

How to Request *Swift* Observations

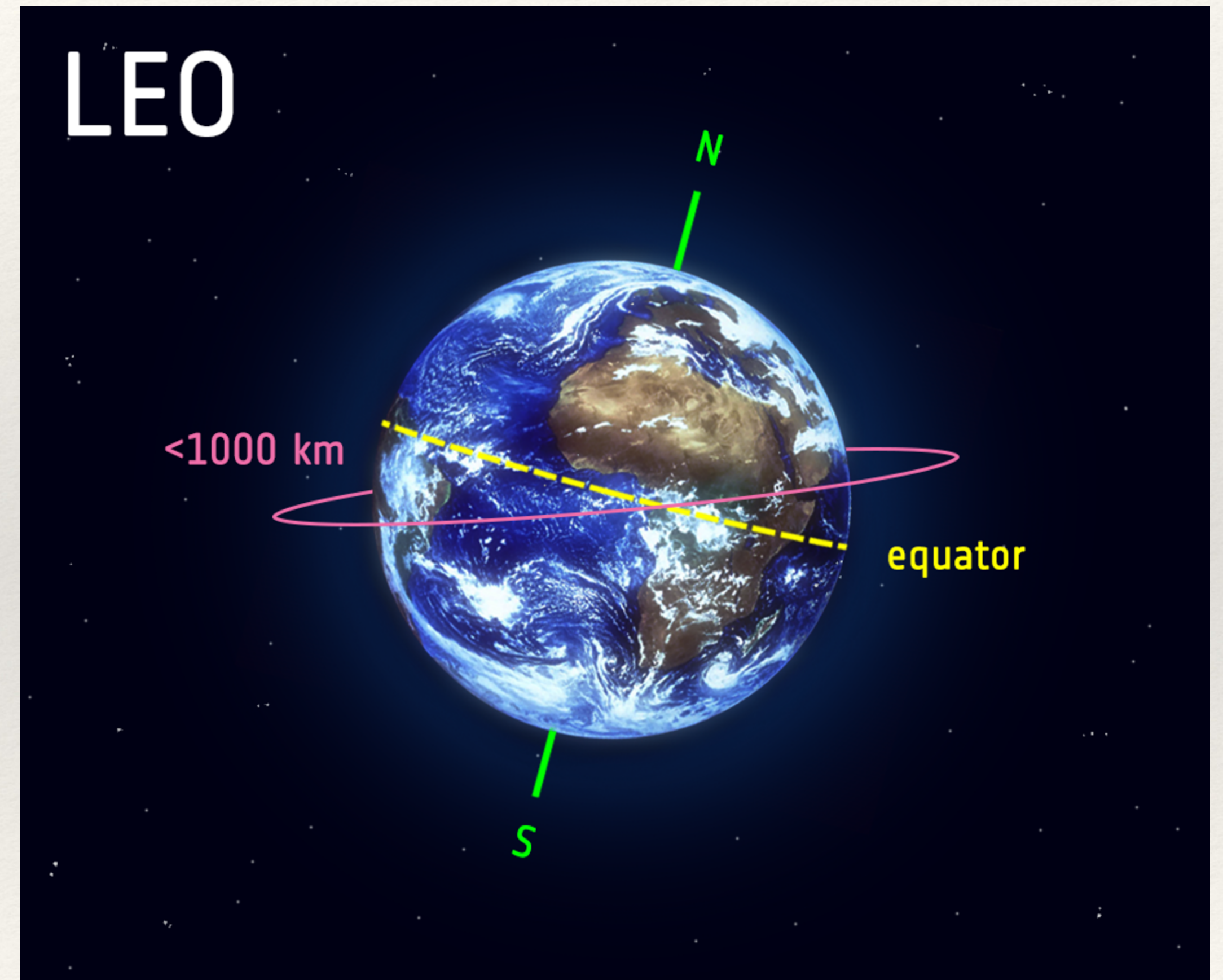
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Requesting *Swift* Observations: A Checklist

- ❖ Step 1: Understand observing constraints
- ❖ Step 2: Define an observing program
- ❖ Step 3: Choose your adventure: Guest Investigator (GI) vs. Target-of-Opportunity (ToO)
- ❖ Step 4: Submit!
- ❖ Step 5: Scheduling and Archive

Understand Observing Constraints: I

- ❖ *Swift* is in a **Low-Earth Orbit (LEO)**: 500 km altitude, 20° inclination
- ❖ For instrument safety, *Swift* **cannot** observe locations close to the Sun ($> 46^\circ$), moon ($> 23^\circ$), or orbital poles ($> 28^\circ$ from Earth limb)
- ❖ Because of the orbit (and pole constraint), each location on the sky is visible for **at most** 30 minutes every ~ 90 minute orbit
 - ❖ Observations longer than 1.8 ks will be split into multiple segments!
 - ❖ There are no continuous viewing zones!
- ❖ *Swift* stops collecting science data during passages through the South Atlantic anomaly



Understand Observing Constraints: II

- ❖ You can (and should) check the visibility of your favorite target!
- ❖ Long-term visibility calculator tells you which dates targets are visible (i.e., not in Sun and Moon constraints)
 - ❖ <https://www.swift.ac.uk/sunpos.php>
- ❖ Detailed visibility calculator: tells you the exact times targets are visible (i.e., Earth occultation, SAA passages; **n.b., only accurate 2-3 weeks in advance!**)
 - ❖ <https://www.swift.psu.edu/operations/visibility.php>

Defining An Observing Program

- ❖ Where?
 - ❖ Target Name / Brightness
- ❖ When?
 - ❖ Observation times / durations
- ❖ How?
 - ❖ Instrument modes (UVOT filters, XRT mode, ...)
- ❖ Why?
 - ❖ Science Justification

RECIPE CARD

INGREDIENTS: _____

DIRECTIONS: _____

Serves: prep: cook:

Notes: _____

UVOT SNR Tool: https://www.mssl.ucl.ac.uk/www_astro/uvot/uvot_observing/uvot_tool.html

XRT SNR Tool: <https://heasarc.gsfc.nasa.gov/cgi-bin/Tools/w3pimms/w3pimms.pl>

Choose Your Adventure: GI vs. ToO

- ❖ Guest Investigator Program
 - ❖ Annual call (mid / late September)
 - ❖ Awards funding and observing time
 - ❖ Any number of targets
 - ❖ Up to 1 Ms of observing time (per program)
- ❖ Target-of-Opportunity Program
 - ❖ Accepted anytime
 - ❖ Awards only observing time
 - ❖ Single target (at a time)
 - ❖ Typically $< \sim 10$ ks per request

Bottom Line: Use the GI Program for large samples, large amounts of observing time, and for funding to support data analysis and publication. Otherwise use ToO program (note we receive ~ 5 ToOs per day!).

How to Submit a ToO Request: I

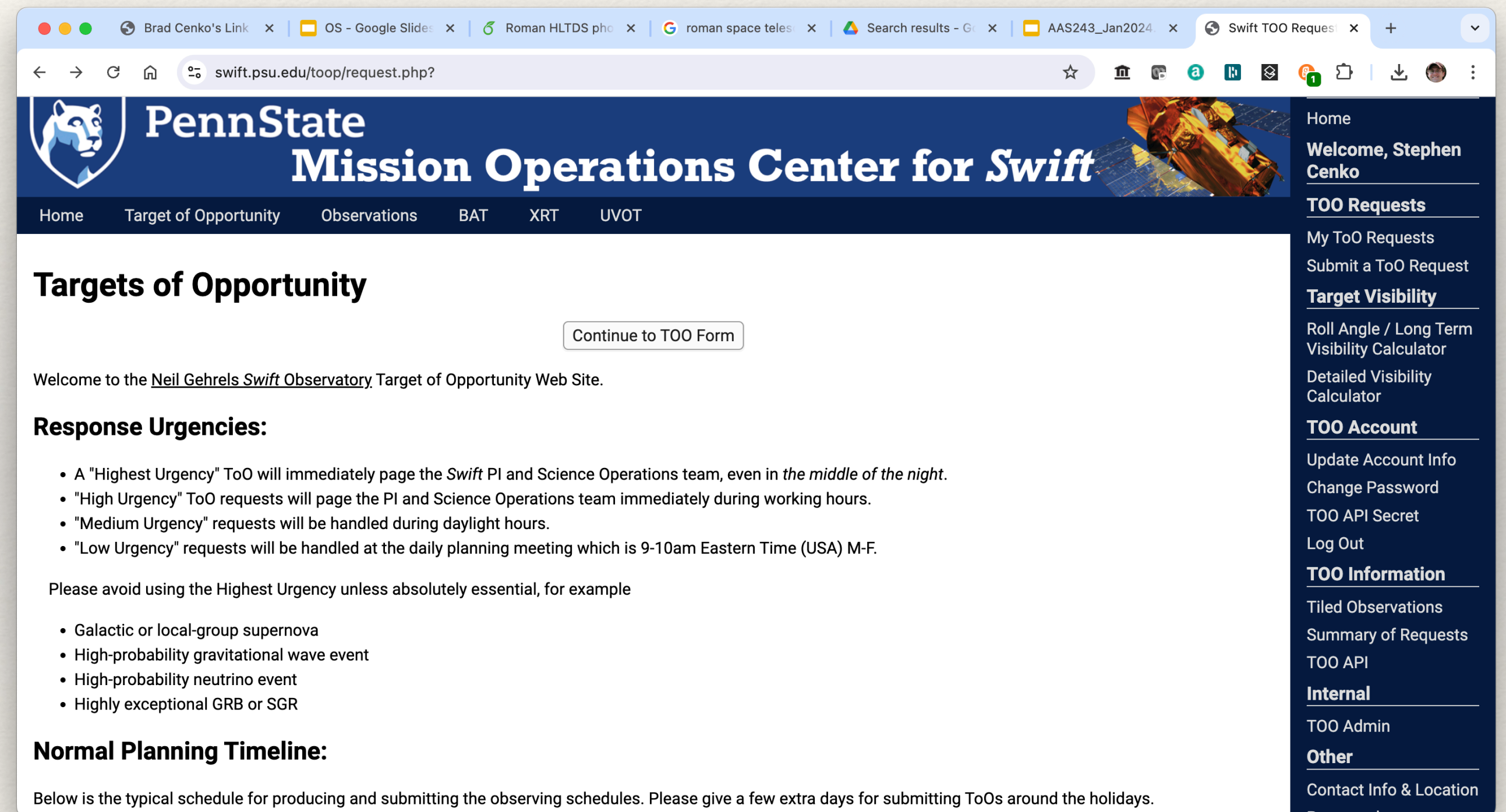
❖ Online webform:

❖ <https://www.swift.psu.edu/toop/too.php>

❖ ToO Python API:

❖ https://www.swift.psu.edu/too_api/

❖ `pip install swifttools`



The screenshot shows a web browser window displaying the PennState Mission Operations Center for Swift website. The page title is "Targets of Opportunity". The navigation bar includes links for Home, Target of Opportunity, Observations, BAT, XRT, and UVOT. The main content area features a "Continue to TOO Form" button and a welcome message: "Welcome to the Neil Gehrels Swift Observatory Target of Opportunity Web Site." Below this, there is a section titled "Response Urgencies:" with a bulleted list of urgency levels and their handling procedures. A note advises against using the Highest Urgency unless absolutely essential, with a list of examples. The page also includes a "Normal Planning Timeline:" section and a footer note about submitting ToOs around holidays. The right sidebar contains a navigation menu with sections for TOO Requests, TOO Account, TOO Information, and Internal links.

How to Submit a ToO Request: II

Response Urgencies:

- A "Highest Urgency" ToO will immediately page the *Swift* PI and Science Operations team, even in *the middle of the night*.
- "High Urgency" ToO requests will page the PI and Science Operations team immediately during working hours.
- "Medium Urgency" requests will be handled during daylight hours.
- "Low Urgency" requests will be handled at the daily planning meeting which is 9-10am Eastern Time (USA) M-F.

- ❖ Urgency "0": Immediate (~ minutes) response. No human in the loop. Requires prior approval.
- ❖ Urgency 1 (Highest Urgency): Response time < 4 hours

- ❖ Urgency 2 (High Urgency): Response within 24 hours
- ❖ Urgency 3 (Medium Urgency): Response within days
- ❖ Urgency 4 (Low Urgency): Response within weeks

How to Submit a ToO Request: III

Normal Planning Timeline:

Below is the typical schedule for producing and submitting the observing schedules. Please give a few extra days for submitting ToOs around the holidays.

Day of the Week	Submit the Schedule for*	Create the Schedule for
Monday	Tuesday	Wednesday
Tuesday	Wednesday	Thursday
Wednesday	Thursday	Friday & Saturday
Thursday	Friday & Saturday	Sunday & Monday
Friday	Sunday & Monday	Tuesday

All times are in Eastern Time (USA).

*Schedules are submitted in the mornings.

Important Notes:

- Urgency 1 (Highest) wakes up multiple team members - please use with discretion!
- Not analyzing your previous data in a timely fashion is **NOT** a justification for a high urgency request. Such requests are generally only appropriate for the first set of observations of a given source; repeat requests will generally be denied!

How to Submit a ToO Request: IV

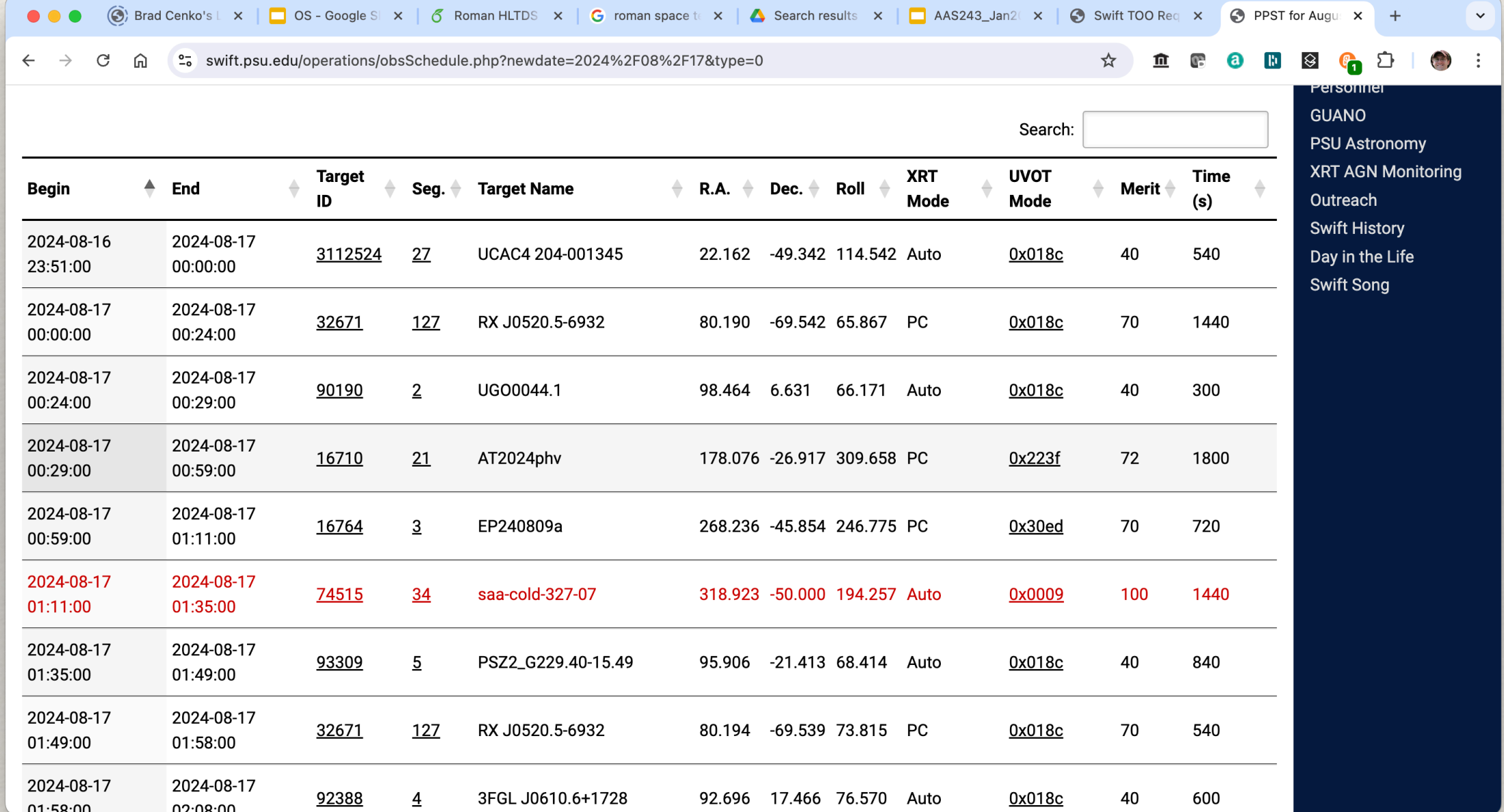
- ❖ Science Justification
 - ❖ If triggering a GI program, please just provide sufficient detail so that we know your source meets the trigger criteria (no detailed science justification is necessary)
 - ❖ If not triggering a GI program, please explain **what we will learn from the proposed observations**, not just what is being measured (i.e., we want to measure the duration of this flare because we will learn X, Y, and Z).

How to Submit a ToO Request: V

- ❖ If you have a question about a ToO request (or anything else regarding the Swift schedule), send an email to: swiftods@swift.psu.edu
- ❖ This will reach the On-Duty Scientist (ODS), a rotating position that is responsible for handling incoming ToO requests

Scheduling and Archive: I

- ❖ *Swift* has two schedules visible online and via the ToO API
 - ❖ Pre-Planned Science Timeline (PPST): The planned observing schedule (typically for the next 24-48 hours)
 - ❖ As-Flown Science Timeline (AFST): The actual sequence of observations, which may be different from the PPST due to GRBs, ToOs, etc.



Begin	End	Target ID	Seg.	Target Name	R.A.	Dec.	Roll	XRT Mode	UVOT Mode	Merit	Time (s)
2024-08-16 23:51:00	2024-08-17 00:00:00	3112524	27	UCAC4 204-001345	22.162	-49.342	114.542	Auto	0x018c	40	540
2024-08-17 00:00:00	2024-08-17 00:24:00	32671	127	RX J0520.5-6932	80.190	-69.542	65.867	PC	0x018c	70	1440
2024-08-17 00:24:00	2024-08-17 00:29:00	90190	2	UGO0044.1	98.464	6.631	66.171	Auto	0x018c	40	300
2024-08-17 00:29:00	2024-08-17 00:59:00	16710	21	AT2024phv	178.076	-26.917	309.658	PC	0x223f	72	1800
2024-08-17 00:59:00	2024-08-17 01:11:00	16764	3	EP240809a	268.236	-45.854	246.775	PC	0x30ed	70	720
2024-08-17 01:11:00	2024-08-17 01:35:00	74515	34	saa-cold-327-07	318.923	-50.000	194.257	Auto	0x0009	100	1440
2024-08-17 01:35:00	2024-08-17 01:49:00	93309	5	PSZ2_G229.40-15.49	95.906	-21.413	68.414	Auto	0x018c	40	840
2024-08-17 01:49:00	2024-08-17 01:58:00	32671	127	RX J0520.5-6932	80.194	-69.539	73.815	PC	0x018c	70	540
2024-08-17 01:58:00	2024-08-17 02:08:00	92388	4	3FGL J0610.6+1728	92.696	17.466	76.570	Auto	0x018c	40	600

Scheduling and Archive: II

- ❖ All *Swift* data becomes public immediately
- ❖ Quicklook site provides fastest access to data (typically within a few hours of reaching the ground)
- ❖ <https://swift.gsfc.nasa.gov/sdc/ql/>
- ❖ *Swift* archive houses final processing, typically 7-10 days after observations
- ❖ <https://swift.gsfc.nasa.gov/archive/>

Check out the Quick Look status page for a list of current known problems.

Sorting:
 Descending (Default)
 Ascending

Select Target Types: (uncheck 'All' if selecting specific types)

All
 GRBs (20k, 100-900k, 3.5M)
 GW Tiling (7M)
 Other Science, e.g., Fill-In, TOO (10k, 30k, 40k, 82-87k, 3.0M, 3.1M)
 Other Non-Science, e.g., SAA, Safe Hold/Pointing (60k, 70k, 3.6M)
 Include older entries (>1 Month)

GI (90k, 3.2M)
 NuSTAR (80-81k, 88-89k, 3.4M)
 Calibration (50k, 3.3M)
 Unknown

View Specific Target ID:
Target ID:

Last updated: Sat Aug 17 02:29:02 2024 GMT

Sequence	Vers	Object	Observed	Processed	Comment
03112576005	005	J150912.2+202653	2024-08-02T01:34:57	2024-08-12T09:31:16	FINAL FOR ARCHIVE
03112564002	008	4FGLJ1132.1-1448	2024-08-06T04:26:57	2024-08-16T05:22:29	FINAL FOR ARCHIVE
03112564001	006	4FGLJ1132.1-1448	2024-08-02T23:06:57	2024-08-12T09:31:33	FINAL FOR ARCHIVE
03112550001	007	SDSSJ124511.25+335610.1	2024-08-07T18:38:57	2024-08-08T18:03:02	new data moc2024-08-08T174708
03112545008	004	J1857+0642g	2024-08-04T10:09:57	2024-08-14T08:46:27	FINAL FOR ARCHIVE
03112542007	005	J1857-0125g	2024-08-15T17:34:56	2024-08-16T02:56:10	new data moc2024-08-16T022647
03112529119	005	GSC08859-00633	2024-08-08T12:44:56	2024-08-09T09:56:45	new data moc2024-08-09T094434
03112529118	009	GSC08859-00633	2024-08-01T02:31:56	2024-08-11T11:46:39	FINAL FOR ARCHIVE
03112529117	006	GSC08859-00633	2024-07-31T23:26:56	2024-08-10T02:08:14	FINAL FOR ARCHIVE
03112526098	004	2MASSJ0033-5116	2024-08-01T06:58:57	2024-08-11T11:46:07	FINAL FOR ARCHIVE
03112525015	004	UPMJ0113-5939	2024-08-09T18:28:56	2024-08-11T16:50:57	new data moc2024-08-11T163603

Questions?