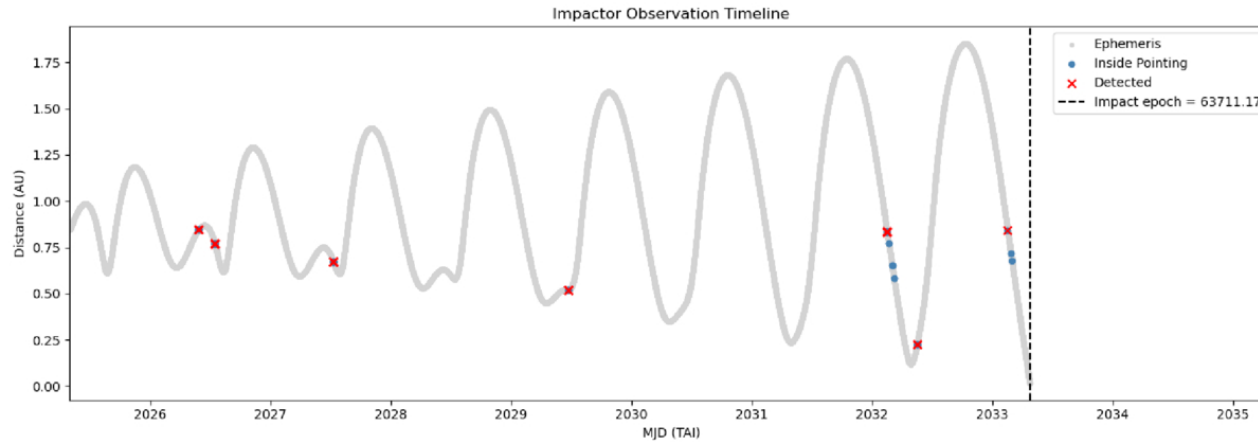


Figure 4. from

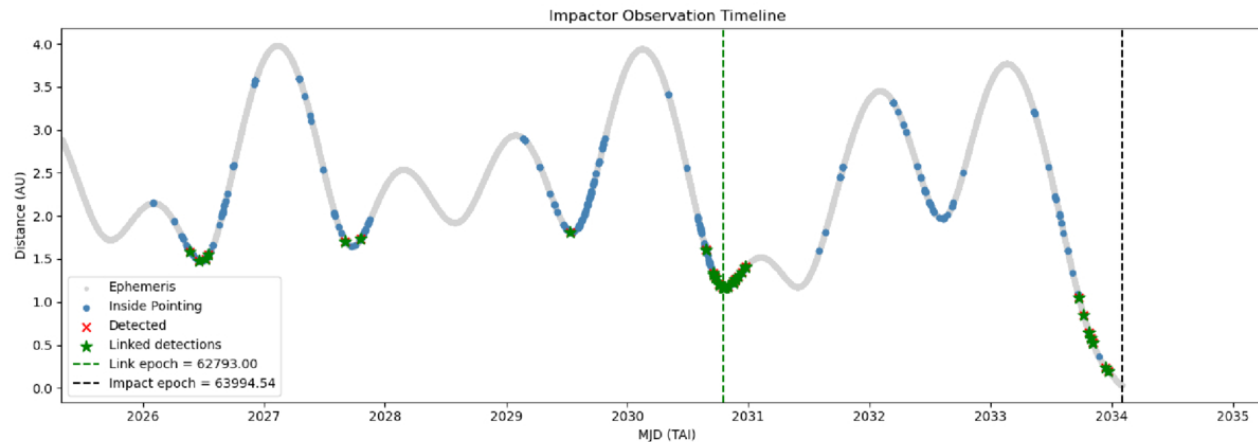
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(a) **Unlinked impactor with partial visibility.** The gray curve shows the geocentric distance as a function of time. Grey points trace the full ephemeris; blue points mark epochs when the object falls within LSST's pointing footprint. The absence of blue points along large portions of the orbit reflects pure *pointing loss*, where the survey never visits the object's location. Where blue points do appear, many lack over-plotted red crosses, indicating that the object is inside the footprint but remains below the single-visit magnitude limit or suffers trailing losses—i.e. *magnitude loss*. Even the epochs with successful synthetic detections (red crosses) occur too sparsely in time to form intra-night or inter-night pairs, preventing any tracklet formation. The result is *linking failure* despite clear visibility windows.



(b) **Successful linked detections.** A contrasting case where the object repeatedly enters LSST's pointing footprint (blue points) at times when it is also bright enough to be detected (red crosses). These detections occur with the cadence required to form valid intra-night tracklets and inter-night linkages. Green stars indicate the subset of detections incorporated into the final linked solution, and the dashed vertical line marks the epoch of first linkage. This case illustrates that successful discovery requires the coincidence of three conditions: pointing coverage, sufficient brightness, and adequate temporal sampling for linking.