



## 16212 - HST Spectroscopy of a Fast-Rising Luminous Ultraviolet Transient

Cycle: 28, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

### INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
<b>Dr. Daniel Perley (PI) (ESA Member) (Contact)</b>	<b>Liverpool John Moores University</b>	<b>d.a.perley@ljmu.ac.uk</b>
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### VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(2) ZTF21AAKILYD	COS/FUV COS/NUV	2	16-Feb-2021 10:00:31.0	yes
03	(2) ZTF21AAKILYD	COS/FUV COS/NUV	2	16-Feb-2021 10:00:32.0	yes
02	(2) ZTF21AAKILYD	STIS/CCD STIS/NUV-MAMA	1	16-Feb-2021 10:00:33.0	yes
04	(2) ZTF21AAKILYD	STIS/CCD STIS/NUV-MAMA	1	16-Feb-2021 10:00:34.0	yes

6 Total Orbits Used

## **ABSTRACT**

The extremely luminous, fast, hot transient AT2018cow has provoked a reconsideration in our view of the transient sky. This event, by far the nearest example of the class of fast-rising luminous transients (sometimes referred to as FBOTs or FELTs), displayed an array of peculiar properties that highly strain theoretical models for what is possible in a supernova explosion. For all their peculiarities, however, fast-rising transients are not rare in a volumetric sense - and with ZTF and ATLAS both obtaining high-cadence observations of wide areas of the northern sky it is probable that another such event will be observed in the coming year. These are primarily ultraviolet phenomena, and UV spectroscopy has the power to reveal similarities or differences between this event and other known varieties of transient (including young CCSNe, superluminous SNe, and TDEs) that are not apparent in optical observations alone, and to discover (or rule out) the presence of a dense stellar wind around the progenitor. We propose to obtain target-of-opportunity UV spectroscopy of another event of this type in Cycle 28 to critically evaluate these links and secure the physical origins of this class while HST's unique UV spectroscopic resource is still available.

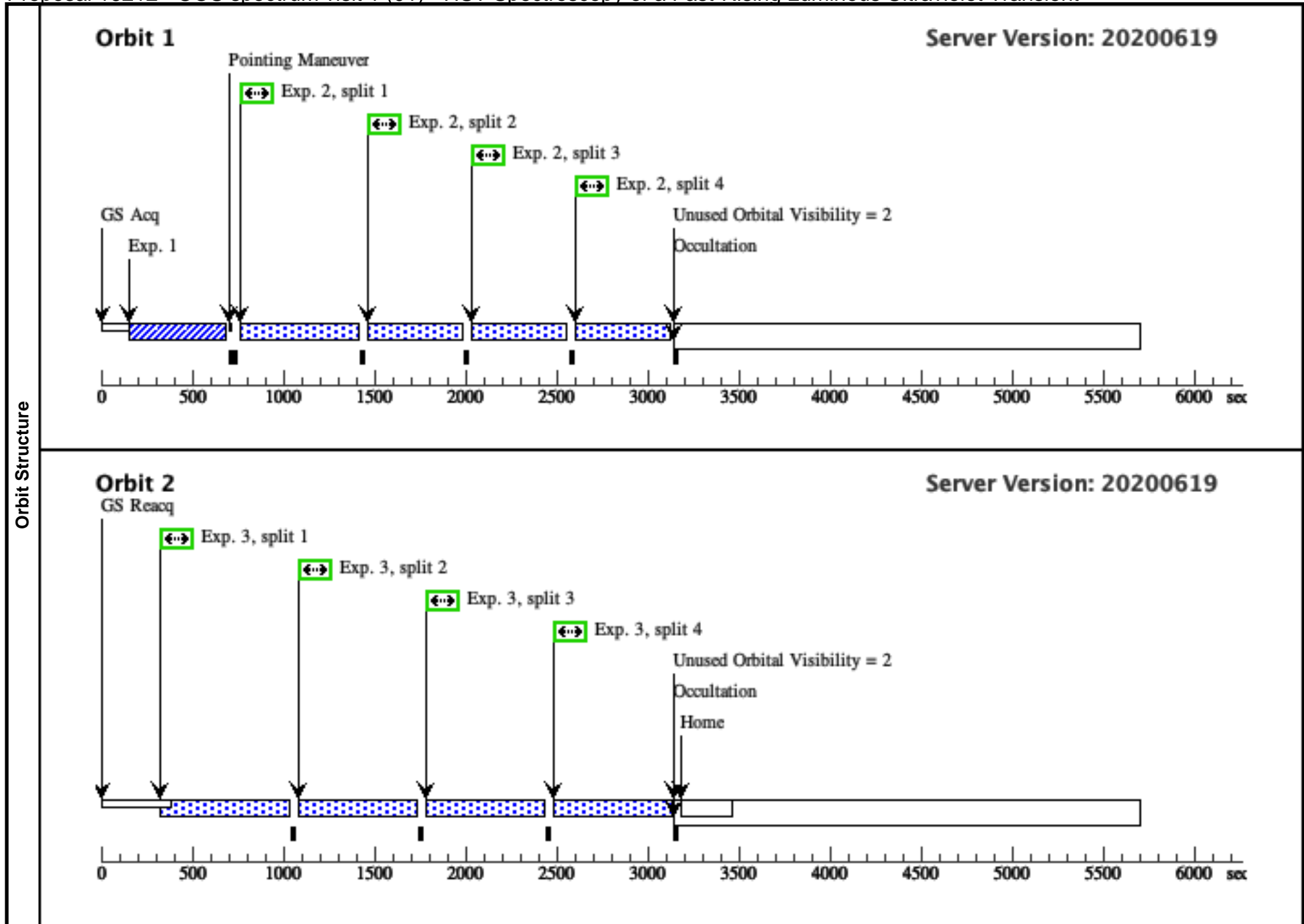
## **OBSERVING DESCRIPTION**

This is a target of opportunity UV spectroscopy proposal that requires as fast turnaround as possible (but not an ultra-rapid response). Selection will be based on ground-based observations and we will supply a precise coordinate for the target as soon as possible. Observations will be requested in the COS/G140L and STIS/G230L grisms. Our nominal plan is to obtain two epochs separated by 1-2 week, although this may depend on the actual brightness and evolution of the target.

Proposal 16212 - COS spectrum visit 1 (01) - HST Spectroscopy of a Fast-Rising Luminous Ultraviolet Transient

Tue Feb 16 15:00:34 GMT 2021

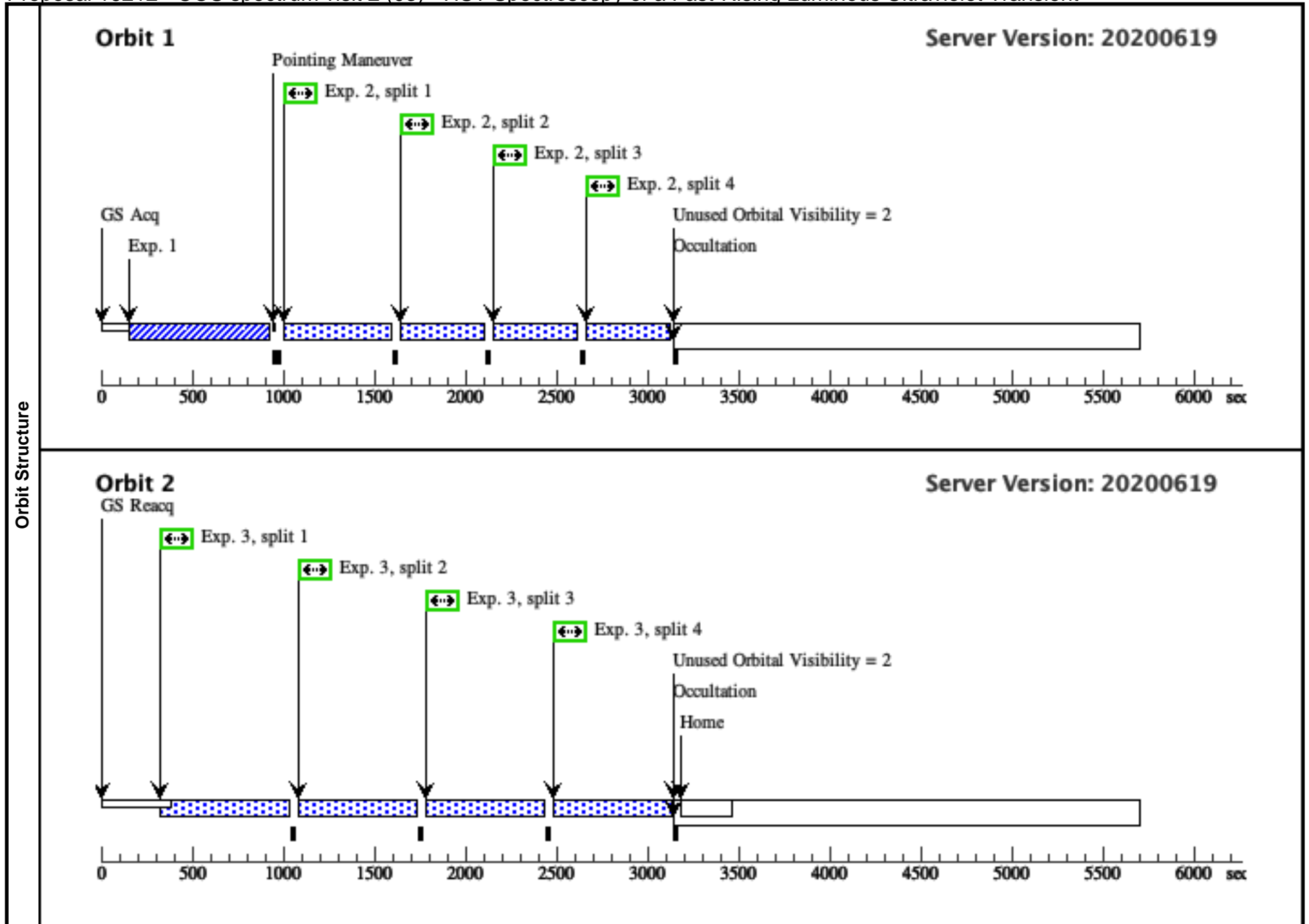
<b>Visit</b>	<b>Proposal 16212, COS spectrum visit 1 (01), scheduled</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: COS/FUV, COS/NUV Special Requirements: ON HOLD ; TOO RESPONSE TIME 4.0D <i>Comments: Exposure times will need to be changed depending on the visibility duration of the actual target at the time of trigger.</i> <i>On Hold Comments: Target of opportunity awaiting a suitable trigger from ZTF or another survey. The prototypical event of this class faded by 0.25 mag/day, so sooner is always better. A response slower than 4 days may be acceptable depending on the initial brightness of the event. This observation should take place as close in time as possible to the STIS observation.</i>																																													
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Proposal 16212 - COS spectrum visit 2 (03) - HST Spectroscopy of a Fast-Rising Luminous Ultraviolet Transient

Tue Feb 16 15:00:34 GMT 2021

<b>Visit</b>	<b>Proposal 16212, COS spectrum visit 2 (03), scheduled</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: COS/FUV, COS/NUV Special Requirements: AFTER 01 BY 2 D TO 16 D; ON HOLD ; TOO RESPONSE TIME 4.0D <i>On Hold Comments: Target of opportunity awaiting a suitable trigger from ZTF or another survey. This is a follow-up spectrum to be executed approximately 1-2 weeks after the first. Depending on the brightness and nature of evolution of the actual target we may wish to change the timescale.</i>																																																																						
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# Proposal 16212 - STIS spectrum visit 1 (02) - HST Spectroscopy of a Fast-Rising Luminous Ultraviolet Transient

Tue Feb 16 15:00:34 GMT 2021

<b>Visit</b>	<b>Proposal 16212, STIS spectrum visit 1 (02), scheduled</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: STIS/NUV-MAMA, STIS/CCD Special Requirements: ON HOLD ; TOO RESPONSE TIME 4.0D Comments: Exposure times will need to be changed depending on the visibility duration of the actual target at the time of trigger. On Hold Comments: Target of opportunity awaiting a suitable trigger from ZTF or another survey. The prototypical event of this class faded by 0.25 mag/day, so sooner is always better. A response slower than 4 days may be acceptable depending on the initial brightness of the event. This observation should take place as close in time as possible to the COS observation.									
<b>Fixed Targets</b>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	ZTF21AAKILYD Alt Name1: AT2021CSP	RA: 14 26 22.1220 (216.5921750d) Dec: +05 51 33.26 (5.85924d) Equinox: J2000	Redshift: 0.081	V=18 u=17.5	Reference Frame: ICRS				
Comments: Category=EXT-STAR Description=[SUPERNOVA] Extended=NO										
<b>Exposures</b>	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	Acquisition (STIS.ta.145 D 0666)	(2) ZTF21AAKILY D	STIS/CCD, ACQ, F28X50LP	MIRROR		GS ACQ SCENARI O SINGLE		30 Secs (30 Secs) [==>]	[1]
	2	STIS spectrum (STIS.sp.14 50230)	(2) ZTF21AAKILY D	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A	BUFFER-TIME=66 3			2100 Secs (2100 Secs) [==>]	[1]
<b>Orbit Structure</b>	<div style="display: flex; justify-content: space-between;"> <span><b>Orbit 1</b></span> <span><b>Server Version: 20200619</b></span> </div> <p>The diagram illustrates the orbit structure over a 6000-second period. It shows the timing of various activities: GS Acq at the start, two exposure periods (Exp. 1 and Exp. 2), a pointing maneuver, a long occultation period, and a return to home position. The total unused orbital visibility is 97 seconds.</p>									

# Proposal 16212 - STIS spectrum visit 2 (04) - HST Spectroscopy of a Fast-Rising Luminous Ultraviolet Transient

Tue Feb 16 15:00:34 GMT 2021

<b>Visit</b>	<b>Proposal 16212, STIS spectrum visit 2 (04), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: STIS/NUV-MAMA, STIS/CCD Special Requirements: SCHED 70%; AFTER 02 BY 2 D TO 16 D; ON HOLD ; TOO RESPONSE TIME 4.0D <i>On Hold Comments: Target of opportunity awaiting a suitable trigger from ZTF or another survey. This is a follow-up spectrum to be executed approximately 1-2 weeks after the first. Depending on the brightness and nature of evolution of the actual target we may wish to change the timescale.</i>									
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	1	Acquisition (STIS.ta.147 D 8302)	(2) ZTF21AAKILY D	STIS/CCD, ACQ, F28X50LP	MIRROR		GS ACQ SCENARI O SINGLE		45 Secs (45 Secs) [==>]	[1]
	2	STIS spectrum (STIS.sp.14 50230)	(2) ZTF21AAKILY D	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A	BUFFER-TIME=66 3			2100 Secs (2030 Secs) [==>2030.0 Secs]	[1]
<b>Orbit Structure</b>	<div style="display: flex; justify-content: space-between;"> <span><b>Orbit 1</b></span> <span><b>Server Version: 20200619</b></span> </div>									