Comet Interceptor Backup Targets

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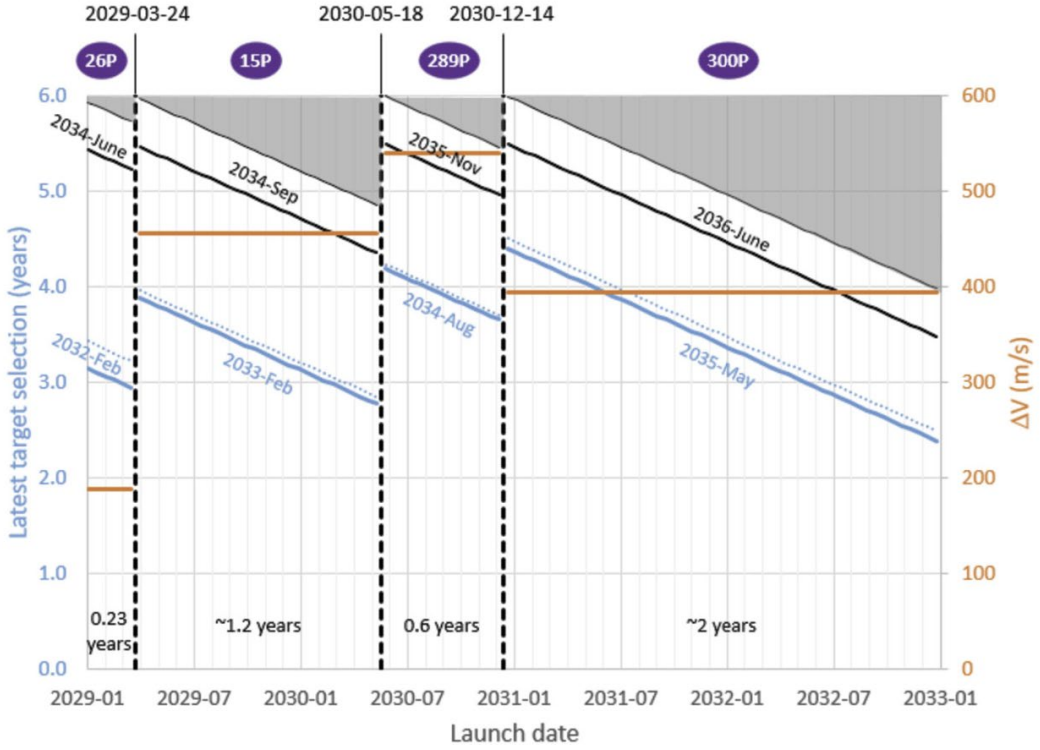
SWT #5 - November 2024

Selected Backup Targets

- 15P/Finlay
- 289P/Blanpain
- 300P/Catalina



(Jones et al. 2024)

Backup Targets Update

Types of objects to consider:

- **Comets**
  - Including Halley-type comets (HTCs)
  - Including less certain orbits and unnumbered objects
- **Dormant comets - Asteroids on cometary orbits (ACOs)**
- **Meteor shower parent bodies**

Orbits:

- At least one perihelion passage between 2030-2040
- More relaxed node crossing cutoff: **0.7-1.5 au**

Backup Targets Update

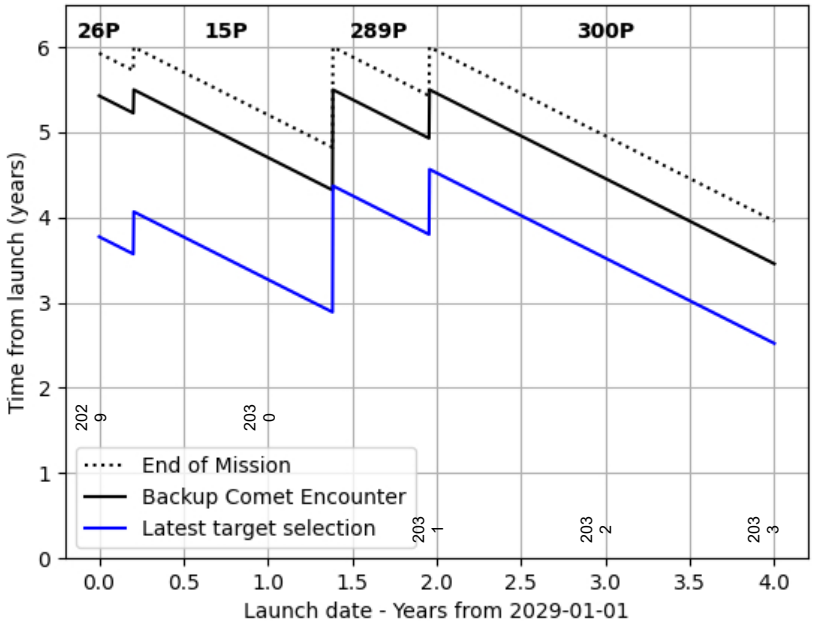
Object	Earliest perihelion	Node crossin	Node crossin	Last perihelion
11P/Tempel-Swift-LINEAR	2032-10-13 11:24:24	5.01	1.25	2038-06-01 3:16:46
55P/Tempel-Tuttle	2031-05-20 23:31:29	18.54	0.97	
104P/Kowal 2	2033-06-24 14:09:46	2.24	1.30	2038-12-31 3:41:30
252P/LINEAR	2032-03-10 6:32:29	1.02	4.70	2037-08-18 16:02:17
255P/Levy	2032-10-07 4:50:03	4.96	0.84	2037-10-16 4:33:29
262P/McNaught-Russell	2030-12-15 21:03:48	11.87	1.28	
387P/Boattini	2030-03-14 17:45:09	7.42	1.29	
P/2009 WX51 (Catalina)	2031-09-15 22:46:47	2.16	1.04	2037-03-11 20:36:43
C/2010 L5 (WISE)	2034-01-23 19:09:23	5.88	0.86	
P/2019 M2 (ATLAS)	2035-04-25 12:16:34	1.13	4.15	
P/2019 Y3 (Catalina)	2030-05-31 17:08:13	0.93	5.09	2035-08-01 3:59:41
P/2021 HS (PANSTARRS)	2030-03-01 1:58:52	0.94	3.24	2038-10-30 8:38:03
P/2021 N1 (ZTF)	2031-09-17 14:51:21	1.00	4.38	2036-11-13 11:06:28
P/2021 PE20 (ATLAS)	2035-11-21 15:05:19	4.82	1.29	
3200	2030-12-21 2:06:29	0.16	0.90	2039-07-29 4:36:12
155140	2030-02-15 10:27:37	1.34	0.17	2038-10-05 16:24:51
196256	2030-10-01 20:34:29	4.97	1.20	2036-04-10 11:10:26

Backup Targets Update

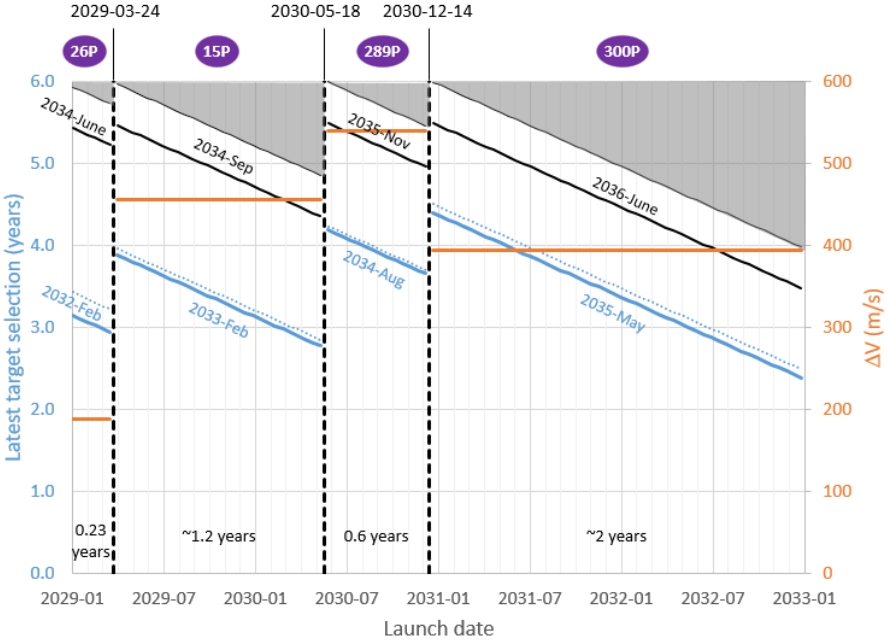
- Updated list of possible targets passed to ESOC (see presentation)
- Considered visibility of targets for ground-based observations at encounter and in advance for characterisation
- Trades to discuss: take longer wait time targets, even if they are lower activity ones?

Backup target selection

CReMA BUCT selection

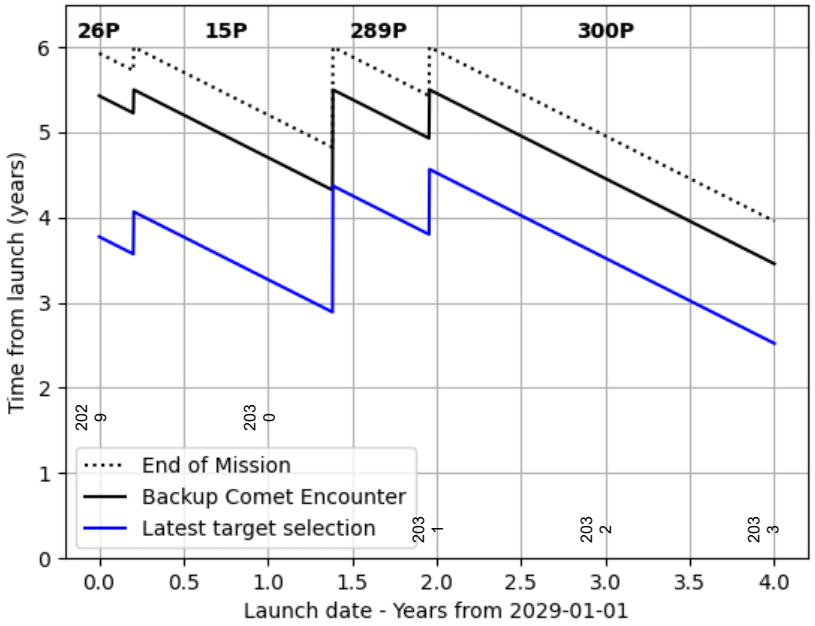


As a reminder the exact plot in CReMA (Fig. 7-29)…
plot on the left shows the same info in a cleaner way

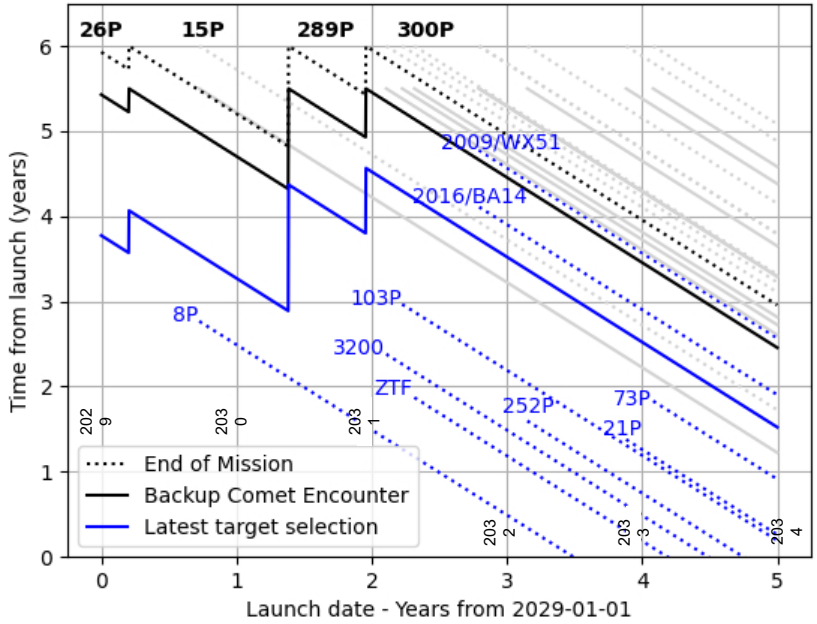


Backup target selection

CReMA BUCT selection



Including new results of 2024-Q3 analysis



Backup Targets Update

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- In the end: new targets in the list aren't better (in either case) than the ones in the red book
- Maybe 8P is more interesting than 15P, but not worth leaving ~7 months earlier for it (also Earth-based telescope visibility at encounter is poor).
- Maybe P/2016 BA14 gives us slightly longer wait times (for very delayed launch) than 300P, but this comet has very low activity levels – probably not better

Backup Targets Update

- Recommendation for CDR: No change to backup targets from red book list

- But, things to keep in mind to revisit closer to launch (i.e., after a few years of LSST):
  - Check again for newly discovered low activity targets that might give us significantly longer wait times. Revisit trade of longer wait time (better chance to find LPC) vs activity of backup
  - We will also have a better idea about the real rate of discovery of distant LPCs after a few years of LSST, so will know how likely it is that we will really need a backup then
  - We will also be able to revisit the analysis post-CDR if the boundary conditions change significantly (e.g. delta-v capability expected)