welcome to the website for the 2012 TC4 Observing Campaign. Our intention is to provide a central clearinghouse for basic information about the near Earth asteroid 2012 TC4 and about the observations that will be obtained during its upcoming apparition.

This site will contain background information about 2012 TC4, a list of observations that are planned/scheduled/obtained, and status reports on the events leading up to the close approach. We will also produce an email list where updates can be broadcast to subscribers.

### What is special about 2012 TC4?

**2012 TC4 is a near-Earth asteroid discovered in 2012**  
It has the potential to get very close to the Earth. There is significant interest in observing it this fall to improve its orbit so that future Earth encounters can be investigated.

**2012 TC4 makes a very close approach to the Earth this fall**  
On 12 Oct 2017, it will pass within the orbit of the Moon. At closest approach, it will be ~50,000 km from Earth.

**Observing conditions vary through the encounter**  
During its approach to the Earth, the observing conditions are good (near opposition for ~2 months, with Earth-facing surface mostly illuminated). After passing the Earth, however, it will be difficult to observe (small solar elongation, with most of the Earth-facing surface in shadow).

### NASA Bulletins

[2012 TC4 NASA Notification - Recovery - Exercise](#)

[2012 TC4 NASA Notification - Close Approach in 2 Weeks - Exercise](#)

### Updates & News

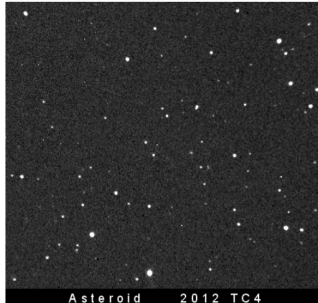
2017.10.16: **New orbit solution precludes any Earth impact for the next 100 years.** Orbit solution JPL#56, which included radar astrometry and close encounter optical data, has ruled out any impact with the Earth in the next 100 years. As of 16 Oct 2017, 2012 TC4 has been removed from the Sentry: Impact Monitoring List.

2017.10.13: **lots of updates!** [Properties](#), [new images](#) and [movies](#),...

2017.10.11: **Two movies showing 2012 TC4 moving across the sky have been obtained.** In both movies, the asteroid can be seen getting brighter and fainter, exhibiting its rapid rotation rate.

One was obtained by Ryou Ohsawa and collaborators at the Kiso observatory in Japan on Oct. 10 and 11, using a newly developed CMOS camera. It is available [here](#).

The other is seen here, or enlarged on the [Gallery Page](#).



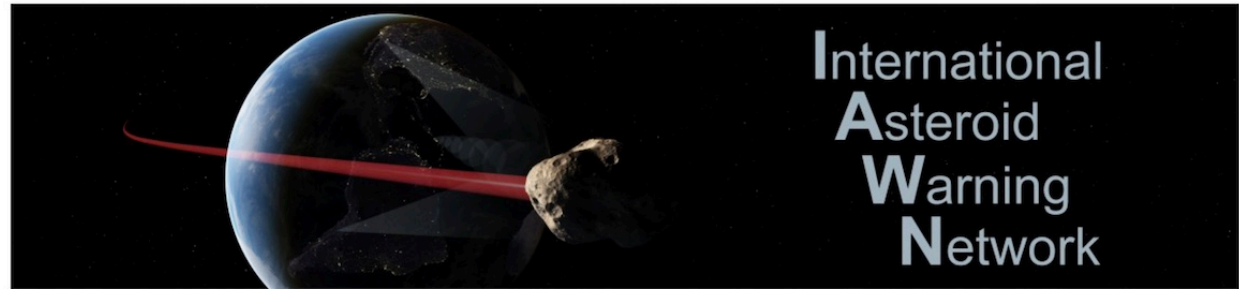
Astronomical image showing the asteroid 2012 TC4 moving across a field of stars. The asteroid appears as a bright, elongated object with a distinct trail, indicating its rapid motion across the sky. The background is filled with numerous smaller, point-like stars.

**Details:** 2012 TC4 moving across the sky on Oct 11, 2017

**Credit:** Alberto Quijano Vodniza and Mario Rojas Pereira, University of Narino Observatory, Colombia

# Current IAWN Page

- Initial effort provides much of the critical content
- **However**, Free-flowing format, blog-like, lacks prioritization.
- Items sometimes difficult to find.



## Asteroid 2018 BF3 close approach



January 23, 2018

[Close approaches](#)

[Leave a comment](#)

Asteroid designation: 2018 BF3  
Discovery station: Catalina Sky Survey  
Close approach date (UTC): 2018 01 19.13  
Close approach distance ( $\times$  lunar distance): 0.63  
[Discovery announcement](#)  
[Latest orbit & observations](#)

## Asteroid 2018 BR1 close approach



January 20, 2018

[Close approaches](#)

[Leave a comment](#)

Asteroid designation: 2018 BR1  
Discovery station: Catalina Sky Survey  
Close approach date (UTC): 2018 01 16.56  
Close approach distance ( $\times$  lunar distance): 0.34  
[Discovery announcement](#)  
[Latest orbit & observations](#)

## Asteroid 2018 BX close approach

Search ...

### RECENT POSTS

- [Asteroid 2018 BF3 close approach](#)
- [Asteroid 2018 BR1 close approach](#)
- [Asteroid 2018 BX close approach](#)
- [Asteroid 2018 BW close approach](#)
- [Asteroid 2018 BD close approach](#)

### RECENT COMMENTS

- [Current List of IAWN Signatories – International Asteroid Warning Network on Statement of Intent](#)

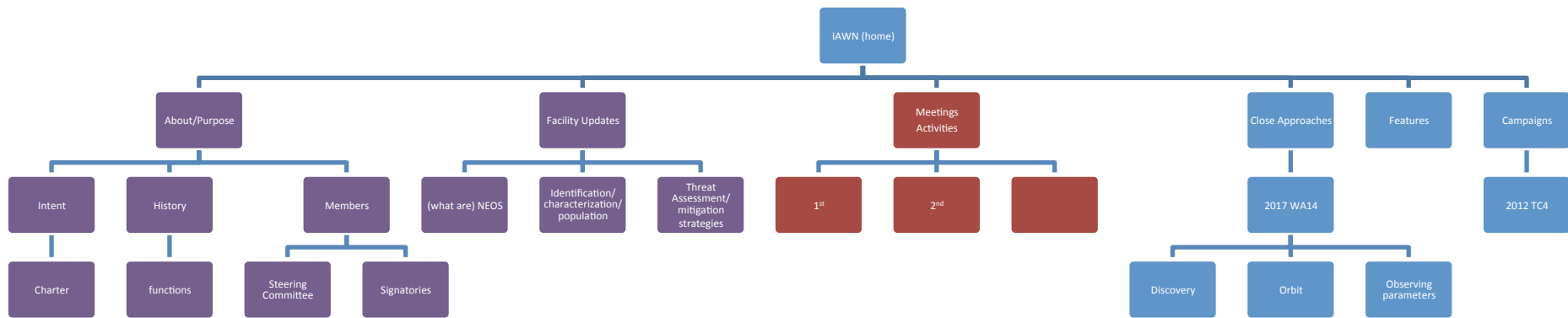
### ARCHIVES

- [January 2018](#)
- [December 2017](#)
- [November 2017](#)
- [October 2017](#)
- [September 2017](#)

# Changes in Website Organization

- More compartmentalized – Landing pages should provide user with a path to the information they are seeking.
- NEO community resource.
- Also serves a resource for IAWN members in providing “Uniform and timely announcement(s) of discovery/designation of new PHAs (“Astronomers discover new potentially hazardous asteroid”): when discovered, by whom, what’s known, what’s not, next opportunity to observe. ... with consistent definitions” (Levels 1-3 – c.f. Billings 2015)

# Notional Top-down Structure



1 to 3 clicks to get to the desired information

IAWN.net -> umd

# Mock-up of New Website:

<http://www.astro.umd.edu/openhouse/TEST/index.shtml>

PSAA - The SBN PDS4 Wiki OPUS - Data ...S Rings Node Apple iCloud Yahoo Bing Google Wikipedia Twitter LinkedIn The Weather Channel

## International Asteroid Warning Network

[Home](#)  
[ABOUT](#)  
[FEATURES](#)  
[TECHNICAL](#)  
[MEETINGS](#)  
[CLOSE APPROACHES](#)  
[CAMPAIGNS](#)  
[GALLERY](#)  
[FAQs](#)  
[Links](#)  
[Contacts](#)

### Our Mission

IAWN was established (2013) to create an international group of organizations involved in detecting, tracking, and characterizing NEOs. The IAWN is tasked with developing a strategy using well-defined communication plans and protocols to assist Governments in the analysis of asteroid impact consequences and in the planning of mitigation responses.

Currently, IAWN includes members from Europe, Asia, South and North America.

[Read more](#)

### FYI...


#### Case Study of 2017 YZ1

On December 20, 2017, observer D. C. Fuls of the Catalina Sky Survey discovered a new Near-Earth Asteroid drifting southward in the constellation of Sextans. Over the next few days, the object was observed by other worldwide observing facilities such that an orbit could be calculated. The Minor Planet Center announced the object on M.P.E.C 2017-Y79 and designated the object 2017 YZ1.

[Read more](#)

### ASSET UPDATE

#### Upgraded CCD detector for Mount Lemmon Survey telescope



The most important capability upgrade in 2016 was the installation of a monolithic 10K X 10K CCD for The Catalina Sky Survey's Mount Lemmon (observatory code G96) 1.5m reflector. This new detector allowed for approximately 5 times the area coverage as the previous camera, and the results were impressive. G96 had more than a 100% increase in discoveries over the previous year. This increase is almost entirely responsible for the 20% increase in discoveries from the previous year.

[Read more](#)

### Recent Close Approach

Asteroid designation: 2018 BF3  
Discovery station: Catalina Sky Survey  
Close approach date (UTC): 2018 01 19.13  
Close approach distance ( $\times$  lunar distance): 0.63  
[Discovery announcement](#)  
[Latest orbit & observations](#)

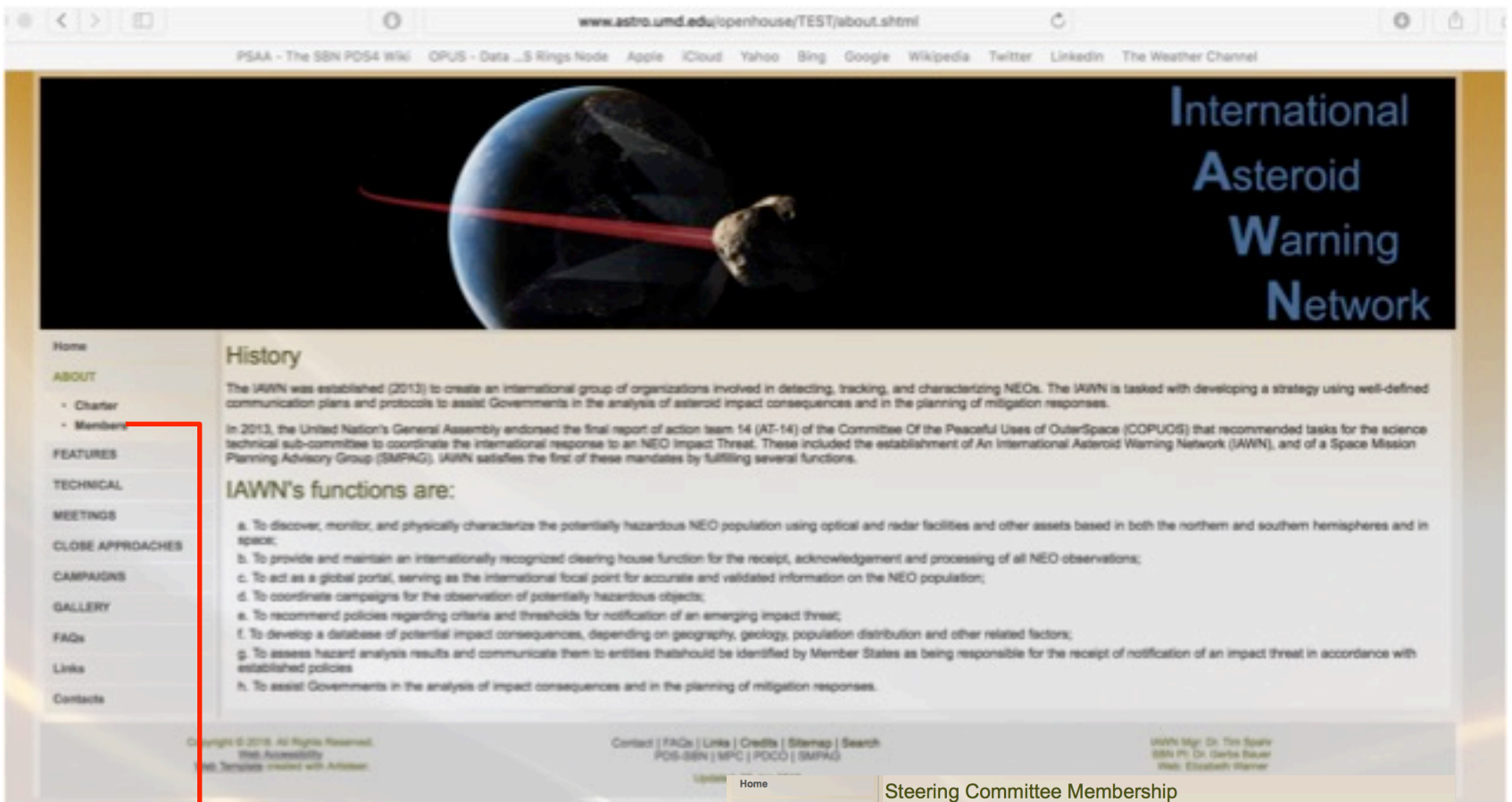
[Read more](#)

Copyright © 2018. All Rights Reserved.  
Web Accessibility  
Web Template created with Artisteer.

Contact | [FAQs](#) | [Links](#) | [Credits](#) | [Sitemap](#) | [Search](#)  
PDS-SBN | MPC | PDCO | SMPAG

IAWN Mgr: Dr. Tim Spahr  
SBN PI: Dr. Gerbs Bauer  
Web: Elizabeth Warner

Updated: 26-Jan-2018



# IAWN History/ Membership

- Home
- ABOUT
  - Charter
  - **Members**
- FEATURES
- TECHNICAL
- MEETINGS
- CLOSE APPROACHES
- CAMPAIGNS
- GALLERY
- FAQs
- Links
- Contacts

### Steering Committee Membership

- Sergio Camacho (UNCOPUOS)
- Lindley Johnson (NASA Hq)
- Boris Shustov (INASAN)
- Giovanni Valsecchi (INAF-IAPS/NEODyS)
- Patrick Michel (Observatoire de la Côte d'Azur)
- Alan Harris (DLR)
- Detlef Koschny (ESA/ESTEC)
- Paul Chodas (JPL)

### IAWN Signatories and their capabilities

Below are the current signatories of the IAWN Statement of Intent.

- Peter Birtwhistle, West Berkshire, England:
- CNSA (Chinese National Space Administration): CNSA statement
- CrAO (Crimean Astrophysical Observatory, Russian Academy of Sciences): CrAO statement
- ESA (European Space Agency): ESA statement
- ESO (European Southern Observatory): ESO statement
- INAOE (the National Institute of Astrophysics, Optics, and Electronics in Cholula, Mexico): INAOE statement
- INASAN (the Institute of Astronomy, Russian Academy of Sciences): INASAN statement
- ISTP (Institute of Solar-Terrestrial Physics, Russian Academy of Sciences): ISTP statement
- KAO UrFU (Kourovka Astronomical Observatory of the Ural Federal University): KAO UrFU statement
- KASI (Korean Astronomy Space Science Institute, Daejeon, South Korea): KASI statement
- SAO RAS (Special Astrophysical Observatory of the Russian Academy of Sciences): SAO RAS statement
- NASA (National Aeronautics and Space Administration, United States): USA statement
- University of Narino, Pasto, Colombia:

Readers will note a broad range of expertise among the signatories, from amateur astronomers providing follow-up on Intent a look, and contact us if you are currently participating in NEO-related activities and interested in signing.



Home  
ABOUT  
FEATURES  
TECHNICAL  
MEETINGS  
CLOSE APPROACHES  
CAMPAIGNS  
GALLERY  
FAQs  
Links  
Contacts

## Assets

### Upgraded IAWN Capabilities – Telescopes & Web Sites

In the past several months, some significant upgrades in capability have taken place. We take this opportunity to present details on these upgrades here, as well as their effect. These upgrades have allowed a large increase in discoveries of NEOs over the previous year. With a couple further immediate upgrades in capability, we expect another surge in discoveries when we compute annual tallies in about a year.

### Upgraded CCD detector for Mount Lemmon Survey telescope

The most important capability upgrade in 2016 was the installation of a monolithic 10K X 10K CCD for The Catalina Sky Survey's Mount Lemmon (observatory code G96) 1.5m reflector. This new detector allowed for approximately 5 times the area coverage as the previous camera, and the results were impressive. G96 had more than a 100% increase in discoveries over the previous year. This increase is almost entirely responsible for the 20% increase in discoveries from the previous year.

### Upgraded CCD detector for Catalina Sky Survey telescope

In addition to the upgraded chip for G96, Catalina was also able to secure and install an identical 10K chip for the Catalina Sky Survey Schmidt telescope (observatory code F03). After some tweaks, this system is now performing well and the resulting sky coverage is truly impressive. F03 can cover the entire observable sky from their site in ~ 3 nights of observing.

### ATLAS telescope(s)

The ATLAS Project has installed and begun operation of a 0.5m telescope capable of covering the entire observable sky from their site in Hawaii every few nights. Some adjustments to the optics are in progress that will allow for fainter limiting magnitudes; however the combination of this telescope with the CSS Schmidt will result in the entire observable northern hemisphere sky being observed every couple of clear nights. ATLAS has also proposed for additional systems, and if successful they will also install one in the southern hemispheres.

### Pending upgrade: A new CCD camera for the Pan-STARRS 2 telescope.

The Pan-STARRS project will also provide a major upgrade boost, commensurate with those described above. A second 1.5-m telescope with a large field of view will begin operation shortly. It is expected that the telescope's capabilities will be very similar to the existing system (PS1) and thus should result in another surge in NEO discoveries, particularly at fainter limiting magnitudes than most other facilities. Because of all of the upgrades described here, we hope for another major increase in NEO discoveries by year end.

### New CNEOS web page

JPL's Center for NEO Studies has completed a major overhaul of their web services and has completed initial release to the public. Part of this upgrade is an application programming interface (API) service. This system can be linked here. We encourage users to give this site a good look, and we also look forward to more good stuff from the folks at JPL in the near future.

Home  
ABOUT  
FEATURES  
TECHNICAL  
MEETINGS  
CLOSE APPROACHES  
CAMPAIGNS  
GALLERY  
FAQs  
Links  
Contacts

## Campaigns

IAWN Campaigns

- 2012 TC4

Other NEO & SB Campaigns

- The Comet Wirtanen Campaign

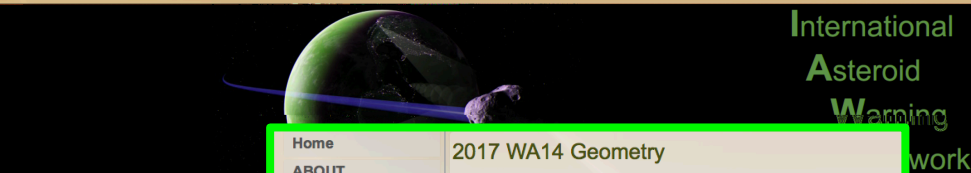
Home  
ABOUT  
FEATURES  
TECHNICAL  
MEETINGS  
CLOSE APPROACHES  
CAMPAIGNS  
GALLERY  
FAQs  
Links  
Contacts

## Meetings

- 4th Steering Committee Meeting
  - 13 Oct 2016
  - Pasadena, CA
  - Agenda & Presentations
- SMPAG
  - 18 Feb 2016
  - ??
  - Agenda & Presentations
- 3rd Steering Committee Meeting
  - 8 Nov 2015
  - Washington, DC
  - Agenda & Presentations
- 2th Steering Committee Meeting
  - 11 Nov 2014
  - Tucson, AZ
  - Agenda & Presentations
- Communications
  - Sep 2014
  - ??
  - Agenda & Presentations
- 1st Steering Committee Meeting
  - 13-14 Jan 2014
  - Cambridge, MA
  - Agenda & Presentations

Copyright © 2016. All Rights Reserved.  
Web Accessibility  
Web Template created with Anisite

# IAWN Logistics



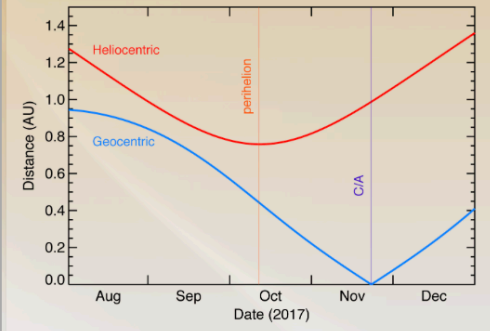
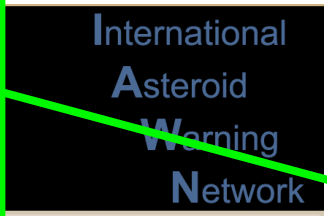
# Enhanced CA Content:

- Home
- ABOUT
- FEATURES
- TECHNICAL
- MEETINGS
- CLOSE APPROACHES
  - CA-table
- CAMPAIGNS
- GALLERY
- FAQs
- Links
- Contacts

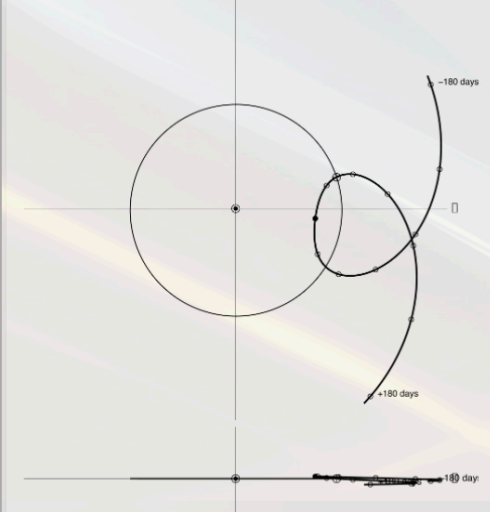
### 2017 WA14 Geometry

- Home
- ABOUT
- FEATURES
- TECHNICAL
- MEETINGS
- CLOSE APPROACHES
  - CA-table
- CAMPAIGNS
- GALLERY
- FAQs
- Links
- Contacts

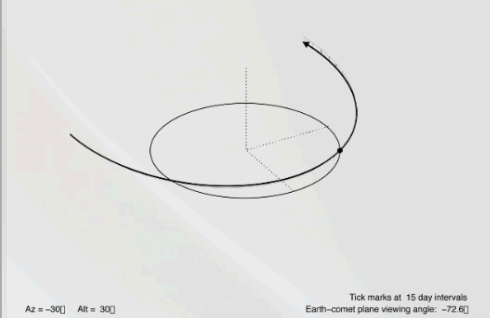
Close Approach	Asteroid Designation	date	0.34
2018 BF3	Posted on January 23, 2018	Catalina Sky Survey	0.34
2018 BR1	Posted on January 20, 2018	Catalina Sky Survey	0.73
2018 BX	Posted on January 19, 2018	Catalina Sky Survey	0.44
2018 BW	Posted on January 18, 2018	Catalina Sky Survey	0.1
2018 BD	Posted on January 18, 2018	Catalina Sky Survey	0.73
2018 BC	Posted on January 18, 2018	Catalina Sky Survey	0.77
2018 AH	Posted on January 7, 2018	ATLAS-MLO, Mauna Loa	0.8
2017 YE7	Posted on December 30, 2017	Mt. Lemmon Survey	0.58
2017 YZ4	Posted on December 26, 2017	Mt. Lemmon Survey	0.25
2017 WA14	Posted on November 25, 2017	Catalina Sky Survey	0.37
2017 WW1	Posted on November 21, 2017	Mt. Lemmon Survey	



(2017 WA14)	Perihelion (JD)	2458037.0899400	Epoch	2000.0
Period (years)	2.8906540	Inclination (deg)	1.6192100	
Semimajor axis (AU)	2.0262275	Long ascending node (deg)	340.6448100	
Perihelion dist (AU)	0.7583200	Arg. of perihelion (deg)	112.2018500	
Eccentricity	0.6263110			



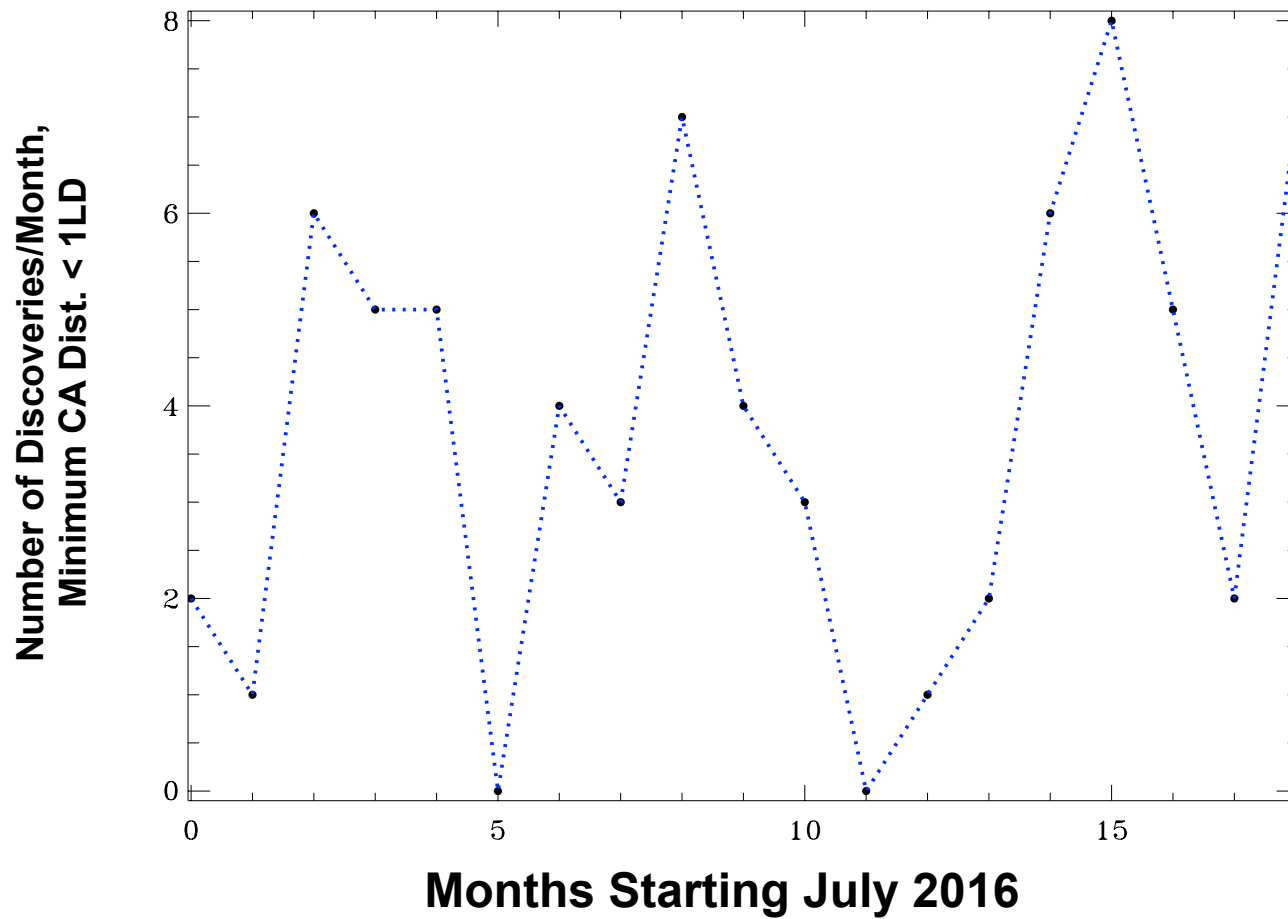
(2017 WA14)	Perihelion (JD)	2458037.0899400	Epoch	2000.0
Period (years)	2.8906540	Inclination (deg)	1.6192100	
Semimajor axis (AU)	2.0262275	Long ascending node (deg)	340.6448100	
Perihelion dist (AU)	0.7583200	Arg. of perihelion (deg)	112.2018500	
Eccentricity	0.6263110			



Az = -30[] Alt = 30[] Tick marks at 15 day intervals Earth-carrot plane viewing angle: -72.6[]

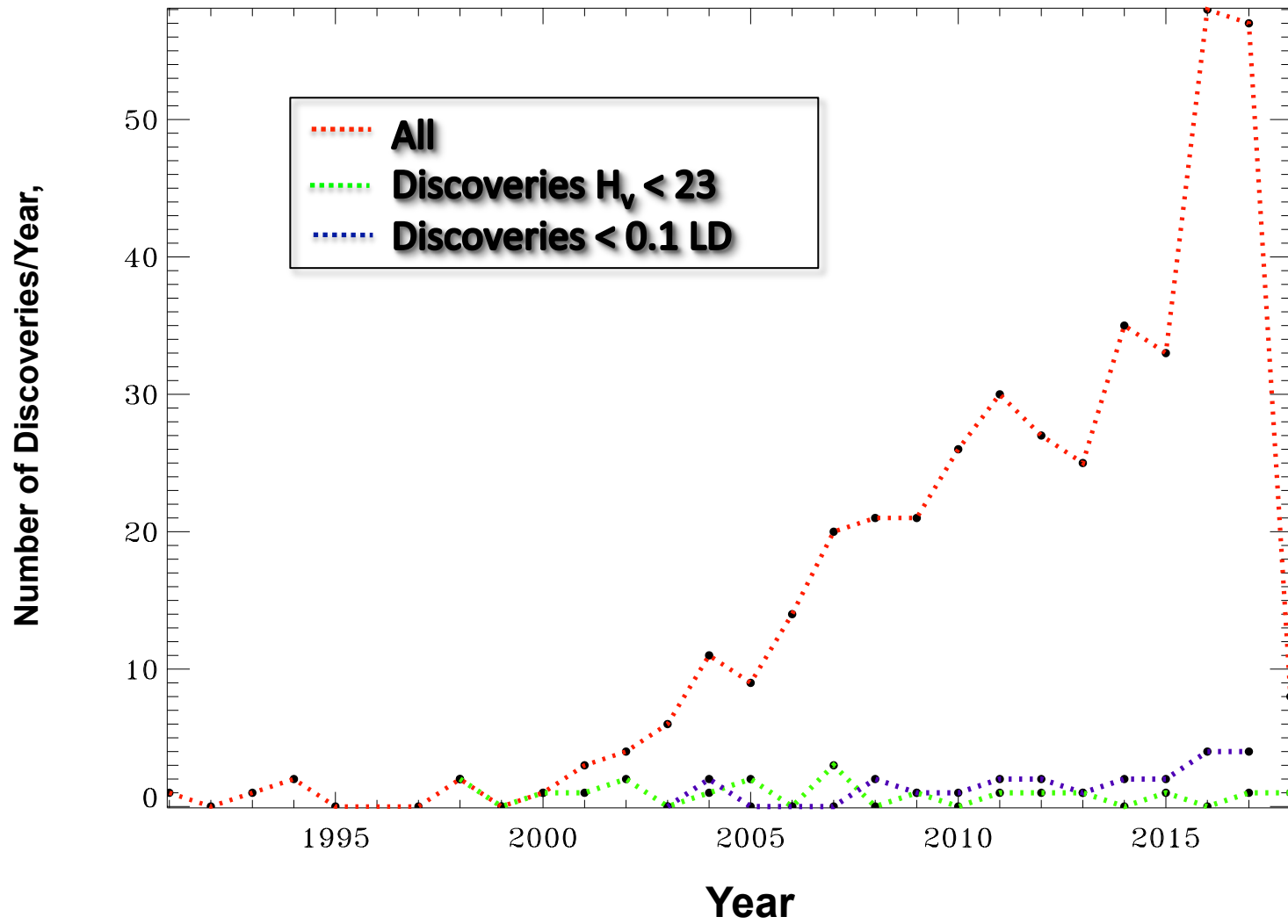
Graphs courtesy Dr. Tony Farnham

# By Month, Number of Discoveries On the IAWN Close Approach Pages

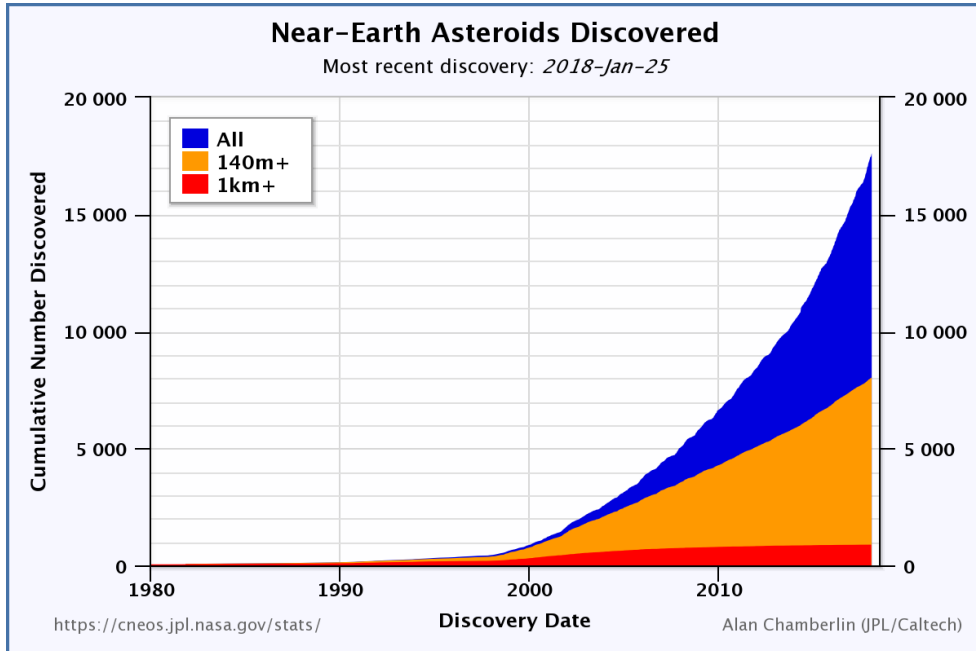


- Slow trend towards more over time, with statistical variations.

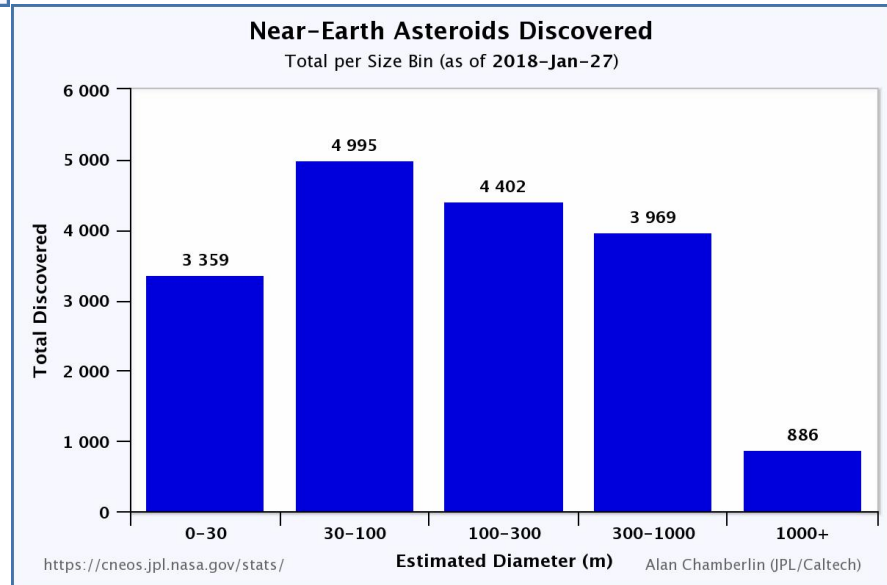
# Number of Discoveries/Year within 1LD



# Context: Total Numbers of NEOs



17611 Total



# Guidance of the IAWN Steering Committee

- Look and Usability of the website
- Key Decision of Close Approach Criteria
  - Distance (presently 1LD)
  - No Mag. Limit