XRT Flare Mode Discussion

- Science Goal 1: Determine the coronal configuration(s) that lead to flares (arbitrarily called "HOP 101")

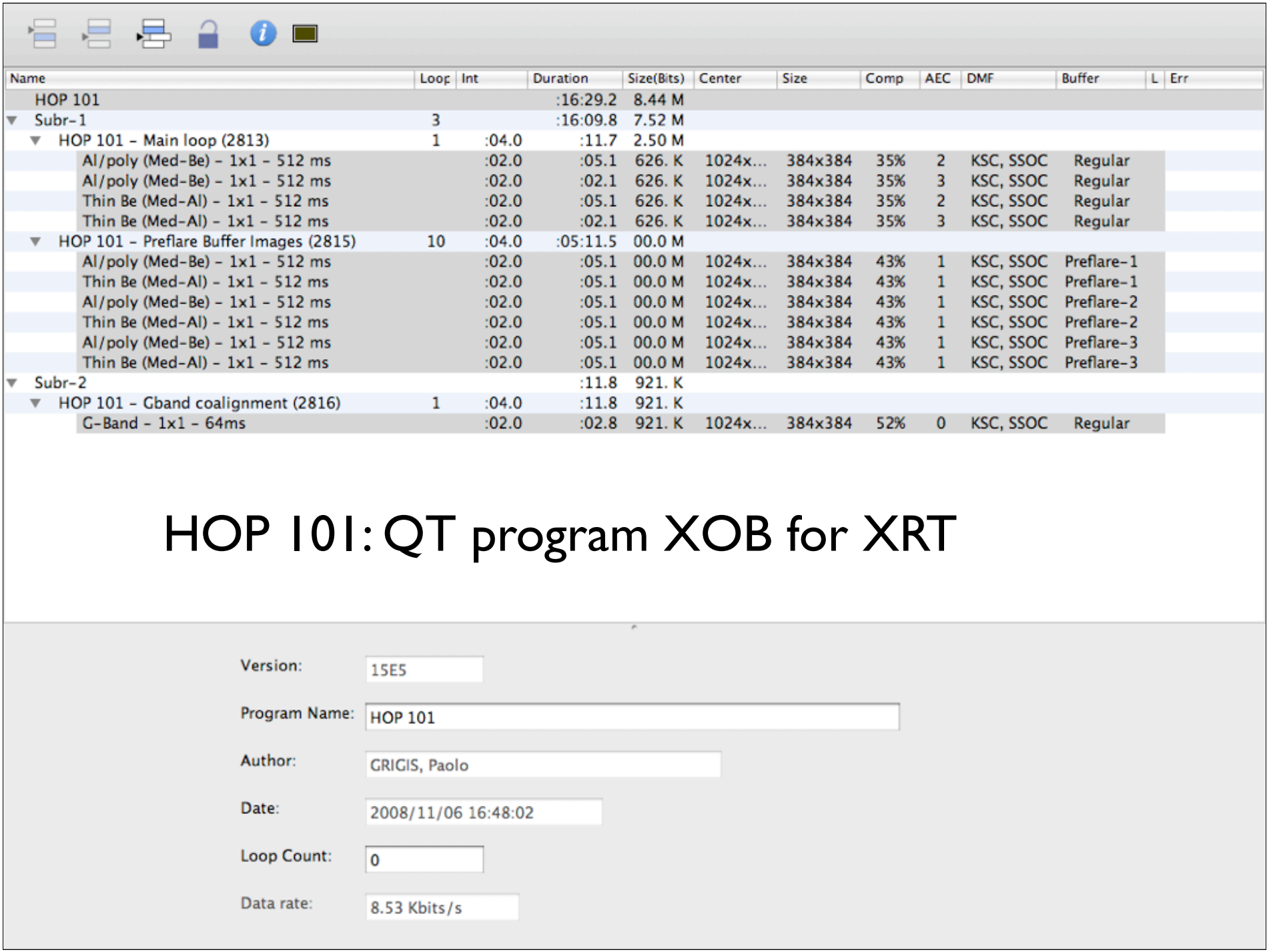
- Comment: this is a medium to long timescale project (in contrast with 4, which considers shorter timescales)

- Normal mode program (QT) should run for 12-24 hours previous to the flare.

- XRT QT program: Al/poly(Med-Be) and Thin-Be(Med-Al), 384x384, no binning, long (AEC 2)/ short (AEC 3) pairs, 5 min cadence. Every 15 minutes, G-band to coalign with SOT. The program will also take the same images (single exposure, AEC 1,not pairs) in the preflare buffer. The preflare buffer should cover the 5 min before the flare flag is set with increasing cadence. Q92 for regular images, Q95 for preflare. The program uses ~ 8 Mbits/hour and can be run for 24 hours with 192Mbits. The preflare data needs 45 Mbits.

- XRT FL program: Thin-Be(Thin-Be+Thick-Be) (for continuity) and Med-Be(Med-Be+Thick-Al) with AEC 1, 20 second cadence for the first 5 minutes, than 60 second cadence. Q95. This takes 11Mbits for the first 5 minutes, then 52 Mbits/hour for max 2 hours (in the very rare case of a long duration flare, additional images are taken at 15 min cadence).

- Size of one HOP run Assuming 24 hours of observations with one 60 min long flare: 290 Mbits. Flare patrol images taken with 60 second cadence.



Name	Loop	Int	Duration	Size(Bits)	Center	Size	Comp	AEC	DMF	Buffer	L	Err
HOP 101			:16:29.2	8.44 M								
▼ Subr-1	3		:16:09.8	7.52 M								
▼ HOP 101 - Main loop (2813)	1	:04.0	:11.7	2.50 M								
Al/poly (Med-Be) - 1x1 - 512 ms		:02.0	:05.1	626. K	1024x...	384x384	35%	2	KSC, SSOC	Regular		
Al/poly (Med-Be) - 1x1 - 512 ms		:02.0	:02.1	626. K	1024x...	384x384	35%	3	KSC, SSOC	Regular		
Thin Be (Med-Al) - 1x1 - 512 ms		:02.0	:05.1	626. K	1024x...	384x384	35%	2	KSC, SSOC	Regular		
Thin Be (Med-Al) - 1x1 - 512 ms		:02.0	:02.1	626. K	1024x...	384x384	35%	3	KSC, SSOC	Regular		
▼ HOP 101 - Preflare Buffer Images (2815)	10	:04.0	:05:11.5	00.0 M								
Al/poly (Med-Be) - 1x1 - 512 ms		:02.0	:05.1	00.0 M	1024x...	384x384	43%	1	KSC, SSOC	Preflare-1		
Thin Be (Med-Al) - 1x1 - 512 ms		:02.0	:05.1	00.0 M	1024x...	384x384	43%	1	KSC, SSOC	Preflare-1		
Al/poly (Med-Be) - 1x1 - 512 ms		:02.0	:05.1	00.0 M	1024x...	384x384	43%	1	KSC, SSOC	Preflare-2		
Thin Be (Med-Al) - 1x1 - 512 ms		:02.0	:05.1	00.0 M	1024x...	384x384	43%	1	KSC, SSOC	Preflare-2		
Al/poly (Med-Be) - 1x1 - 512 ms		:02.0	:05.1	00.0 M	1024x...	384x384	43%	1	KSC, SSOC	Preflare-3		
Thin Be (Med-Al) - 1x1 - 512 ms		:02.0	:05.1	00.0 M	1024x...	384x384	43%	1	KSC, SSOC	Preflare-3		
▼ Subr-2			:11.8	921. K								
▼ HOP 101 - Gband coalignment (2816)	1	:04.0	:11.8	921. K								
G-Band - 1x1 - 64ms		:02.0	:02.8	921. K	1024x...	384x384	52%	0	KSC, SSOC	Regular		

HOP 101: QT program XOB for XRT

Version:	15E5
Program Name:	HOP 101
Author:	GRIGIS, Paolo
Date:	2008/11/06 16:48:02
Loop Count:	0
Data rate:	8.53 Kbits/s

PRG: 15E6: HOP 101- Flare response

Name	Loop	Int	Duration	Size(Bits)	Center	Size	Comp	AEC	DMF	Buffer	L
HOP 101- Flare response (15E6)			:06:22:41.2	279. M							
Subr-1	1	:02.0	:05:13.3	24.1 M							
HOP 101 - Flare response (2817)	15	:20.0	:05:00.0	23.2 M							
Thin-Be (Thin-Be + Thick-Be) - 1x1 - 128ms		:02.0	:11.3	774. K	1024x...	384x384	43%	1	KSC, SSOC	Regular	
Med-Be (Med-Be + Thick-Al) - 1x1 - 362ms		:02.0	:04.0	774. K	1024x...	384x384	43%	1	KSC, SSOC	Regular	
HOP 101 - Gband coalignment (2816)	1	:04.0	:13.3	921. K							
G-Band - 1x1 - 64ms		:02.0	:13.3	921. K	1024x...	384x384	52%	0	KSC, SSOC	Regular	
Subr-2	8	:02.0	:02:01:46.7	193. M							
HOP 101 - Flare response -short exposure (2818)	15	:01:00.0	:15:00.0	23.2 M							
Thin-Be (Thin-Be + Thick-Be) - 1x1 - 16ms		:02.0	:11.3	774. K	1024x...	384x384	43%	1	KSC, SSOC	Regular	
Med-Be (Med-Be + Thick-Al) - 1x1 - 64ms		:02.0	:03.7	774. K	1024x...	384x384	43%	1	KSC, SSOC	Regular	
HOP 101 - Gband coalignment (2816)	1	:04.0	:04.0	921. K							
G-Band - 1x1 - 64ms		:02.0	:13.3	921. K	1024x...	384x384	52%	0	KSC, SSOC	Regular	
Subr-3	25	:02.0	:04:15:33.6	61.7 M							
HOP 101 - Flare response (2817)	1	:10:00.0	:10:00.0	1.54 M							
Thin-Be (Thin-Be + Thick-Be) - 1x1 - 128ms		:02.0	:11.3	774. K	1024x...	384x384	43%	1	KSC, SSOC	Regular	
Med-Be (Med-Be + Thick-Al) - 1x1 - 362ms		:02.0	:04.0	774. K	1024x...	384x384	43%	1	KSC, SSOC	Regular	
HOP 101 - Gband coalignment (2816)	1	:04.0	:13.3	921. K							
G-Band - 1x1 - 64ms		:02.0	:13.3	921. K	1024x...	384x384	52%	0	KSC, SSOC	Regular	

HOP 101: FL program XOB for XRT

Version:	15E6
Program Name:	HOP 101- Flare response
Author:	GRIGIS, Paolo
Date:	2008/11/06 21:06:10
Loop Count:	0
Data rate:	12.1 Kbits/s

- Science Goal 2: Locate and measure the properties of inflows in flare current sheets in the corona related to flares (HOP102).

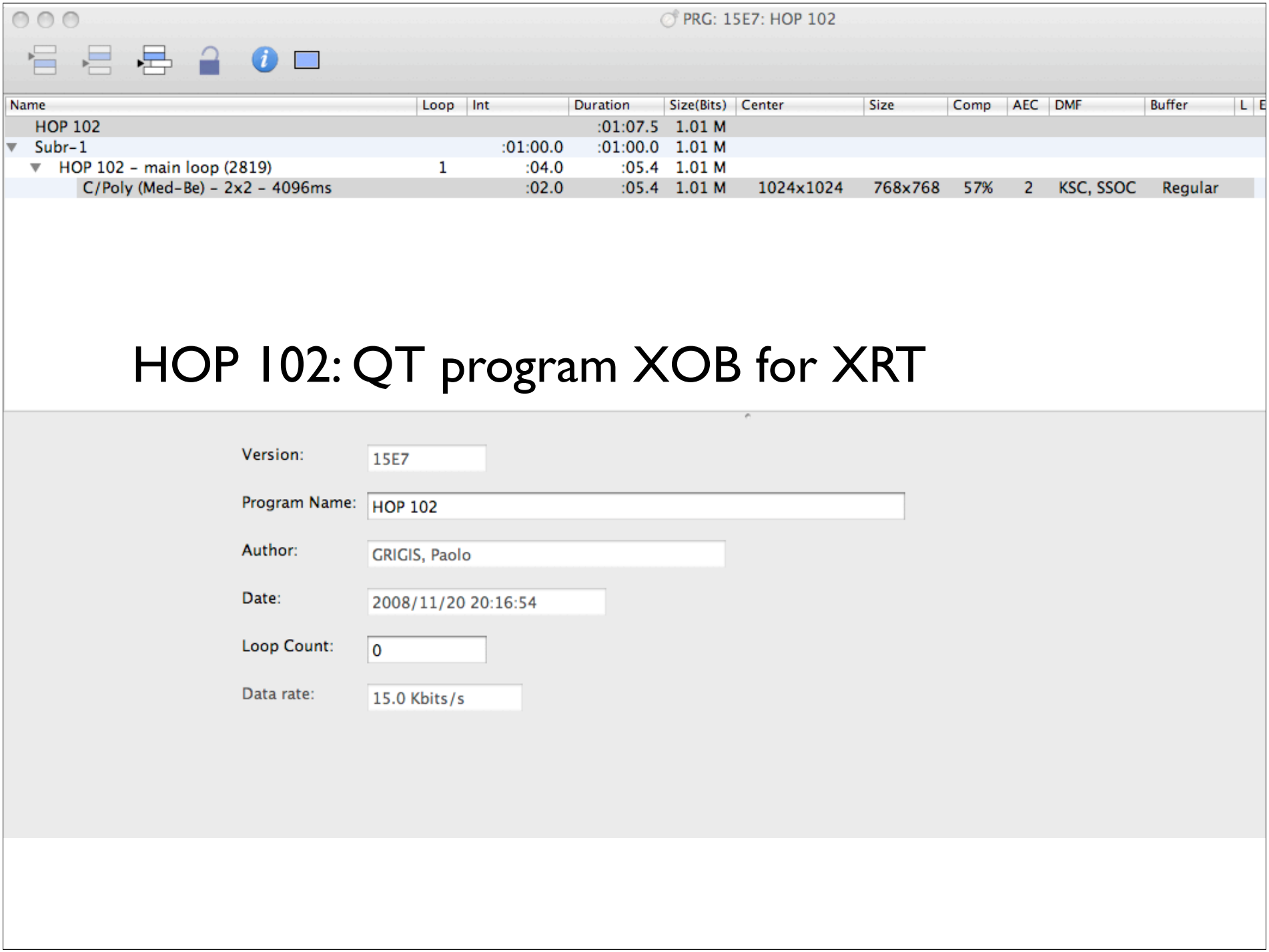
- Comment: this is a flare and post-flare project to be run as TOO for a flare on an AR near the limb.

- Normal mode program (QT) should run for 6 hours.

- XRT QT program: C/poly(Med-Be), 768x768, binned 2x2, 60 sec cadence, lossless DPCM compression (lossy compression cannot be used because we need to detect dynamical behavior of faint structures!), AEC 2 (overexposes the quiet Sun at limb to better see faint structures above the limb), FOV offset toward limb. This takes 263Mbits of data in 6 hours.

- XRT FL program: Med-Be(Med-Be+Thick-Al), 768x768, binned 2x2, 30 seconds cadence, DPCM, AEC 2 (overexposes the flare core). This takes about 83Mbit/hour. FOV offset toward limb. Alternatively, this can be run at 1024x1024 with 53 seconds cadence instead.

- Size of one HOP run, assuming 6 hours of observations (with a 60 min long flare): 302 Mbits. Flare patrol images taken with 90 seconds cadence.


PRG: 15E7: HOP 102
Name
Loop
Int
Duration
Size(Bits)
Center
Size
Comp
AEC
DMF
Buffer
L
HOP 102
:01:07.5
1.01 M
Subr-1
:01:00.0
:01:00.0
1.01 M
HOP 102 - main loop (2819)
1
:04.0
:05.4
1.01 M
C/Poly (Med-Be) - 2x2 - 4096ms
:02.0
:05.4
1.01 M
1024x1024
768x768
57%
2
KSC, SSOC
Regular
HOP 102: QT program XOB for XRT
Version:
15E7
Program Name:
HOP 102
Author:
GRIGIS, Paolo
Date:
2008/11/20 20:16:54
Loop Count:
0
Data rate:
15.0 Kbits/s

PRG: 15E8: HOP 102- Flare response

Name	Loop	Int	Duration	Size(Bits)	Center	Size	Comp	AEC	DMF	Buffer	L	Er
HOP 102- Flare response (15E8)			:37.5	774. K								
▼ Subr-1			:30.0	774. K								
▼ HOP 102 - Flare response (281A)	1	:30.0	:30.0	774. K								
Med-Be (Med-Be + Thick-Al) - 2x2 - 128ms		:02.0	:02.0	774. K	1024x1024	768x768	43%	2	KSC, SSOC	Regular		

HOP 102: FL program XOB for XRT

Version:	15E8
Program Name:	HOP 102- Flare response
Author:	GRIGIS, Paolo
Date:	2008/11/21 16:09:35
Loop Count:	0
Data rate:	20.6 Kbits/s

- Science Goal 3: Measure the eruption speeds of CMEs as they first develop and leave the solar surface (HOP 103).

- Comment: this is a flare program and preflare program to observe the dynamics of SXR ejecta.

- XRT QT program: Thin-Be(Med-Al), 768x768, binned 2x2, AEC 1,Q90, 25 seconds cadence. Preflare buffer are used to improve cadence around the start of the flare (however, we have to keep in mind that the CME may not be so kind as to start exactly at the same time as the flare). Unbinned 384x384 G-band images for coalignment in context. The preflare buffers take Thin-Be(Med-Al), 768x768, binned 2x2, AEC 1,Q95 images. This will deliver increased cadence starting about 120 seconds before the flare is detected. Normal mode program takes 280 Mbits for a 6 hour run.

- XRT FL program: Med-Al (Med-Al+Thick-Al), 1024x1024, binned 2x2, AEC1, Q90, 10 sec cadence. Unbinned 384x384 G-band for coalignment in context. This take 20Mbits more than the QT program.

- The program will take 360 Mbits for a 6 hour run with one flare and one set of preflare buffer images. Flare patrol images taken with 60 seconds cadence.

PRG: 15E9: HOP 103

Name	Loop	Int	Duration	Size(Bits)	Center	Size	Comp	AEC	DMF	Buffer	L	Err
HOP 103 (15E9)			:10:19.3	13.6 M								
▼ Subr-1	24	:02.0	:10:00.0	12.7 M								
▼ HOP 103 - main loop (281C)	1	:05.0	:05.0	530. K								
Thin Be (Med-Al) - 2x2 - 512 ms		:02.0	:02.0	530. K	1024x1024	768x768	30%	1	KSC, SSOC	Regular		
▼ HOP 103 - preflare buffer (281D)	1	:20.0	:20.0	00.0 M								
Thin Be (Med-Al) - 2x2 - 512 ms		:06.0	:06.0	00.0 M	1024x1024	768x768	43%	1	KSC, SSOC	Preflare-1		
Thin Be (Med-Al) - 2x2 - 512 ms		:06.0	:06.0	00.0 M	1024x1024	768x768	43%	1	KSC, SSOC	Preflare-2		
Thin Be (Med-Al) - 2x2 - 512 ms		:06.0	:06.0	00.0 M	1024x1024	768x768	43%	1	KSC, SSOC	Preflare-3		
▼ Subr-2	1	:02.0	:11.8	921. K								
▼ HOP 101 - Gband coalignment (2816)	1	:04.0	:11.8	921. K								
G-Band - 1x1 - 64ms		:02.0	:11.8	921. K	1024x1024	384x384	52%	0	KSC, SSOC	Regular		

HOP 103: QT program XOB for XRT

Version: 15E9

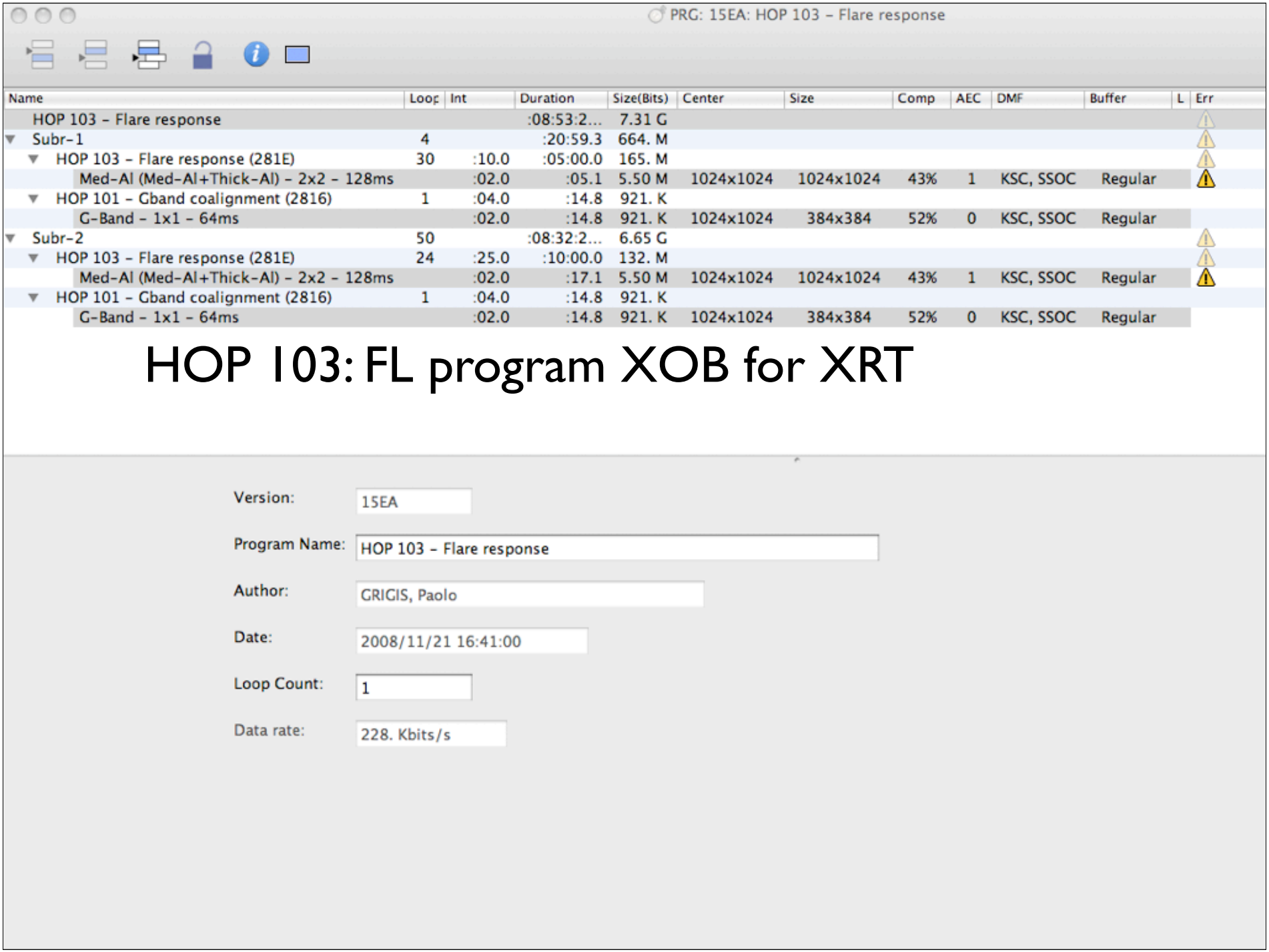
Program Name: HOP 103

Author: GRIGIS, Paolo

Date: 2008/11/21 16:15:59

Loop Count: 0

Data rate: 22.0 Kbits/s



HOP 103: FL program XOB for XRT

- Science Goal 4: Find the locations and basic observable properties of flare initiation sites in the corona (HOP 104)

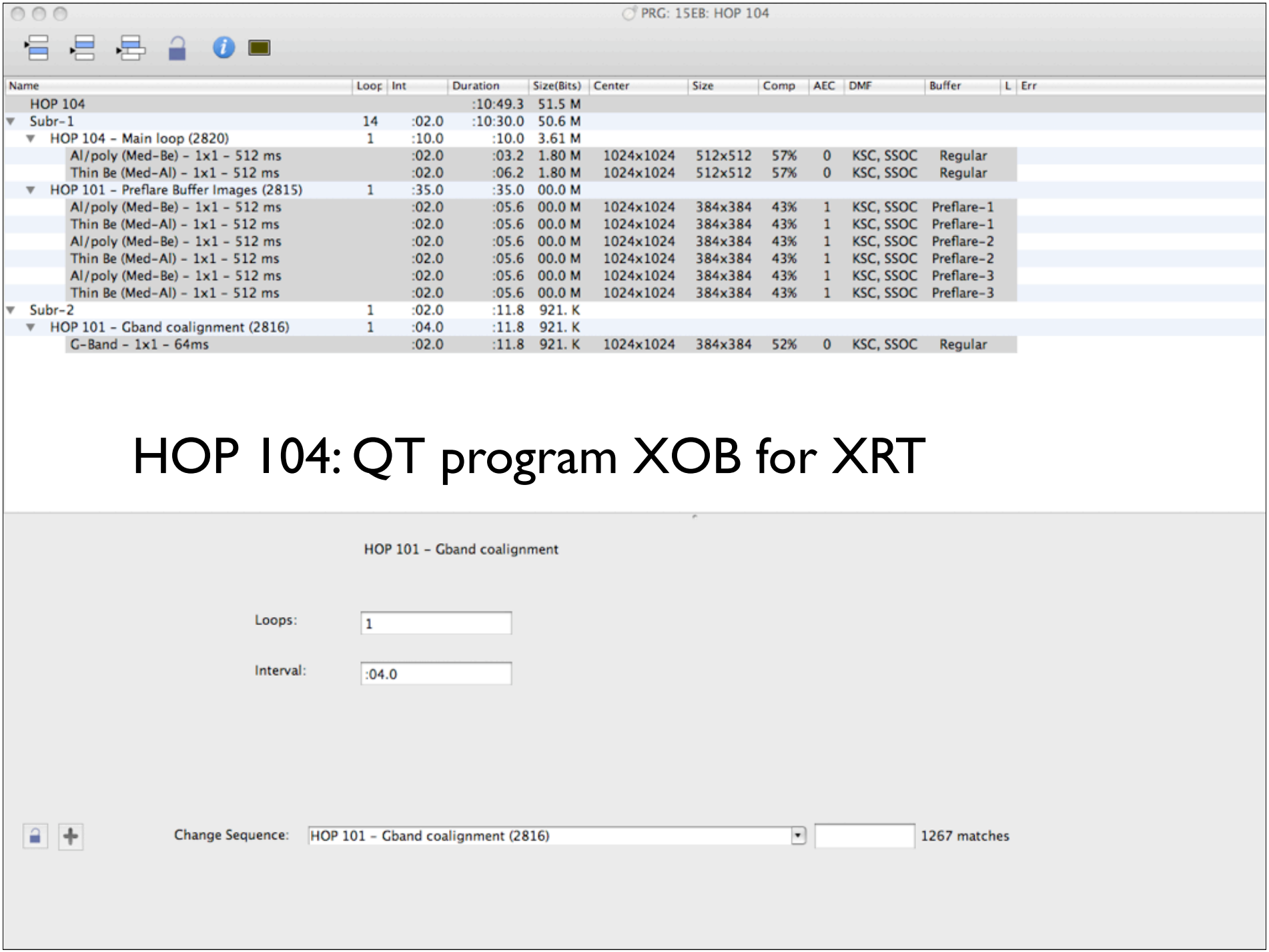
- Comment: this is similar to number 1, but the emphasis is more on short term phenomena and triggering for the flare.

- Normal mode program (QT) should run for 6 hours.

- XRT QT program: Al/poly(Med-Be) and Thin-Be(Med-Al), 384x384, no binning, AEC 1, 45 sec cadence. Every 15 minutes, G-band to coalign with SOT. The program will also take the same images (single exposure, AEC 1, not pairs) in the preflare buffer. The preflare buffer should cover the 4 min before the flare flag is set with increasing cadence. Q90 for regular images, Q95 for preflare. The program uses 30 Mbits/hour and can be run for 6 hours with 180Mbits. The preflare data needs 45 Mbits.

- XRT FL program: (same as for HOP 101) Thin-Be(Thin-Be+Thick-Be) (for continuity) and Med-Be(Med-Be+Thick-Al) with AEC 1, 20 second cadence for the first 5 minutes, than 60 second cadence. Q95. This takes 11Mbits for the first 5 minutes, then 52 Mbits/hour for max 2 hours (in the very rare case of a long duration flare, additional images are taken at 15 min cadence).

- The program takes about 280 Mbits for a 6 hour run with one 60min long flare. Flare patrol images are taken with 60 second cadence.



HOP 104: QT program XOB for XRT

PRG: 15E6: HOP 101- Flare response

Name	Loop	Int	Duration	Size(Bits)	Center	Size	Comp	AEC	DMF	Buffer	L
HOP 101- Flare response (15E6)			:06:22:41.2	279. M							
Subr-1	1	:02.0	:05:13.3	24.1 M							
HOP 101 - Flare response (2817)	15	:20.0	:05:00.0	23.2 M							
Thin-Be (Thin-Be + Thick-Be) - 1x1 - 128ms		:02.0	:11.3	774. K	1024x...	384x384	43%	1	KSC, SSOC	Regular	
Med-Be (Med-Be + Thick-Al) - 1x1 - 362ms		:02.0	:04.0	774. K	1024x...	384x384	43%	1	KSC, SSOC	Regular	
HOP 101 - Gband coalignment (2816)	1	:04.0	:13.3	921. K							
G-Band - 1x1 - 64ms		:02.0	:13.3	921. K	1024x...	384x384	52%	0	KSC, SSOC	Regular	
Subr-2	8	:02.0	:02:01:46.7	193. M							
HOP 101 - Flare response -short exposure (2818)	15	:01:00.0	:15:00.0	23.2 M							
Thin-Be (Thin-Be + Thick-Be) - 1x1 - 16ms		:02.0	:11.3	774. K	1024x...	384x384	43%	1	KSC, SSOC	Regular	
Med-Be (Med-Be + Thick-Al) - 1x1 - 64ms		:02.0	:03.7	774. K	1024x...	384x384	43%	1	KSC, SSOC	Regular	
HOP 101 - Gband coalignment (2816)	1	:04.0	:04.0	921. K							
G-Band - 1x1 - 64ms		:02.0	:13.3	921. K	1024x...	384x384	52%	0	KSC, SSOC	Regular	
Subr-3	25	:02.0	:04:15:33.6	61.7 M							
HOP 101 - Flare response (2817)	1	:10:00.0	:10:00.0	1.54 M							
Thin-Be (Thin-Be + Thick-Be) - 1x1 - 128ms		:02.0	:11.3	774. K	1024x...	384x384	43%	1	KSC, SSOC	Regular	
Med-Be (Med-Be + Thick-Al) - 1x1 - 362ms		:02.0	:04.0	774. K	1024x...	384x384	43%	1	KSC, SSOC	Regular	
HOP 101 - Gband coalignment (2816)	1	:04.0	:13.3	921. K							
G-Band - 1x1 - 64ms		:02.0	:13.3	921. K	1024x...	384x384	52%	0	KSC, SSOC	Regular	

HOP 104: FL program XOB for XRT (same as HOP101)

Version:	15E6
Program Name:	HOP 101- Flare response
Author:	GRIGIS, Paolo
Date:	2008/11/06 21:06:10
Loop Count:	0
Data rate:	12.1 Kbits/s

- Explanation of XRT-specific acronyms used in this document
- XOB: "XRT OBservation program": comes in two flavors, QT (Quiet Time) and FL (FLare)
- AEC: "Automatic Exposue Control": AEC 1 is standard, 2 overexposes slightly, 3 underexposes slightly
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