sTGC Commissioning Plan For Run22

S. Prashanth for the sTGC Group

sTGC Full Detector Assembly

- Constructing a plane
  - There is a custom frame for each plane
  - First four chambers are placed in a frame and mounting holes were marked
  - Then remove the chambers and drill the holes
  - Then four chambers are put back to the frame and mounted
- Four planes are assembled together in the iTPC installation platform
- FEE card mounting
  - Can be done plane by plane or at the end when all 4 planes are put together
  - There are enough room between planes to connect/disconnect the FEEs
- Dressing cables and gas lines
  - Gas lines connecting chambers in a plane need to be connected before 4 chambers are put together
  - Rest can be done after 4 chambers are assembled

STAR Shutdown plan & sTGC

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Names
28		**Small Strip Thin Gas Chamber (sTGC)**	**44 days**	**Mon 8/16/21**	**Tue 10/19/21**		
29		Remove West Scaffolding	1 day	Thu 9/2/21	Thu 9/2/21	27	Carpenters
30		Install West Poletip	1 day	Fri 9/3/21	Fri 9/3/21	29	M Techs,STSG
31		Install n- Pentane Gas Panel and Lines	7 days	Tue 9/7/21	Wed 9/15/21	30	STSG
32		New Platform Installation	5 days	Tue 9/7/21	Mon 9/13/21	30	STSG,M Techs[300%]
33		Rail and Support Structure installlation inside Poletip	7 days	Tue 9/14/21	Wed 9/22/21	32	STSG,M Techs[200%]
34		sTGCs Assembly Completed	0 days	Mon 8/16/21	Mon 8/16/21	24	
35		sTGC Installation in Poletip and Survey	5 days	Thu 9/23/21	Wed 9/29/21	33,34	M Techs[200%],STSG
36		Testing STSG	5 days	Thu 9/30/21	Wed 10/6/21	35	STGC
37		Comissioning STGC and Gas System	5 days	Thu 10/7/21	Thu 10/14/21	36	STGC
38		Remove STSG Platform	3 days	Fri 10/15/21	Tue 10/19/21	37	M Techs[200%]

Time available: May to August/September (about 16-20 weeks)

sTGC Commissioning Plan For Run22

Rev: 2.0, Apr-15

Item	Task	Resources			Start date	Finish date	Comments
		STGC	STSG	SESG			
1	**sTGC mounting frame preparation**			STSG			
2	**QA of sTGC Chambsers in BNL**						
	Chambers 1-4				3-May	11-May	About 7 working days allocated for each 4 chambers
	Chambers leak testing	IU, ZW					
	HV burning	IU, ZW					
	Chambers 5-8				12-May	21-May	
	Chambers leak testing						
	HV burning	IU, ZW					
	Chambers 9-12				24-May	1-Jun	
	Chambers leak testing	IU, ZW					
	HV burning	IU, ZW					
	Chambers 13-16				2-Jun	11-Jun	
	Chambers leak testing	IU, ZW					
	HV burning	IU, ZW					
	Chambers 17-20 (Spare)				14-Jun		
	Chambers leak testing	IU, ZW					
	HV burning	IU, ZW					
	Electronics joint testing with mixed gas	2					Can be done at a later stage, when plane 4 is done
3	**Individual plane preparation**						
	Plane 1				31-May	11-Jun	About 14 working days for each plane
	Test fit 1st set of 4 chambers to frame and mark mounting holes	PS		WS			If chambers get delayed, this time can be used
	Drill mounting holes			WS			for testing the chambers, while milling is done
	Mount chambers to the frame	PS		WS			
	Mount FEEs to the chambers		1				This can be done at step 4 too, but easy to do here
	HV, LV, gas line dressing	PS	1	WS			HV & LV dressing may not needed
	Electronics testing with mixed gas at full HV	IU, ZW, PS, TL	1				Ensure plane is ready in all the asspects
	Plane 2				14-Jun	2-Jul	
	Test fit 2nd set of 4 chambers to frame and mark mounting holes	PS		WS			
	Drill mounting holes			WS			
	Mount chambers to the frame	PS		WS			
	Mount FEEs to the chambers		1				This can be done at step 4 too, but easy to do here
	HV, LV, gas line dressing	PS	1	WS			HV & LV dressing may not needed
	Electronics testing with mixed gas at full HV	IU, ZW, PS, TL	1				
	Plane 3				5-Jul	16-Jul	
	Test fit 3rd set of 4 chambers to frame and mark mounting holes	PS		WS			
	Drill mounting holes			WS			
	Mount chambers to the frame	PS		WS			
	Mount FEEs to the chambers		1				This can be done at step 4 too, but easy to do here
	HV, LV, gas line dressing	PS	1	WS			HV & LV dressing may not needed
	Electronics testing with mixed gas at full HV	IU, ZW, PS, TL	1				
	Plane 4				19-Jul	30-Jul	
	Test fit 4th set of 4 chambers to frame and mark mounting holes	PS		WS			
	Drill mounting holes			WS			
	Mount chambers to the frame	PS		WS			
	Mount FEEs to the chambers		1				This can be done at step 4 too, but easy to do here
	HV, LV, gas line dressing	PS	1	WS			HV & LV dressing may not needed
	Electronics testing with mixed gas at full HV	IU, ZW, PS, TL	1				
4	**Full sTGC detecor assembly**				2-Aug	20-Aug	
	Mount 4 planes together, supporting structure and wheels			WS, RS			
	Air duct installation			WS, RS			
	HV, LV and gas lines and dressing	PS	1				
	Move full assembly from TPC mounting platform to cart, then to West side of STAR	PS		WS, RS			
5	**Final testing of sTGC whole assembly (in cart) near the STAR west pole tip**	1,TL	1		23-Aug	22-Sep	23-Sep installation in pole-tip
	Full functional testing						
6	**sTGC installation in poletip**	PS		STSG, MTECHS	23-Sep	29-Sep	
	Installation in poletip						
	Survey						
	Cabling, gas lines and dressing						
7	**ROB crates installation in the pole tip**	PS	1	1	1 day	14-Oct	Install after step 5 completed, if the mini sas cable length is not enough
8	**Full system testing after sTGC is mounted to the pole-tip**	1,TL	1		30-Sep	14-Oct	15-Oct removal of STGC platform
	Test HV & GUI						
	Test LV & GUI						
	Gas leak testing and HV burn testing						
	Gas system preparation and testing						
	Electronics and DAQ testing						
	Cosmics						
9	**Gas system**						
	Mount distribution panel to west pole tip	PS		RS			
	Complete gas lines from west platform to gas pannel	PS		RS			
	Maintenance	PS		RS			
	Ordering spare parts	PS					
	Testing spare parts	PS		RS			
10	**Interlock system**						
	Gas sniffers for sTGC chambers	PS	MS			22-Sep	Talk to Joe Levesque and Mike Gaffeny soon as possible
	Integrating to SGIS (STAR Global Interlock System)	PS	MS				Need help to identify SGIS input/outpts -> Talk to Bill Christie
	Maintenance	PS	MS				
	Ordering spare parts	PS	MS				
11	**Safety approvals**						

Resources
STAR Technical Support Group - STSG
STAR Electronics Support Group - SESG
Issac Upsal - IU
Zhen Wang - ZW
Tonko Ljubicic - TL
Feng Li - FL
Chi Yang - CY
Chi Yang - QY
Bob Soja - RS
Bill Struble - WS
Milke Capotosto - MS
Tim Camarda - TS
Christian Videbaek -CV
Prashanth Shanmuganathan - PS
New Tech (for STAR) - NT
CAD Mechanical techs - MTECHS

Cell key identifier	
	Absolute cut-off date
	Can be flexible

Notes:

1. Whenever sTGC chambers are handeled, a sTGC member should present be to ensure the protection of the chambers.

2. Numbers in the resources colums show how many people are needed, will be filled with name soon.

Notes

- I have given more than enough time (almost twice) for each step
  - As we discussed, expecting 4 chambers to arrive BNL every 15 days from May
  - But, we have some room to tolerate any delays
  - It is good to have the required amount of FEEs as we built the planes
- Student/Post-doc support
  - Issac and Zhen are available until July
  - Another student will continue to help on the sTGC installation
  - Zhen is available for data analysis, throughout the installation
- Tech support
  - Resources from the STSG group is good enough
  - Resources from the STAR Electronics Support Group (SESG) shouldn't be an issue
  - The activities are spread out, all we need is to manage who is doing what? and when?
- At least one person from the sTGC group need to be present when the sTGC chambers are handled to avoid any physical damage to the chambers
  - It is a lesson learned from the prototype testing
- All the prep work is going to be around iTPC installation platform in the assembly hall
  - We need to have 4 tables to keep assembled 4 planes, before it put together as a module
  - Restrict that area for non-related people to avoid any accidents

Full System/Integration Testing

- Full system needed to be tested before pole-tip is closed
- Cosmic ray data through run control should be ideal
  - Any comments?
- Tests should include:
  - HV controls
    - Trips, alarms, current calibration
  - LV controls
  - DAQ
    - Cosmic ray trigger
    - Run control
    - Monitoring plots
    - Pedestals
  - Gas system and interlocks