

Performing and organizing Maintenance Days and Shutdown Periods at FLASH.

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Abstract:

FLASH is DESY's free-electron laser user facility providing ultra-short femtosecond laser pulses in the EUV and soft-X ray wavelength. FLASH is also a pilot facility for the European XFEL project and a test bed for further research and development for linear collider related superconducting accelerator technologies. Since 2014 the FLASH Linac operates two separate beamlines, FLASH 1 and FLASH 2, in parallel. Currently a third beamline, FLASHforward, is under construction and installation. To keep the accelerator running and to provide time for installation work regularly maintenance and shutdown periods are needed. On behalf of the whole FLASH Coordination team, we describe the organization, the work flow of those periods and the hence resulting difficulties and pending issues.

FLASH Organization:

- Machine Coordination**
- 1 Machine Coordinator
 - 1 Deputy
 - 3 Supporting Machine Scientists
- Technical Coordination**
- 4 Technical Coordinators
- Meetings:**
- FLASH Run coordination meetings: Every Monday and Thursday: The Monday meeting is allocated to the run summary of the last week, reports on technical problems and issues, preparation and decisions on a possible maintenance day on Tuesday, and to an outlook of the program of the upcoming week. The Thursday meeting concentrates on issues on the running experiment and machine performance of the ongoing week.
 - As to the users experiments:
 - Is the machine behavior/performance OK ?
 - Are urgent schedule changes required?
- Minutes are available in the weekly overview of the FLASH e-logbook.
- Shift:**
- 3 8 hours shifts per day, 24/7
- User Run:**
- 2 Operators (part of the overall shift crew present in the DESY control room)
 - 1 Machine coordinator available 24/7
 - 1 Technical coordinator available throughout regular working hours
 - 1 LLRF expert on call available 24/7
 - 1 SASE expert on call available 24/7
 - Several on call experts for various subsections
 - 1 photon coordinator on users side as local contact

FLASH in a nutshell:

FLASH - user facility since 2005

- Single-pass high-gain SASE Free-Electron Laser
- Photon wavelength range from XUV to soft X-rays
- Femtosecond range pulses with high brilliance
- A third electron beamline is under construction

FEL Radiation Parameters

Wavelength range	nm
Average single pulse energy	μJ
Pulse duration (FWHM)	fs
Peak power	GW
Pulses per second	
Photons per pulse	

FLASH1/FLASH2

4.2 - 51	4 - 90
1 - 500	1 - 1000
<30 - 200	
1 - 5	
10 - 5000	
10 ¹¹ - 10 ¹⁴	

Diagram: RF Stations, Accelerating Structures, sFLASH, Fixed Gap Undulators, Photon Diagnostics, FLASH1, FLASH2, Variable Gap, FLASHForward, FEL Experiments, Albert Einstein, Kai Siegbahn.

Beam time allocation

- Two user calls per year
- User experiments: 4500h/a
- FEL Studies/Photon beamlines and user preparation: 2500h/a
- Accelerator R&D: 750h/a

Courtesy of S.Schreiber and K.Honkavaara

Maintenance/Shutdown operation workflow:

(I) : Machine Coordination decides if and when a maintenance day is required. Usually maintenance days takes place once a month. Longer shutdown periods, usually up to 4 weeks long, will only be on special needs e.g. machine upgrade, major modifications or requests from external e.g. electricity supplier. Typically these periods takes place twice a year (winter and summer).

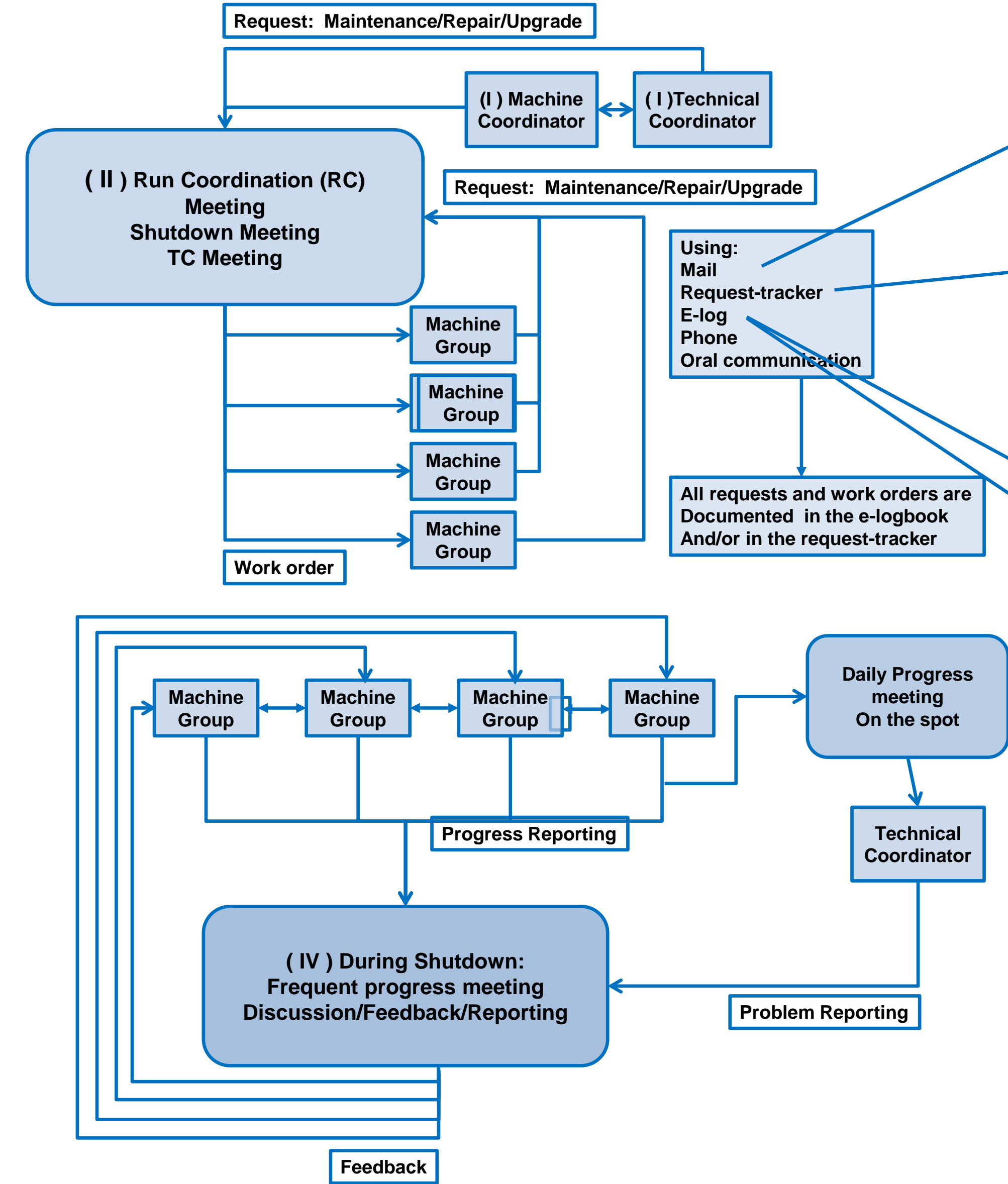
(II) : At the TC meeting pending issues are discussed resulting in work orders to the machine groups which are announced in the Run coordination Meeting. Requests from the machine groups and beam users concerning maintenance, repair and/or upgrade are communicated in this meeting as well. A detailed schedule is created and passed on to all involved parties.

Maintenance days are announced in the RC Meeting as well. Upcoming needed work is required in the logbook (III). Usually a maintenance day lasts from app. 07:30 am to 01:00 pm.

(IV) During Shutdown periods a daily progress meeting on location takes place to check progress and to eventually change the schedule on short notice. In addition a frequent Shutdown progress meeting will be held, where potentially emerged problems can be discussed and all involved staff members will be briefed.

Exemplary procedure of a common Maintenance day;

1. Maintenance day is declared and released in the operation schedule
 2. Involved parties announces access requests in the e-logbook.
 3. Maintenance day starts at 07:00 a.m. with end of the nightshift
- Experiments are informed, beam is blocked
- Radiation measurement and clearance has to be done. This takes about 1 hour to be done.
- At around 08:00 a.m. the accelerator tunnel is opened for all staff members with a work order.
 - About noon the TCs collect information about done/undone work .Furthermore an inspection round is done by the TCs.
 - Tunnel will be closed, Interlocks set
 - Start up the machine



Logbook entry: TTFellog/data/2017/44/02.11_M

FLASH2 Gerd, Hoffmann, Duhme

Server give not a response of Value.

This e-logbook entry was sent to following experts:

DOCCS mailing list

This device is connected to the Ethernet switch in Container16, which is broken by now.

Needs tunnel access from NOC

O.Henler

This e-logbook entry was sent to following experts:

TC Mailinglist

FLASH2 Access-Requests

25.01.2018 12:42 TCs planned Maintenance-Days 2018

Access usually 8-12 h

- Tue September-4 (limited FEL access, FL2 open)

- Tue September-5

- Wed October-10 (short unusual weekday)

FLASH2 Access/Maintenance requests

Please do NOT edit the entries in the first row (like NAME, Phone etc.).

Please do NOT send this entry to the tc-mailinglist !!!

Please add your request to the list.

You will be informed if new a maintenance or access takes place.

Please inform the operators about your work/leave and write a brief summary in the logbook.

To leave a phone number on which you can be reached is obligatory

ask the request to define your request when finished

work requests for the next maintenance day (usually Tuesday)

access request on maintenance days

access request on other days

NAME	Phone	Duration/open or not	Where	Person/date	Priority/reason	Comment
P. Viallet	04331	5-10h	FLASH2	2	every week	change undulator film
P. Kienle	04374	5-10h	FLASH1	2	every week	cryo control round
P. Laroche	4446	10h	FLASH2	1	every month	KLIXON 15 maintenance
P. Hupke	04152	10h	FLASH2	2	every maintenance	KLIXON 15 maintenance
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