Scout: short-arc orbit analysis and hazard assessment for NEOCP objects

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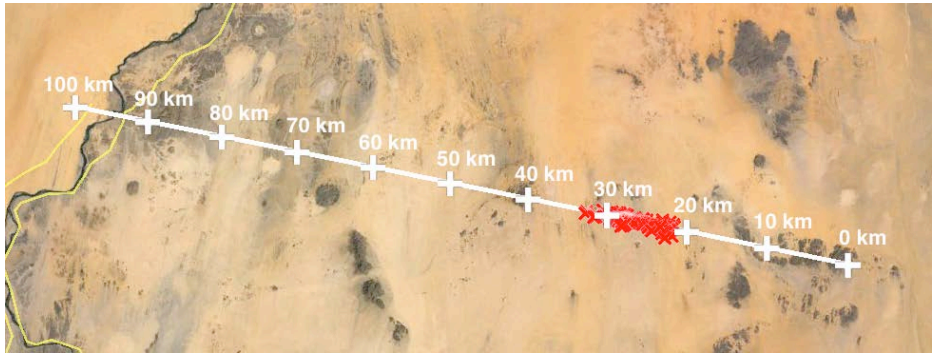
Time is of the essence

~ 5 m

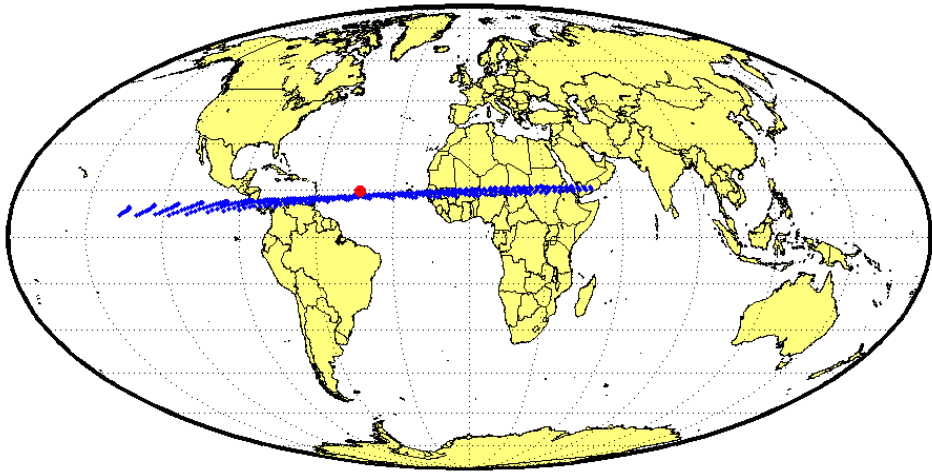
R. Kowalski, Catalina Sky Survey

~ 20 hours before impact

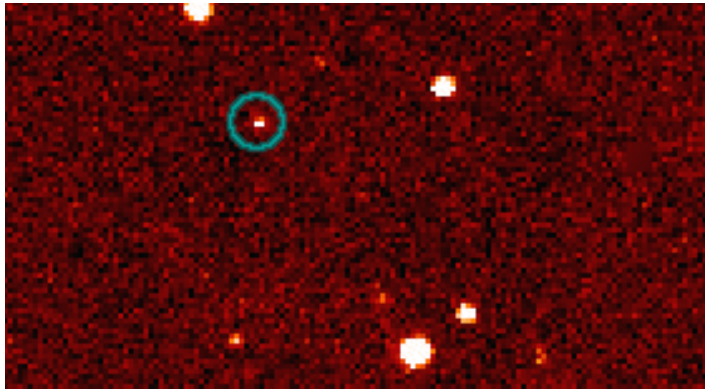
2008 TC_3 Nubian desert, Sudan

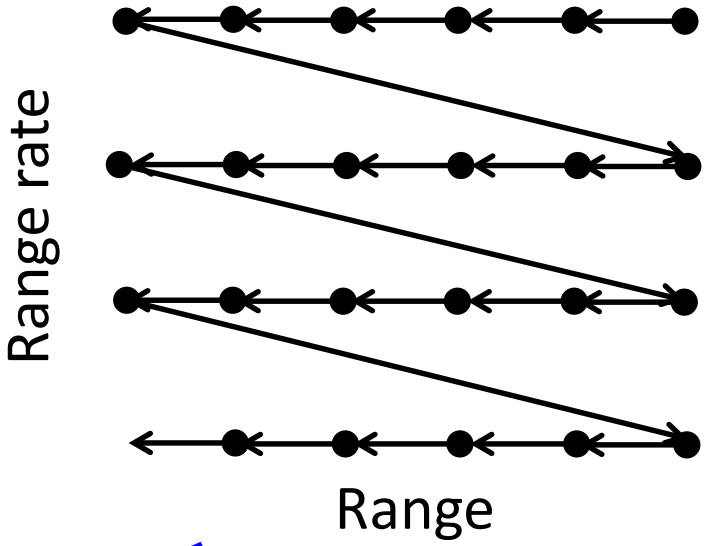


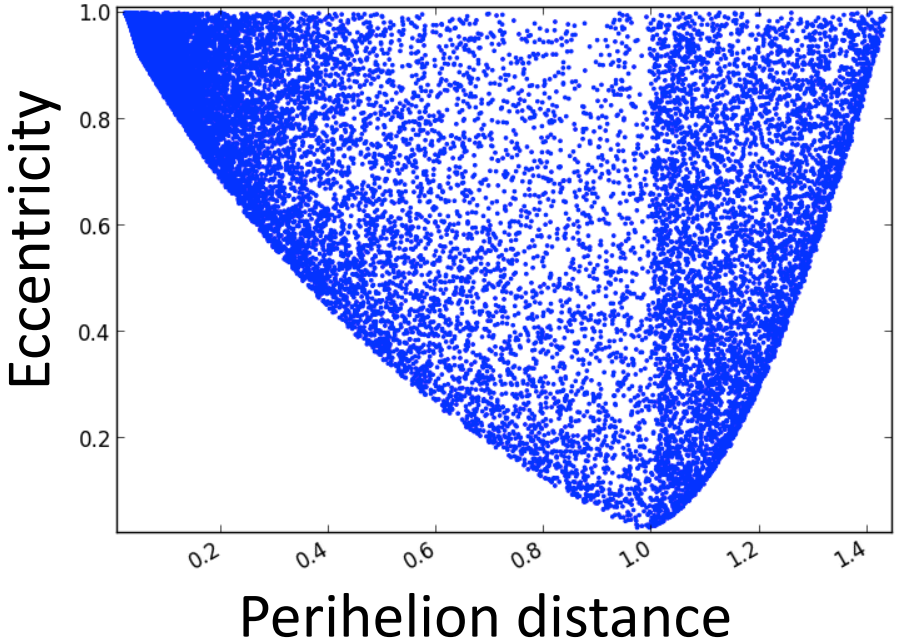
2014 AA Atlantic Ocean



Systematic ranging on NEOCP objects







Rapid identification of interesting objects

Object	Number of observations	Arc length	Impact probability
2008 TC_3	4	43 min	4%
2014 AA	3	28 min	3%

Once the data are available, Scout takes ~10 min to process an object

Scout

Introduction | **Data Table** | Object Data | Ephemeris

Data Table

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Show 10 entries

Object	#obs	Arc (h)	RMS	H	Impact Rating	MOID (au)	CA Dist. (LD)	V-inf (km/s)	PHA	NEO	NEO >1km	Geo.	IEO	$T_J < 3$	Last Upd
XT9742B	12	24.06	0.85	29.7	0	0.001	0.56	8.8	0	100	0	0	0	0	2016-10-1
XT9D939	7	1.41	0.31	27.5	0	0.001	0.97	10.3	0	100	0	0	0	0	2016-10-1
XT9E194	7	1.10	0.41	26.4	0	0.004	1.35	10.4	0	100	0	0	0	54	2016-10-1
XT9B05B	26	25.01	0.42	26.2	0	0.01	3.78	3.5	0	100	0	0	0	0	2016-10-1
XT9D0C1	14	4.91	0.41	26.0	0	0.006	6.41	2.0	0	100	0	0	0	0	2016-10-1
XT9D4BE	8	1.23	0.43	25.9	0	0.006	8.22	8.7	0	100	0	0	0	50	2016-10-1
XT9D5EC	7	1.17	0.77	25.3	0	0.02	9.48	15.6	0	100	0	0	0	48	2016-10-1
P10xk6Z	3	0.63	0.19	21.3	0	0.01	9.60	41.4	27	73	0	0	0	46	2016-10-0
P10xmeh	6	22.32	0.24	26.4	0	0.01	9.65	9.8	0	100	0	0	0	0	2016-10-1
XT9512F	6	0.29	0.35	25.2		0.03	10.65	23.6	0	100	0	0	0	39	2016-10-0

Showing 1 to 10 of 95 entries

First Previous **1** 2 3

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Impact rating

Object	#obs	Arc (h)	RMS	H	Impact Rating	MOID (au)	CA Dist. (LD)	V-inf (km/s)	PHA	NEO	NEO >1km	Geo.	IEO	$T_J < 3$	Last Upd
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XT9E194	7	1.10	0.41	26.4	0	0.004	1.35	10.4	0	100	0	0	0	54	2016-10-1
XT9B05B	26	25.01	0.42	26.2	0	0.01	3.78	3.5	0	100	0	0	0	0	2016-10-1
XT9D0C1	14	4.91	0.41	26.0	0	0.006	6.41	2.0	0	100	0	0	0	0	2016-10-1
XT9D4BE	8	1.23	0.43	25.9	0	0.006	8.22	8.7	0	100	0	0	0	50	2016-10-1
XT9D5EC	7	1.17	0.77	25.3	0	0.02	9.48	15.6	0	100	0	0	0	48	2016-10-1
P10xk6Z	3	0.63	0.19	21.3	0	0.01	9.60	41.4	27	73	0	0	0	46	2016-10-0
P10xmeh	6	22.32	0.24	26.4	0	0.01	9.65	9.8	0	100	0	0	0	0	2016-10-1
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Close approach distance

Object	#obs	Arc (h)	RMS	H	Impact Rating	MOID (au)	CA Dist. (LD)	V-inf (km/s)	PHA	NEO	NEO >1km	Geo.	IEO	$T_J < 3$	Last Upd
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XT9D4BE	8	1.23	0.43	25.9	0	0.006	8.22	8.7	0	100	0	0	0	50	2016-10-1
XT9D5EC	7	1.17	0.77	25.3	0	0.02	9.48	15.6	0	100	0	0	0	48	2016-10-1
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Showing 1 to 10 of 95 entries

First Previous **1** 2 3

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Mission accessible

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Scores for PHA, NEO, Geocentric, Cometary

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Showing 1 to 10 of 95 entries

First Previous **1** 2 3

Plane-of-sky uncertainty looks weird!

Select NEOCP Object

Ephemerides

Enter desired ephemeris parameters.

By default, a geocentric (code=500) ephemeris is generated at the current time with no lin

Start Time (UTC): Current time

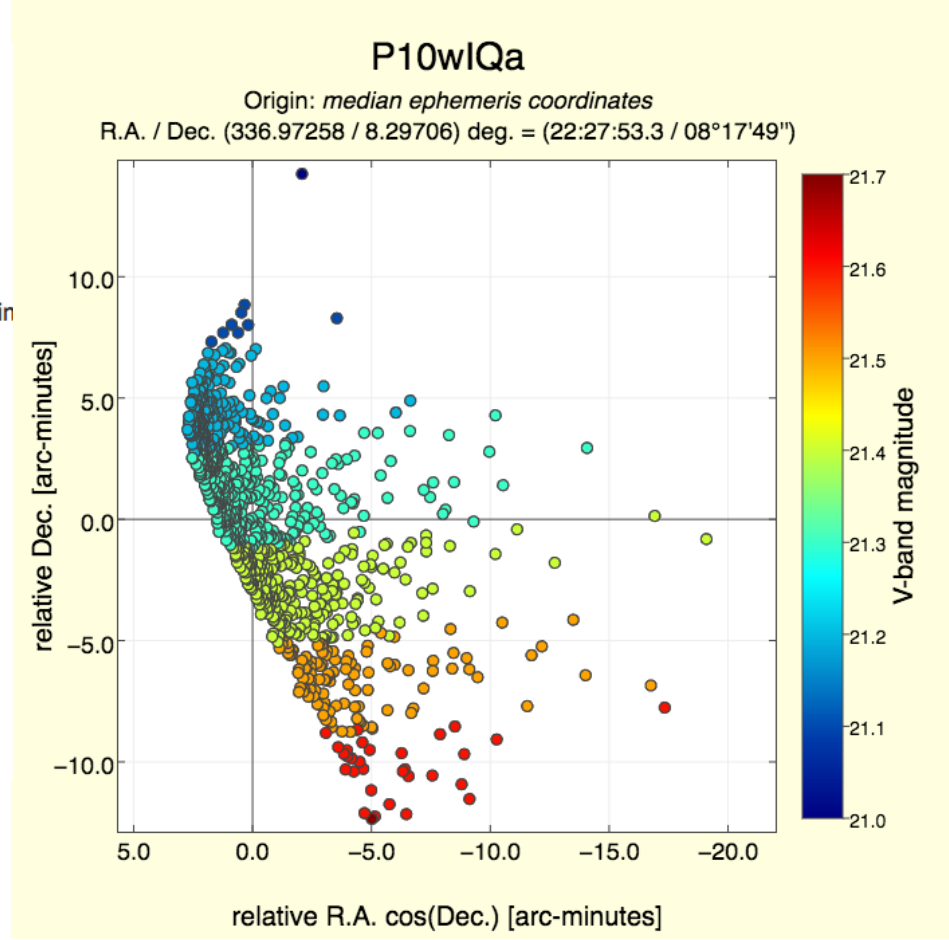
Observatory Code: 500

Stop Time (UTC):

Limiting magnitude:

Time Step:

Submit



Summary

- Scout automated system to analyze NEOCP objects
- Early detection of interesting objects: short-term impactors and close approachers, PHA, mission accessible, mini-moons, …
- Ephemeris tool to help observers follow up objects
- Should go live soon