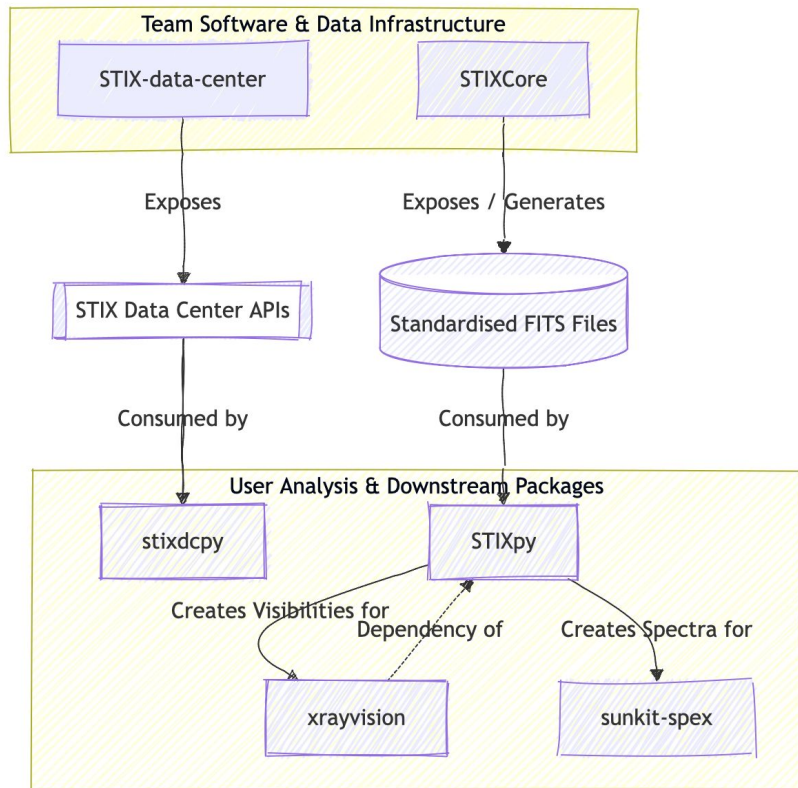


Python Software Update

STIX Team Meeting, DIAS, July 22-24 2026,
Shane Maloney, Nicky Hochmuth, +Team

STIX Python Software Map



Links/Repo

STIX DataCenter

- <https://datacenter.stix.i4ds.net>

STIXCore

- <https://stixcore.readthedocs.io/en/latest/>
- <https://github.com/i4Ds/STIXCore>

stixdcpy

- <https://github.com/i4Ds/stixdcpy/tree/dev>

STIXpy

- <https://github.com/TCDSolar/stixpy>
- <https://stixpy.readthedocs.io/en/latest/>

xrayvision

- <https://github.com/TCDSolar/xrayvision>
- <https://xrayvision.readthedocs.io/en/latest/>

sunkit-spex

- <https://github.com/sunpy/sunkit-spex>
- <https://sunkit-spex.readthedocs.io/en/latest/>

Pipeline - STIXCore

STIXCore - ~~v1.5.1~~ v1.7.4

v1.6.0 - ~~Nov 31~~ Nov 15 2025

- Upgrade python and library version
 - Python3.11, sunpy 6.0.0, astropy
- Publish L3 QL plot images (SVG)

V1.6.1 - Nov 18 2025

- Fix date issue in name and path, show rcr in plot, only use latest version

V1.6.2 - Nov 18 2025

- Fix missing keyword in TM 1.X packets constructor

v1.7.0 - Mar 2 2026

- **Daily energy calibration**
- fix end2end testing
- pinpoint numpy dependency to 2
- CAL spectra reshape error in LB to L0

v1.7.1 - Mar 2 2026

- Cal L1 should not be file with time range in name but just day

v1.7.2 - Mar 2 2026

- Cal filename fix

v1.7.3 - Mar 10 2026

- suppress adding (combining) of cal-spectra on fits file

v1.7.3 - July 10 2026

- Fix for IDB errors in cal energy live_time and quiet_time

Pipeline - STIXCore

Summary

- **Daily Calibration Results**

- Already created in pipeline process will start delivering to ESA SOAR soon
- <https://pub099.cs.technik.fhnw.ch/fits/CAL/2026/07/18/CAL/>

Next steps

- **Flare List**

- Feedback wanted on draft flare list
 - Example work book here
https://stixpy--225.org.readthedocs.build/en/225/generated/gallery/flarelist_demo.html
 - Sample files
 - https://pub099.cs.technik.fhnw.ch/testing/p311_comp_test/L3/

- **L2 Spectrogram**

- As “calibrated” as can do $c / (\text{keV s cm})$
- Live time, energy,

Analysis - STIXpy

STIXpy - ~~v0.1.3~~ v0.3.0

v0.2.0 - ~~Oct 15~~ Jan 19 2026

- **Python ≥ 3.11 , Sunpy $\geq 6.0.0$**
- Live time correction bug fix
- Image demo improvements
- Pixel plot improvements

v0.2.1 - ~~Dec 2025~~ Mar 10 2026

- Fido update for sunpy dependency to <7.0

Stixpy - v0.3.0

- The ``get_data`` is now keyword only
- Increased minimum versions for these dependencies:
 - Python ≥ 3.12
 - astropy $\geq 6.1.0$
 - matplotlib $\geq 3.8.0$
 - sunpy ≥ 7.0
 - xrayvisim $\geq 0.2.1$ (#212)
- Add ability to control the data normalisation to ``get_data`` via the `vtype` keyword:
 - 'c' - count [c]
 - 'cr' - count rate [c/s]
 - 'dcr' - differential count rate [c/(s keV)]

Analysis - STIXpy

Summary

- Many small bug fixes and improvements
- Large features to come very soon (many work just need to be integrated)

Next steps

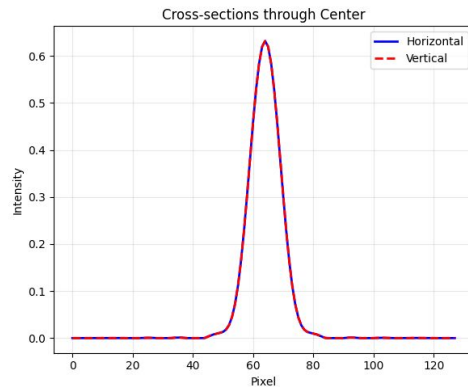
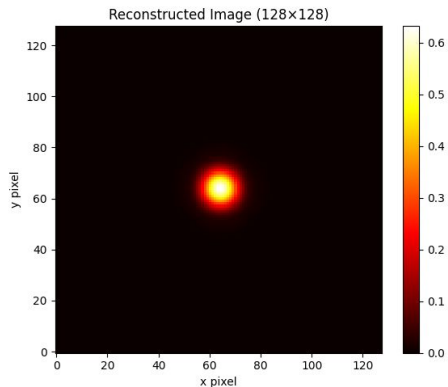
- Daily Calibration Products (Fido and Product) PR#226
- Flare List (Fido and Product) PR#225 (**Feedback wanted**)
- Spectral “calibration” PR#193
 - ELUT & live time (to match IDL?!)
- IDL like `estimate\_flare\_location` PR#234
- Component Imaging
- New transmission model and ELUT correction (similar to current IDL release 6.2)

Analysis - XRAYVISION

XRAYVISIM - ~~v0.2.1~~ v0.3.0

v0.3.0 - July 13 2026

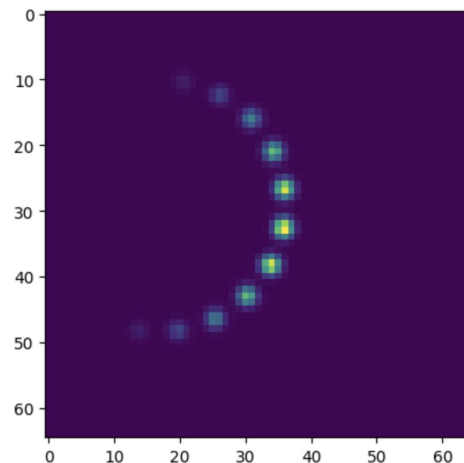
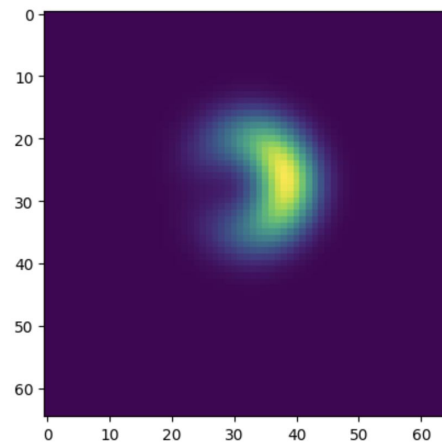
- Update core minimum versions to:
 - python>=3.12
 - astropy>=7.0.0
 - packaging>=24.2
 - numpy>=2.1
 - scipy>=1.15
 - xarray>=2024.7.0
 - matplotlib>=3.10.0
 - sunpy[map]>=7.0.0 (#93)
- Updates for strict mode typing and add mypy and pyright configuration. (#97)



Analysis - XRAYVISION

- **Next Steps**

- uv-smooth (generalised)
 - Tidy and test (help wanted)
- vis-forward-fit (many optimisation methods) #PR83
 - Done but not parameter tie/fixing etc
 - Tidy and test (help wanted)
- Component Imaging?



Basic Flare List (https://pub099.cs.technik.fhnw.ch/testing/p311_comp_test/L3/2024/09/01/FLARELIST/)

Column	Unit	Description
flare_id		unique flare id for flarelist SDCFlareListManager
start.UTC		start time of flare
duration	s	duration of flare
end.UTC		end time of flare
peak.UTC		flare peak time
att_in		was attenuator in during flare
bkg_baseline	ct	background baseline at 4-10 keV
GOES_class		GOES class of the GOES XRS data at time of flare - not derived from STIX data. Do not use when flare isn't visible to Earth
goes_min_class_est		min GOES class estimate derived from STIX data
goes_max_class_est		max GOES class estimate derived from STIX data
goes_mean_class_est		mean GOES class estimate derived from STIX data
GOES_flux	W / m2	GOES flux of the GOES XRS data at time of flare- not derived from STIX data. Do not use when the flare isn't visible to Earth
goes_min_flux_est	W / m2	min GOES flux estimate derived from STIX data
goes_max_flux_est	W / m2	max GOES flux estimate derived from STIX data
goes_mean_flux_est	W / m2	mean GOES flux estimate derived from STIX data
lc_peak	ct	counts in 4s peak window from quicklook lightcurve
lc_bgk_peak	ct	background counts in 4s peak windowfrom quicklook lightcurve
energy_index		energy band index
soop_encoded_type		campaign ID

Basic Flare List

Column	Unit	Description
soop_encoded_type		campaign ID
soop_id		S00P ID
soop_type		name of the S00P campaign
anc_ephemeris_path		Path to the daily ancillary ephemeris file
cpd_path		Path to the CPD file used for flare location estimation
_position_status		Status of the flare position calculation
_position_message		Message describing the status of the flare position calculation
location_icrs	deg,deg,km	Flare location in ICRS coordinates at 'location_time_UTC'
solo_location_icrs	deg,deg,km	Solar Orbiter location in ICRS coordinates at 'location_time_UTC'
sidelobes_ratio		Ratio of sidelobes in the STIX image used to assess imaging quality
rcr_at_peak		max rcr level at flare location estimation time range, > 0 attenuator in place
visible_from_earth		Whether the flare location is visible from Earth (not occulted by the Sun)
location_time_UTC		time center used for flare location estimation in UTC
location_duration	s	duration of the flare location estimation time range
time_shift	s	Time(Sun to Earth) - Time(Sun to S/C)
sun_disc_size	arcsec	Apparent photospheric solar radius
location_hgs	deg,deg,km	Flare location in Heliographic Stonyhurst coordinates at 'location_time_UTC'
solo_location_hgs	deg,deg,km	Solar Orbiter location in Heliographic Stonyhurst coordinates at
'location_time_UTC'		

Flare List enhanced with imaging (Technical Preview)

Column	Unit	Description
flare_id		
start.UTC		
duration		
end.UTC		
peak.UTC		
GOES_class		
goes_min_class_est		
goes_max_class_est		
goes_mean_class_est		
GOES_flux		
goes_min_flux_est		
goes_max_flux_est		
goes_mean_flux_est		
bkg_baseline		
bkg_quiet_period		
lc_peak		
lc_peak_rate		
lc_bgk_peak		
lc_bgk_peak_rate		
rcr_at_peak		
rcr_max		
att_in		

Flare List enhanced with imaging (Technical Preview)

Column	Unit	Description

att_in		
energy_index		
soop_encoded_type		
soop_id		
soop_type		
anc_ephemeris_path		
cpd_path		
_position_status		
_position_message		
location_icrs.ra		
location_icrs.dec		
location_icrs.distance		
solo_location_icrs.ra		
solo_location_icrs.dec		
solo_location_icrs.distance		
sidelobes_ratio		
visible_from_earth		
location_time_UTC		
location_duration		
time_shift		