

Preliminary discussion on LS3 activities

10th February 2025

Standard maintenance for ATLAS Gas Systems

Standard maintenance covered by the M&O work-package agreement

- Some activities will require the STOP of the system
 - Activities which require stop of the system will be scheduled in parallel with other activities
 - They will be coordinated with the detector responsible (we will contact them asap)
- Maintenance activities will be schedule from Q3 2026 to ~ Q2 2029
 - Some activities can be done early but others better to do at the end of LS3 (example safety valves checks and MFC calibration)

FSU Manpower:	35 weeks
STAFF Manpower:	52 weeks
System STOP:	3 weeks per system 21 weeks in total

Activity	2019				2020			
	T 1	T 2	T 3	T 4	T 1	T 2	T 3	T 4
Purifier module maintenance								
Mixer module maintenance								
Distribution module maintenance								
Pump module maintenance								
Exhaust module maintenance								
Electrical maintenance								
PLC replacement + Software								
Analysis module maintenance								
General maintenance								

Standard maintenance for ATLAS Gas Systems

Gas System Standard Maintenance during LS2 per experiment										
Activity	2019				2020				Responsible	COMMENTS:
	T 1	T 2	T 3	T 4	T 1	T 2	T 3	T 4		
Purifier maintenance										
modification with manual valves filters bypass		RPC							Site responsible	RPCx2; TGCx1; TRTx1+Manual
cleaning of valves	TGC	TRT					RPC		Site responsible	New valves RPC1, RPC2, TGC
pressure vessel check & leak test	TGC,MDT	TRT					RPC		Fred	RPC2, RPC3, TRT, TGC
replacement of material	TGC						RPC		Andrea	TGC, RPC1, RPC2 + TRT Manual
change of filters	TGC	TRT					RPC		Site responsible	RPC1, RPC2, TRT, TGC
Mixer maintenance										
MFC check + recalibration			x		x	x	x	x	Beatrice/Kacper	~25 MFC to check
Distribution maintenance										
flowcell check + calibration						x	x	x	Michal	
check bubblers								x	Site responsible	
Festo Valve islands		MDT		REST	REST				Site responsible	
Check regulation valves									Site responsible	
Pump maintenance										
Change of membranes + service	x	TFC	MDT	x	x	x	x	x	Kacper/Site responsible	
Change/add regulation valves									Site responsible	
Change of filters	TGC,RPC	TRT					x	x	Site responsible	
Filter Bypass +dP sensor		TRT	TGC,MDT		RPC				Kacper/Site responsible	
Check regulation valves									Site responsible	
Exhaust module										
Buffer volumes to be qualified	TRT	x	x	x					Fred	MDT, RPC, TRT
Change of filters + PT sensor for Delta P							x	x	Site responsible	MDT, RPC, TRT
Electrical maintenance										
Change of power supplies (18 V/ 24 V)	CSC	AUX							Lukasz/Patrick	CSC/AUX (TFC?)
Canbus quality									Michal	
Profibus quality									Patrick	
Check/repair connectors	x	x	x	x					Patrick	
Heating cables purif + bloc regul.	x	x	x	x					Patrick	
PLC replacement + Profibus separation (With quality check)	x	x	x	x					Michal	RPC, CSC(MM), MDT, TGC, AUX, Worth to change PLC in TFC and TRT?
Analysis										
Check/change of analysis devices				x	x	x			LPh/Site responsible	TGC H2O to change
Calibration of all analysis devices							x	x	LPh/Site responsible	Chemical cells to change
Manifold analysis					x	x	x	x	LPh/Site responsible	LS2 to check, LS3 to replace
General										
Pressure sensors: change/calibration	x	x	x	x					Beatrice/Site responsible	PT Atmospherique (1000CHF 2PT + 2 Afficheur)
Check/repair pneumatic valves	x	x	x	x	x	x			Site responsible	
Check/repair electro valves	x	x	x	x	x	x			Site responsible	
Check all bubblers								x	Site responsible	
Check/calibrate safety valves							x	x	Site responsible	
System Commissioning									Michal/Site responsible	
Krohne	RPC,ID						TRT		Kacper	Exhaust: RPC, TRT (after gas will be decided), ID CO2 Tot:3 (if all bad: 21kCHF)

- We will prepare similar table to share with you

Upgrades of TGC

- **MIXER**: 2nd evaporator
 - To allow higher flow
 - Nowadays max flow in the mixer is ~5000 l/h
- **PUMP**: adding 3rd pump
 - To allow higher flow
- **PURIFIER**: several modifications necessary for better operation (covered by M&O WP)

TGC mixer

FSU (kCHF)	25
Material (kCHF)	27

TGC pump

FSU (kCHF)	9.5
Material (kCHF)	37.5

Upgrades of RPC

- **DISTRIBUTION SYSTEM:** old racks need to be upgraded
 - Nowadays operation very difficult in some situations (time consuming and possibility of human error)
 - 2 possibilities under discussion: complete refurbishment of old racks or minor upgrades
- **ANALYSIS O₂:** request of having O₂ analysis for each distribution rack
 - Under discussion some possibilities
 - For std analysis some pipes will be needed (or from UX to US or between distribution racks)
- **HIGH FLOW:** request to increase the flow in Run 4
 - Several tests have to be done to understand impact on gas system

General

- **ELMB/PLC:** upgrade
 - Upgrade for all gas systems
- **SOFTWARE:** some upgrades needed
 - Software regeneration and new commissioning
- **GAS SUPPLY BE-EA:** refurbishment of gas panels
 - Schedule still to be provided but we will try to coordinate the activities if gas system will have to run
- **What will be the gas system status during LS3?**
 - On? Off? for how long? What gas mixture? etc.
 - We need inputs from detector people —> we will contact them asap
- **We have to coordinate gas system maintenance and upgrades for four experiments**
 - We're collecting inputs
 - We will try to follow experiment schedule when possible

New projects

- HGTD Flushing system
 - Under discussion
- ITK Flushing system
 - Under discussion
- **SOFTWARE: some upgrades needed**
 - Software regeneration and new commissioning

Please let us know of possible upgrades of existing detectors or new systems