15600 - Seeing The Cow in Ultraviolet Light

Cycle: 25, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) AT2018COW	WFC3/UVIS	1	02-Aug-2018 18:11:40.0	yes
02	(1) AT2018COW	WFC3/UVIS	1	02-Aug-2018 18:11:41.0	yes
03	(1) AT2018COW	WFC3/UVIS	1	02-Aug-2018 18:11:42.0	yes

3 Total Orbits Used

ABSTRACT

With an exponentially increasing number of explosive transient discoveries, we are finding increasingly diverse and spectacular ways for stars to die. In the last few years, we identified a class of rapidly evolving transients - objects with luminosities similar to supernovae (SN), but fade ten times faster. They are distinct from normal SN, and represent a new variety of stellar explosion.

We recently discovered a truly unique member, AT 2018cow ("The Cow"). It is similar to other rapidly-evolving transients, but represents both the most luminous and fastest event discovered to date. In addition, it exhibits a significant non-thermal component, manifesting as both strong radio emission and particularly luminous, long-lasting, and variable X-ray emission. Such a transient was not predicted and no physical model to-date explains all observations. The prompt discovery, high luminosity, and close distance (60 Mpc) of The Cow offer an unique opportunity to probe the nature of these explosions.

Currently, the best models are either a magnetar-powered explosion or a fallback supernova. While current observations cannot distinguish between these models, continued photometric monitoring in the UV with HST can. Multiple imaging epochs can also provide a link between the thermal and non-thermal components if the X-ray decline changes significantly during this campaign. A UV spectrum will reveal unique spectral species, constraining the nature of the progenitor star. Here we request HST UV spectra and photometry to determine the progenitor and explosion scenario for this extraordinary event and to provide a legacy data set for future "bovine" transients.

OBSERVING DESCRIPTION

We plan to image AT 2018cow in 4 UV filters over 3 epochs.

Visit

Proposal 15600, Visit 01, implementation Thu Aug 02 22:11:43 GMT 2018

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: BEFORE 09-AUG-2018:00:00:00

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1-4)

Fixed Targets

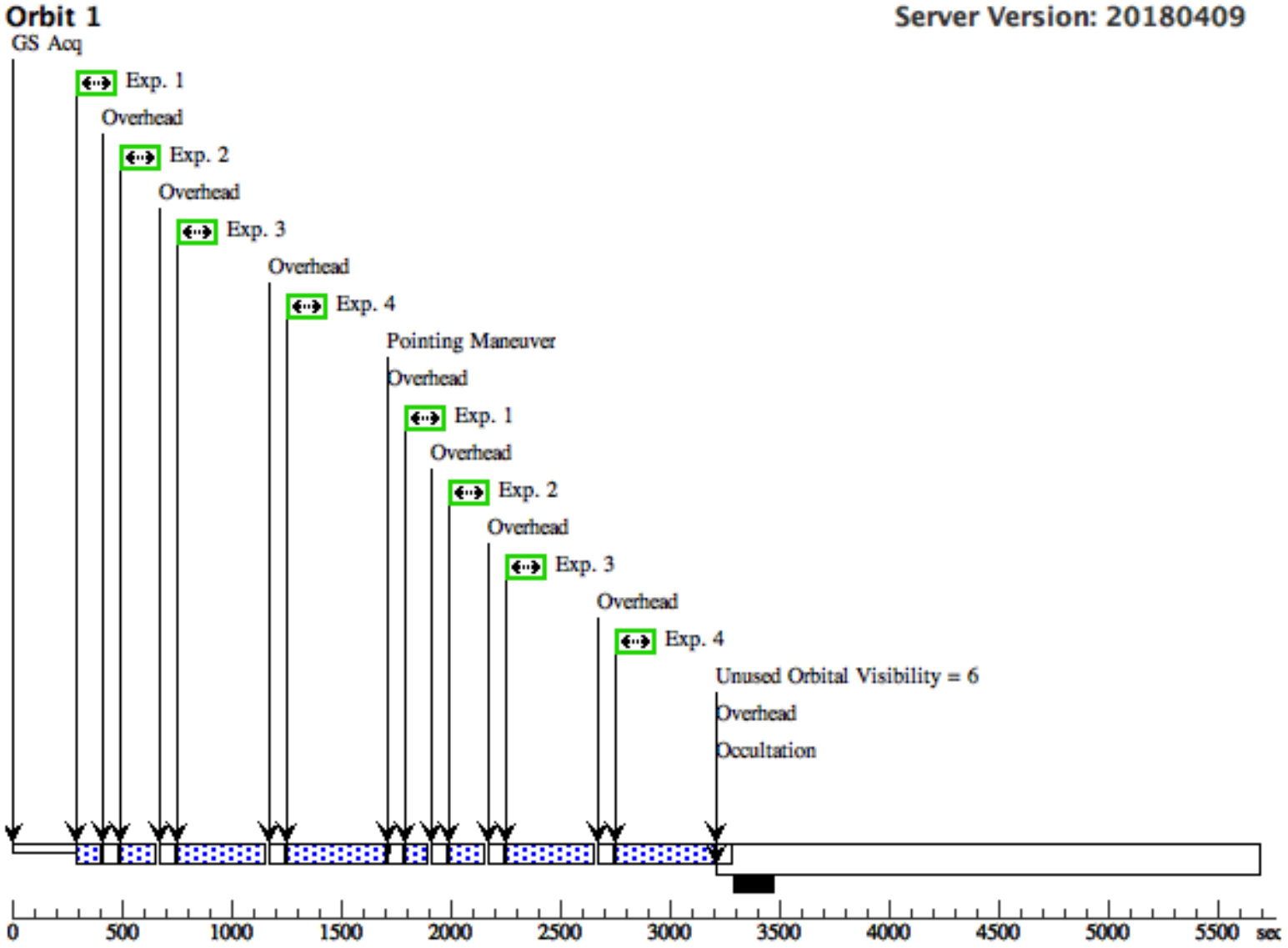
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	AT2018COW	RA: 16 16 0.2200 (244.0009167d) Dec: +22 16 4.83 (22.26801d) Equinox: J2000		V=18.0+/-0.1 UVW1 = 15.98 and WUVW2 = 16.13 on 7/7	Reference Frame: ICRS

Comments:
Category=STAR
Description=[SUPERNOVA, X-RAY TRANSIENT]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) AT2018COW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F336W	FLASH=12		Pattern 1, Exps 1-4 in Visit 01 (1)	75 Secs (150 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2		(1) AT2018COW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F275W	FLASH=12		Pattern 1, Exps 1-4 in Visit 01 (1)	140 Secs (280 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
3		(1) AT2018COW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F225W	FLASH=12		Pattern 1, Exps 1-4 in Visit 01 (1)	385 Secs (770 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
4		(1) AT2018COW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F218W	FLASH=12		Pattern 1, Exps 1-4 in Visit 01 (1)	440 Secs (880 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***

Orbit Structure



Visit

Proposal 15600, Visit 02, implementation Thu Aug 02 22:11:43 GMT 2018

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: SAME ORIENT AS 01; AFTER 01 BY 4 D TO 6 D

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1-4)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	AT2018COW	RA: 16 16 0.2200 (244.0009167d) Dec: +22 16 4.83 (22.26801d) Equinox: J2000		V=18.0+/-0.1 UVW1 = 15.98 and WUVW2 = 16.13 on 7/7	Reference Frame: ICRS

Comments:
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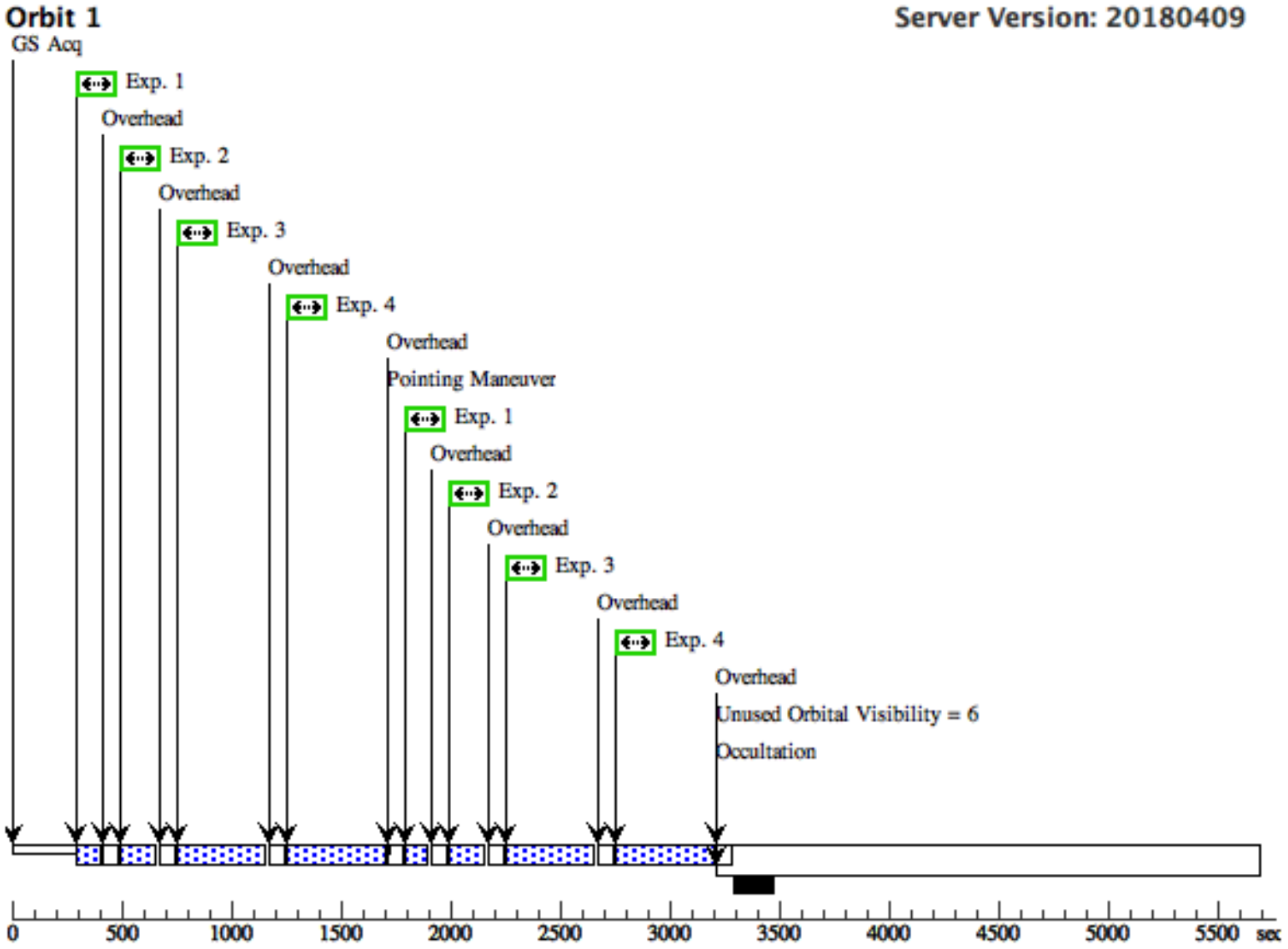
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) AT2018COW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F336W	FLASH=12	POS TARG -0.5,-0.5	Pattern 1, Exps 1-4 in Visit 02 (1)	75 Secs (150 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2		(1) AT2018COW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F275W	FLASH=12	POS TARG -0.5,-0.5	Pattern 1, Exps 1-4 in Visit 02 (1)	140 Secs (280 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
3		(1) AT2018COW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F225W	FLASH=12	POS TARG -0.5,-0.5	Pattern 1, Exps 1-4 in Visit 02 (1)	385 Secs (770 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
4		(1) AT2018COW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F218W	FLASH=12	POS TARG -0.5,-0.5	Pattern 1, Exps 1-4 in Visit 02 (1)	440 Secs (880 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***

Orbit Structure



Visit

Proposal 15600, Visit 03, implementation Thu Aug 02 22:11:43 GMT 2018

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: SAME ORIENT AS 01; AFTER 02 BY 4 D TO 6 D

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1-4)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	AT2018COW	RA: 16 16 0.2200 (244.0009167d) Dec: +22 16 4.83 (22.26801d) Equinox: J2000		V=18.0+/-0.1 UVW1 = 15.98 and WUVW2 = 16.13 on 7/7	Reference Frame: ICRS

Comments:
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Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) AT2018COW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F336W	FLASH=12	POS TARG -1,-1	Pattern 1, Exps 1-4 in Visit 03 (1)	75 Secs (150 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2		(1) AT2018COW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F275W	FLASH=12	POS TARG -1,-1	Pattern 1, Exps 1-4 in Visit 03 (1)	140 Secs (280 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
3		(1) AT2018COW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F225W	FLASH=12	POS TARG -1,-1	Pattern 1, Exps 1-4 in Visit 03 (1)	385 Secs (770 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
4		(1) AT2018COW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F218W	FLASH=12	POS TARG -1,-1	Pattern 1, Exps 1-4 in Visit 03 (1)	440 Secs (880 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***

Orbit Structure