

Multi-wavelength Data Analysis System User's Guide,  
Astronomy Data Center,  
National Astronomical Observatory of Japan

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# Chapter 1

## Introduction

### 1.1 About the Multi-wavelength Data Analysis System

The Astronomy Data Center (ADC) is operating the Multi-wavelength Data Analysis System (MDAS) which is an open-use computing system. MDAS is constructed to analyze astronomy data at various wavelengths. There are over one hundred pieces of software and it supports data reduction and analysis of astronomy data observed by various telescopes.

MDAS consists of computers and its peripherals. The computers are classified into interactive data analysis servers, batch processing data analysis servers, and the MDAS terminals. Users access an interactive data analysis server with SSH connection, and they can analyze data or submit jobs into a batch processing data analysis server from the interactive data analysis server. The MDAS terminals located in the Subaru building open-use room and ALMA building room 101 on the NAOJ Mitaka campus can be used for connecting to the interactive data analysis servers.

MDAS is a computing system for “analytic researches of astronomical observation data”. For those who want to perform calculations related to the simulation astronomy, please use computing systems offered by Center for Computational Astrophysics (<http://www.cfca.nao.ac.jp>).

### 1.2 ADC open-use help desk

The ADC open-use help desk is operating MDAS and supporting its users. If you have any questions about MDAS or the open-use rooms, please feel free to contact us.

Place	ADC open-use help desk, 1F South building
Reception time	Mon-Fri 9:30-12:00, 13:00-17:30
E-mail address	consult(at-mark)ana.nao.ac.jp
Extension number	3832

### 1.3 Information about MDAS

Please refer to the following URLs for information about MDAS.

- MDAS website ([https://www.adc.nao.ac.jp/MDAS/mdas\\_e.html](https://www.adc.nao.ac.jp/MDAS/mdas_e.html))
- Information from ADC (<https://www.adc.nao.ac.jp/cgi-bin/cfw2013/wiki.cgi/adcinfo/MLinfo>)
- FAQ (<https://www.adc.nao.ac.jp/cgi-bin/cfw/wiki.cgi/FAQ/FAQE>)



## Chapter 2

# Regulations for use of Data Analysis System

### National Astronomical Observatory of Japan Astronomy Data Center Regulations for use of Data Analysis System

#### (Purpose)

##### The 1st article

This regulation intends to establish requirements about use of the data analysis system (hereafter “system”) in National Astronomical Observatory of Japan Astronomy Data Center (hereafter “center”)

#### (User qualification)

##### The 2nd article

The person who can use the system (hereafter “user”) is a member to whom the following applies:

1. Staff of National Astronomical Observatory of Japan (hereafter NAOJ)
2. Researchers (who graduated from college) of astronomy and the related field
3. The person who is allowed by the center chief in particular

#### (The kind of use)

##### The 3rd article

The kind of use of the system is limited to the following.

1. Data processing of astronomy and related fields
2. The study and the work which are permitted by the center chief in particular

#### (Use application)

##### The 4th article

The person who would like to use the system has to submit a prescribed application form to the center chief and to receive an approval. When applying person belongs to the research institute outside Japan, the research and educational staff of NAOJ must be a supervisor of the applicant.

#### (Approval)

##### The 5th article

1. When the center chief accepts application form of the preceding article and admits to be suitable, he approves it and gives the user a distinction sign (hereafter “user ID”) and also gives the group distinction sign (hereafter “group ID”) if necessary.
2. The validity of user ID and group ID of the preceding clause is 1 year from approved use starting day. And it is available up until the next March 31.

3. When users hope to use their approved user ID or group ID continuously beyond the next March 31, they must renew the application within the period designated by the center chief.

**(The prohibition of user ID diversion)**

**The 6th article**

Users cannot use their user ID for the purpose other than that of application and users cannot allow third party to use their user ID.

**(The prohibition of group ID diversion)**

**The 7th article**

Users cannot use their group ID for the purpose other than that of application and users cannot allow third party except for their research group to use the group ID.

**(Notification)**

**The 8th article**

When the following has occurred during the validity period of use, users should notify the center chief promptly.

1. Use of system was ended or stopped.
2. Institution or position was changed.

**(Revoke of use qualification)**

**The 9th article**

When users do not comply with the regulation of center or use the system except for the approved purpose, the center chief can revoke the use qualification or suspend the use.

**(Final report)**

**The 10th article**

When studies that related to the use of system have finished or the validity period of user ID has ended, the center chief may ask users to submit reports on the system use (progress reports).

**(The publication of results)**

**The 11th article**

When users make public the results obtained by using the system, they must acknowledge clearly in their papers the use of the system.

**(Others)**

**The 12th article**

1. Alteration and abolition of this regulation is executed by the center chief after consultation with the technical committee.
2. In addition to this regulation, the center chief can establish a special bylaw about the system use requirements.

**(The rider)**

1. This regulation comes into effect on the March 1st 2013.



## Chapter 3

# How to get an MDAS user account

In order to use MDAS, you must submit an application. By applying, your MDAS account will be issued and you will be able to log-in to the interactive data analysis servers.

If a user's PC is on the NAOJ network, then the user can access an interactive data analysis server directly with SSH connection. In contrast, if a user's PC is not on the NAOJ network, the user must establish a Virtual Private Network (VPN) connection in advance. ADC also offers VPN service for MDAS, please submit an application for the VPN service if necessary.

MDAS provides group ID service. If you share data with other users, please submit an application for the group ID service.

### 3.1 Application for MDAS

The application form of MDAS is on [https://www.adc.nao.ac.jp/MDAS/appl/id\\_e.html](https://www.adc.nao.ac.jp/MDAS/appl/id_e.html). Please refer to regulations for use of MDAS (see [Section 2](#)) before applying. Account registration process will be proceeded out based on the information entered on the form. Once the registration process is complete, your account will be informed you by e-mail.

### 3.2 Application for VPN service

You can use the MDAS VPN service offered by ADC or NAOJ staff's VPN service offered by the NAOJ NETWORK SERVICE HELP CENTER. If you are a NAOJ staff, please use the NAOJ staff's VPN service. If not, please use the MDAS VPN service.

An application form of the MDAS VPN service is on [https://www.adc.nao.ac.jp/MDAS/appl/vpn\\_e.html](https://www.adc.nao.ac.jp/MDAS/appl/vpn_e.html). Once the registration process is complete, how to use the MDAS VPN service will be informed you by e-mail. Note that installation of anti virus software into user's PC is mandatory for the use of the MDAS VPN service. Be sure to install it. If you have any questions, please contact the ADC open-use help desk ([consult\(at-mark\)ana.nao.ac.jp](mailto:consult(at-mark)ana.nao.ac.jp)).

An application form of the NAOJ staff's VPN service is on <https://nethelp.mtk.nao.ac.jp/contents/en/node/4>. If you have any questions, please contact the NAOJ NETWORK SERVICE HELP CENTER (<https://nethelp.mtk.nao.ac.jp/contents/en>, accessible only from the NAOJ network).

### 3.3 Application for group ID service

A group ID is issued for a group of users. Files can be shared within the group of users by setting the group ID as a group owner of the files. An application form of the group ID service is on [https://www.adc.nao.ac.jp/MDAS/appl/gid\\_e.html](https://www.adc.nao.ac.jp/MDAS/appl/gid_e.html).



## Chapter 4

# How to use computers

MDAS consists of interactive data analysis servers, batch processing data analysis servers, the MDAS terminals, and its peripherals. In this chapter, we will introduce how to use each computer.

### 4.1 How to use interactive data analysis servers

Interactive data analysis servers are computers constructed for reducing and analyzing astronomy data interactively. Each server is accessible from user’s PCs or the MDAS terminals in the open-use rooms with SSH connection. For non-interactive and resource-intensive calculation, the batch data analysis servers introduced in [Section 4.2](#) should be used.

#### 4.1.1 System configuration

Interactive data analysis servers consist of 32 servers (FUJITSU Server PRIMERGY RX2530 M2). These servers are classified into “kaim” servers and “kaih” servers from the difference of Random Access Memories(RAM) and Hard Disk Drives(HDD) they contain. A kaim server has 192GB RAM and 12TB HDD, and a kaih server has 256GB RAM and 51TB HDD. The Red Hat Enterprise Linux 7 is installed into both servers.

Table 4.1: Specification of a kaim server

Host name	kaim[01-20].ana.nao.ac.jp
Machine	FUJITSU Server PRIMERGY RX2530 M2
Quantity	20
OS	Red Hat Enterprise Linux 7
CPU	Intel Xeon E5 2667 V4 3.2 GHz 16 core
RAM	DDR4 2400 RDIMM 192GB
HDD of the local disk region	1.8 TB 2.5 inch SAS 10000 rpm
Size of the local disk region	12.24 TB

Table 4.2: Specification of a kaih server

Host name	kaih[01-12].ana.nao.ac.jp
Machine	FUJITSU Server PRIMERGY RX2530 M2
Quantity	12
OS	Red Hat Enterprise Linux 7
CPU	Intel Xeon E5 2667 V4 3.2 GHz 16 core
RAM	DDR4 2400 RDIMM 256GB
HDD of the local disk region	10 TB 3.5 inch NLSAS 7200 rpm
Size of the local disk region	51 TB

### 4.1.2 How to log-in

In order to log-in to an interactive data analysis server, the user’s PC must be connected to the NAOJ network. To log-in to the server via the Internet, first establish a VPN connection from the user’s PC to the NAOJ network using either the MDAS VPN service or NAOJ staff’s VPN service.

#### How to establish a VPN connection

**MDAS VPN service** The MDAS VPN service requires a VPN client software AnyConnect. Please download and install it according to the e-mail you received after completing the registration process of the VPN service.

In order to establish a VPN connection, launch the AnyConnect and connect to a VPN host server “kaimvpn.ana.nao.ac.jp” or “kaihvpn.ana.nao.ac.jp”. You should be required to input username and password, so please fill in your MDAS account and password.

Note that you can log-in to the kaim and kaih server from both the “kaimvpn.ana.nao.ac.jp” and “kaihvpn.ana.nao.ac.jp”.

Table 4.3: MDAS VPN host server

Host name
kaimvpn.ana.nao.ac.jp
kaihvpn.ana.nao.ac.jp

**NAOJ staff’s VPN service** Please refer to <https://nethelp.mtk.nao.ac.jp/contents/en/node/4> for details.

#### How to log-in to an interactive data analysis server

An user log-in to an interactive data analysis server “kaim[01-20].ana.nao.ac.jp” or “kaih[01-12].ana.nao.ac.jp” with SSH connection<sup>1</sup>. Please launch a terminal emulator on your PC and input commands as follows.

```
$ ssh [-X] your_account@(kaim[01-20]|kaih[01-12]).ana.nao.ac.jp
```

### 4.1.3 Disk areas

The following disk areas are available from the interactive data analysis servers.

Table 4.4: Disk areas available from the interactive data analysis servers

Area	Mount point	Size per a mount point	Soft/Hard limit	Retention period
User home directory (NFS)	/home[01-02]	55TB	140GB/150GB	As long as your account in force
Large volume file system (NFS)	/lfs[01-16]	102TB	30TB · 32TB	12 months
Local disk area of the middle-range servers	/wkm[01-20]	12TB	NA/NA	12 months
Local disk area of the high-end servers	/wkh[01-12]	51TB	14TB/16TB	12 months

<sup>1</sup>Operation of the load balancer was terminated at the end of February 2023.

NFS areas for data migration	/ext_nfs[1-2]	393TB	9TB/10TB	NA
NFS areas for data migration	/ext_nfs3	306TB	9TB/10TB	NA

- Before using the large volume file system or local disk area, please create a directory named your account under the disk areas.
- If your data volume reaches the soft/hard limit, application may not work normally.
- Files exceeding the retention period will be target of the periodic data deletion.

#### About NFS areas for data migration

- These areas, which became available on 17th October 2022, are for placing user data that you want to migrate to the next system. These areas will connect with the next system after the system replacement.
- Please refrain from analyzing data on these areas.
- These areas can be accessed from kaim and kaih servers.
- Periodic data deletion will not be carried out for the time being.

**Periodic data deletion** Periodic data deletion will be carried out in the scheduled maintenance. The policy of this deletion is as follows:

- Target disk areas: the large volume file system and local disk areas exceeding utilization of 90%.
- Target files: files satisfying a condition that a difference between the date of the scheduled maintenance and timestamp(ctime) of a file exceeds the retention period.
- Date on which the target disk areas are determined: 2 weeks before the scheduled maintenance.
- Date on which data deletion is carried out: scheduled maintenance day.

In a disk area, if disk usage exceeds utilization of 90% as of 2 weeks before the scheduled maintenance, then the disk area will be a target of the periodic data deletion. If disk usage does not exceed utilization of 90%, then the disk area will not be a target. Files to be deleted are decided just before the scheduled maintenance.

**Disk quotas** Disk quotas are set in MDAS to limit the amount of disk space used by each user. The amount of maximum available disk space (soft limit/hard limit) varies for each disk area.

- Soft limit: amount of maximum available disk space. An user can write data to the disk area even if the amount of data volume exceeds the soft limit. However, the user will become unavailable to write after seven days if the situation persists.
- Hard limit: amount of absolute maximum available disk space. An user cannot write data to the disk space if the amount of data volume exceeds the hard limit.

If your data volume reaches the soft/hard limit, application may not work normally, so you should copy or remove your data before reaching.

#### 4.1.4 Network access control

Access (i.e. ssh, scp, or rsync) from the interactive data analysis servers to devices on the NAOJ network is not permitted for a security measure. In order to download data on an interactive data analysis server, please execute commands such as “scp” or “rsync” from user’s PC to the interactive data analysis server.

```
$ scp your_account@(kaim[01-20]|kaih[01-12]).ana.nao.ac.jp:<yourfile> ~/your/pc
```

## 4.2 How to use batch processing data analysis servers

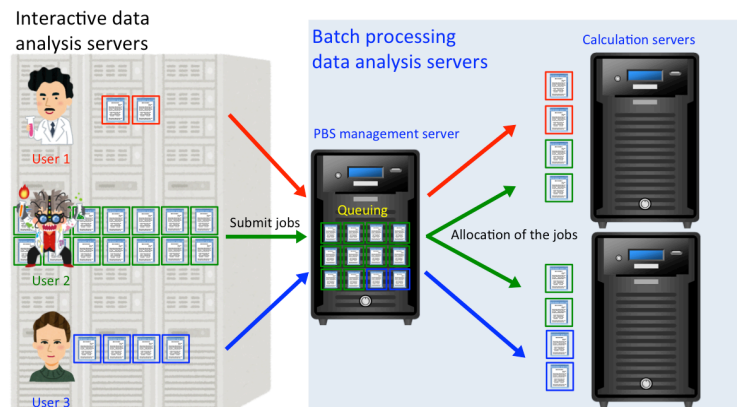


Figure 4.1: Illustrated outline of batch processing data analysis servers.

MDAS has batch processing data analysis servers so as to implement batch processing. Batch processing is a processing mechanism that computers automatically and sequentially process each job which is a group of programs having shared purpose.

Processing efficiency may be decreased because of the lack of computational resource if multiple users run multiple programs on a interactive data analysis server. A job management system on the batch processing data analysis servers manages and runs these jobs sequentially, and the jobs should be processed most efficiently in the usable computational resource. The batch processing data analysis servers are effective against many programs and programs which need big computational resource.

Batch servers consist of 2 servers (kaibm[01-02].ana.nao.ac.jp). A job management system, named PBS Professional (hereinafter referred to PBS), is installed in the servers for the batch processing. The “kaibm01” functions as a PBS management server, and both the “kaibm01” and “kaibm02” function as calculation servers.

The PBS management server manages jobs submitted by users, and it allocates jobs to the calculation servers. Submitted jobs will be queued when there is no calculation resource on the calculation servers. Queued jobs will be run once computational resource is allocated. For the efficient processing, it could well happen that running jobs will be killed and required in order to run other jobs instead.

### 4.2.1 System configuration

Batch processing data analysis servers consist of 2 servers (FUJITSU Server PRIMERGY RX2530 M2). The Red Hat Enterprise Linux 7 is installed in each server.

Table 4.5: Specification of a kaibm server

Host name	kaibm[01-02].ana.nao.ac.jp
Machine	FUJITSU Server PRIMERGY RX2530 M2
Quantity	2
OS	Red Hat Enterprise Linux 7
CPU	Intel Xeon E5 2667 V4 3.2 GHz 16 core
RAM	DDR4 2400 RDIMM 192GB

### 4.2.2 Queue configuration

The PBS has job queues which control an execution sequence of jobs. When a user submits a job to one of job queues, the PBS management server makes a judgment whether the calculation servers can execute the job or not. If it judges that they can execute the job, then the job will be run on them. If not, the job will be queued up until the calculation resource is allocated. The usable computational resource and the execution priority differ by the job queues. Users must select a suitable queue depending on the scale of the user's own jobs because to use an unsuitable queue is a wasteful use of the computational resource.

Table 4.6: Job queue configuration

Queue	CPU cores	Usable memory per a job	Time limit for a job	Number of executable jobs per an user
q1	1	11GB	30 days	hard limit:32, soft limit: 2
q4	4	44GB	30 days	hard limit:8, soft limit: 1
q8	8	88GB	15 days	hard limit:4, soft limit: 1
q16	16	176GB	15 days	hard limit:2, soft limit: 1

- The maximum number of submittable jobs by each user is 1024.
- The job priority is q1 >q4 >q8 >q16 >jobs lowered by soft limit.
- The hard limit is a number of maximum executable jobs. If an user submits multiple jobs exceeded the hard limit value, a part of jobs will be queued.
- The soft limit is a number of jobs that will be executed preferentially. If an user submits multiple jobs exceeded the soft limit value, a part of jobs will be low priority.
- Please refer to [Section 4.2.4.7](#) for details of a priority control of jobs.

### 4.2.3 Tutorial

In order to use batch processing data analysis servers, you have to make a shell script called job script and submit a job into a job queue using “qsub” command from the “kaim” or “kaih” servers. In this section, we will introduce basic steps to submit your jobs.

1. [How to make a job script](#)
2. [How to submit and delete a job](#)
3. [How to display a job status](#)

#### 1. How to make a job script

Job script is a shell script in which the directives for the PBS and executable programs are described. The following script is an example of the job script when we want to run a program “a.out” with a queue “q1”.

```
#!/bin/bash
#PBS -M taro.tenmon@nao.ac.jp
#PBS -m abe
#PBS -q q1

# Go to this job's working director
cd $PBS_O_WORKDIR

# Run your executable
./a.out
```

The “#PBS” lines are the directives for the PBS. In this script, we have made the following directives.

#PBS -M taro.tenmon@nao.ac.jp: E-mails will be sent to taro.tenmon@nao.ac.jp. Please make sure to use this directive. If you do not use this directive, administrators will receive error E-mails bounced back from the interactive server since the default E-mail address “user@host.ana.nao.ac.jp” is invalid.

#PBS -m a: An E-mail will be sent when a job is stopped, a job is started to run, and a job is finished, respectively. The “#PBS -m a” is enabled by default.  
 #PBS -q q1: A job will be submitted into the queue “q1”.

The “\$PBS\_O\_WORKDIR” is an environment variable defined in the PBS and expresses the path to the directory where the job script is submitted.

## 2. How to submit and delete a job

In order to submit a job into a queue, execute the “qsub” command on a interactive data analysis server.

```
$ qsub job_script.sh
```

The submitted job can be deleted by executing the “qdel” command. The Job\_id can be displayed by using the “qstat” command as we shall see later.

```
$ qdel job_id
```

## 3. How to display job status

The “qstat” command shows you a status of submitted jobs.

```
$ qstat
Job id          Name      User      Time Use  S  Queue
-----
9013.a000      job1     user1     50:20:10  R  q1
9019.a000      job2     user2     40:32:13  R  q1
9030.a000      job3     user3     30:14:19  R  q1
9079.a000      job4     user4     00:59:15  R  q1
9102.a000      job5     user5           0  Q  q1
```

Each column represents the job id, job name, user name, CPU time used, job status, and queue name, respectively. The job status has following states.

Q (Queued): Job is queued and will run once computational resource is allocated.

R (Running): Job is running.

S (Suspended): Job is suspended. It occurs when a higher priority job needs computational resource.

As a side note, finished jobs are shown by using a “qstat -x” command.

### 4.2.4 PBS Professional

In this section, we will introduce the PBS professional briefly. Please refer to its User’s Guide(<https://www.pbsworks.com/pdfs/PBSUserGuide18.2.pdf>) for details. This section refers and quotes the User’s Guide.

1. [About the PBS Professional](#)
2. [Lifecycle of a PBS job](#)
3. [PBS job scripts](#)
4. [PBS commands](#)
5. [PBS directives](#)
6. [PBS environment variables](#)
7. [About a priority control of jobs](#)

#### 1. About the PBS Professional

PBS Professional is a distributed workload management system. PBS manages and monitors the computational workload for one or more computers. PBS does the following:



**Queuing jobs** PBS collects jobs (work or tasks) to be run on one or more computers. Users submit jobs to PBS, where they are queued up until PBS is ready to run them.

**Scheduling jobs** PBS selects which jobs to run, and when and where to run them, according to the policy specified by the site administrator. PBS allows the administrator to prioritize jobs and allocate resources in a wide variety of ways, to maximize efficiency and/or throughput.

**Monitoring jobs** PBS tracks system resources, enforces usage policy, and reports usage. PBS tracks job completion, ensuring that jobs run despite system outages.

## 2. Lifecycle of a PBS job

Your PBS job has the following lifecycle:

1. You write a job script.
2. You submit the job to PBS.
3. PBS accepts the job and returns a job ID to you.
4. The PBS scheduler finds the right place and time to run your job, and sends your job to the selected execution host(s).
5. Licenses are obtained.
6. On each execution host, PBS creates a job-specific staging and execution directory.
7. PBS sets PBS\_JOBDIR and the job's jobdir attribute to the path of the job's staging and execution directory.
8. On each execution host allocated to the job, PBS creates a job-specific temporary directory.
9. PBS sets the TMPDIR environment variable to the pathname of the temporary directory.
10. If any errors occur during directory creation or the setting of variables, the job is requeued.
11. Input files or directories are copied to the primary execution host.
12. The job runs under your login.
13. Output files or directories are copied to specified locations.
14. Temporary files and directories are cleaned up.
15. Licenses are returned to pool.

## 3. PBS job script

An PBS jobscript consist of a shebang to specify a shell, PBS directives, and job tasks(programs or commands). Under the Linux, a shell script, Python, Perl, or other script can be allowed to make a job script. An example of job scripts using a shell script is as follows:

```
#!/bin/sh
# Job script with a single core

#PBS -M taro.tenmon@nao.ac.jp
#PBS -m abe
#PBS -q q1
#PBS -r y
#PBS -N job_name
#PBS -o Log.out
#PBS -e Log.err

# Go to this job's working director
cd $PBS_O_WORKDIR

# Run your executable
./a.out
```

```
#!/bin/bash
# Job script with multiple cores

#PBS -M taro.tenmon@nao.ac.jp
#PBS -m abe
#PBS -r y
#PBS -q q4
#PBS -N job_name
#PBS -o Log.out
#PBS -e Log.err

# Go to this job's working directory
cd $PBS_O_WORKDIR

# Run your executable
./a_0.out &
./a_1.out
```

#### 4. PBS commands

PBS has various commands so that users can submit, monitor, and manage jobs. We will describe commonly used commands.

**qsub** This is a command to submit a job into a queue. Please specify your job script for the argument.

```
$ qsub job_script.sh
```

**qdel** This is a command to delete a submitted job. The Job\_ID can be displayed by using “qstat” command as we shall see later.

```
$ qdel Job_ID
```

**qstat** This is a command to check status of submitted jobs. Status of a specific job can be displayed by specifying the Job\_ID as a argument. If a queue name is specified, status of the queue's jobs should be displayed.

```

$ qstat
Job id          Name      User      Time Use  S  Queue
-----
1000.kaibm01    job1     user1     50:20:10  R  q1
1001.kaibm01    job2     user1     40:32:13  R  q1
1002.kaibm01    job3     user2     30:14:19  R  q1
1003.kaibm01    job4     user2     00:59:15  R  q4
1004.kaibm01    job5     user3              0  Q  q16

$ qstat 1000
Job id          Name      User      Time Use  S  Queue
-----
1000.kaibm01    job1     user1     50:20:10  R  q1

$ qstat q1
Job id          Name      User      Time Use  S  Queue
-----
1000.kaibm01    job1     user1     50:20:10  R  q1
1001.kaibm01    job2     user1     40:32:13  R  q1
1002.kaibm01    job3     user2     30:14:19  R  q1

```

Each column represents the job id, job name, user name, CPU time used, job status, and queue name, respectively. The representative states of a job are as follows:

- W (Waiting): Job is waiting. It will be queued and run when its submitter-assigned start time comes.
- Q (Queued): Job is queued. Job will run once the calculation resource is allocated.
- R (Running): Job is running.
- S (Suspended): Job is suspended. It occurs when a higher priority job needs computational resource.
- H (Held): Job is held. The “qhold” command can hold a job.
- F (Finished): Job is finished. It represents that the job was completed, failed, or deleted.

The representative options of the “qstat” command are as follows:

- a: Displays information for all queued and running jobs. You can check the elapsed time of a job.
- x: Displays information for finished jobs in addition to queued and running jobs.
- n: The exec host string is listed on the line below the basic information. If the -l option is given, the comment string is listed on the end of the same line.
- T: Displays the estimated start time for queued jobs
- f: Displays full information for jobs.
- Q: Displays queue status in default format.
- q: Displays queue status in alternate format.

**qhold** This is a command to hold a submitted job. The execution of the job is interrupted, and allocated computational resource is released. The job will be resumed after executing “qrls” command that we shall see later. This command is available if you would like to run queued or suspended jobs preferentially.

**qrls** This is a command to release a held job.

```
$ qrls Job_ID
```

## 5. PBS directives

PBS directives, which are used in a job script, are options for the “qsub” command to give various directives to the PBS. A directive needs a prefix “#PBS” at the beginning of a line, and must be put above any commands. If you put it below any commands, it will be ignored. We will show you representative PBS directives.

**-M** This directive sets an E-mail address. Please make sure to use this directive. If you do not use this directive, administrators will receive error E-mails bounced back from an interactive server since the default E-mail address “user@host.ana.nao.ac.jp” is invalid.

```
#PBS -M your.address@example.jp
```

**-m** This directive sets an E-mail notification from the PBS. If you do not use this directive, “#PBS -m a” will be set.

```
#PBS -m n|(one or more of a,b,e)
```

n: No mail is sent.

a: Mail is sent when the job is aborted by the PBS.

b: Mail is sent when the job begins execution.

e: Mail is sent when the job terminates.

**-q** This directive specifies a queue where you submit a job. If you do not use this directive, “#PBS -q q1” will be set.

```
#PBS -q q1|q4|q8|q16
```

q1: Job is submitted to the queue “q1”.

q4: Job is submitted to the queue “q4”.

q8: Job is submitted to the queue “q8”.

q16: Job is submitted to the queue “q16”.

**-l** This directive sets a limit on the calculation resource.

```
#PBS -l select=ncpus=X:mem=Ygb|walltime=hh:mm:ss
```

select=ncpus=X:mem=Ygb: The number of CPU cores and amount of memory used by your job are restricted to X cores and Y GB, respectively. You cannot specify the number of CPU cores and amount of memory exceeded the default values for the queue you will use. Available units for the memory are b, kb, mb, and gb.

walltime=hh:mm:ss: Maximum job execution time is set. You cannot specify the walltime exceeded the default value for the queue you will use.

**-r** This directive specifies whether the PBS restarts submitted jobs or not after the system is restored. If you do not use this directive, “#PBS -r -y” will be set.

```
#PBS -r y|n
```

y: Job is rerunnable.

n: Job is not rerunnable.

**-a** This directive sets a job start time. The job will be waited, and submitted when the specified time comes.

```
#PBS -a YYMMDDhhmm.SS
```

YYMMDDhhmm.SS: If you want to start a job at 07:30 on 1st September, 2020: “#PBS -a 2009010730.00”.

**-h** This directive holds a job. The effect is same as the “qhold” command.

```
#PBS -h
```

**-N** This directive sets a job name. The specified name is displayed on the Name columns of the “qstat” command. If you do not use this directive, the job name will be the job script’s file name.

```
#PBS -N Job_name
```

**-o** This directive sets a file name to the standard output. If the relative path is used, the current directory will be a directory where the “qsub” command was executed. If you do not use this directive, the file name will be“(job script name).o(job ID)”, and stored into the directory where the “qsub” command is executed .

```
#PBS -o /path/to/output.log
```

**-e** This directive sets a file name to the standard error output. If the relative path is used, the current directory will be a directory where the “qsub” command was executed. If you do not use this directive, the file name will be“(job script name).e(job ID)”, and stored into the directory where the “qsub” command is executed .

```
#PBS -e /path/to/error.log
```

**-j** This directive merges a standard output and standard error output.

```
#PBS -j oe|eo
```

oe: Standard output and standard error output are merged into standard output.

eo: Standard output and standard error output are merged into standard error.

**-R** This directive removes the standard output and/or standard error output files.

```
#PBS -R o|e|oe
```

o: The standard output stream is removed.

e: The standard error output stream is removed.

oe: The standard output and standard error output streams are removed.

## 6. PBS environment variables

PBS environment variables, which are defined in the PBS, are available in the job script. Representative variables are as follows:

\$PBS\_JOBID: Submitted job’s job ID.

\$PBS\_JOBNAME: Submitted job’s job name.

\$PBS\_O\_HOME: Value of environment variable \$HOME.

\$PBS\_O\_HOST: The host name on which the “qsub” command was executed.

\$PBS\_O\_LANG: Value of environment variable \$LANG.

\$PBS\_O\_LOGNAME: Value of environment variable \$LOGNAME.

\$PBS\_O\_PATH: Value of environment variable \$PATH.

\$PBS\_O\_QUEUE: The queue name to which the job was submitted.

\$PBS\_O\_SHELL: Value of environment variable \$SHELL.

\$PBS\_O\_WORKDIR: The absolute path of directory where “qsub” command was executed.

## 7. About a priority control of jobs

There are hard limit and soft limit on each queue which are values to limit on the number of executable jobs for each user.

The hard limit is a number of maximum executable jobs. If an user submits multiple jobs exceeded the hard limit value, a part of jobs will be queued. For example, if you submit ten jobs to q4 the hard limit of which is eight, eight jobs will be executed but two jobs will be queued.

The soft limit is a number of jobs that will be executed preferentially. If an user submits multiple jobs exceeded the soft limit value, a part of jobs will be low priority. For example, if you submit four jobs to q4 the soft limit of which is one, one job will be high priority but three jobs will be low priority lower than that of q16 which has the lowest priority among queues on our system. When you or someone submits additional jobs, the low priority jobs should be killed and requeued.

**Examples of the priority control** We show an example of the priority control in the situation where several users submit jobs onto our system. In the example below, “1(AAAA)” represents a user A’s q4 job which was firstly submitted onto the system. Note that the job priority is q1 >q4 >q8 >q16 >jobs lowered by soft limit and the soft limit values of q1, q4, q8, and q16 are 2, 1, 1, and 1, respectively.

### 1. User A submits six q4 jobs. All jobs will be run but the second and the following jobs will be low priority due to the soft limit.

Status	Job	CPU Cores Used
Running(kaibm01)	: 1(AAAA) 2(AAAA) 3(AAAA) 4(AAAA)	16/16
Running(kaibm02)	: 5(AAAA) 6(AAAA)	8/16
Queued	:	

### 2. User B submits a q16 job. The q4 job in low priority and most recently submitted will be queued.

Status	Job	CPU Cores Used
Running(kaibm01)	: 1(AAAA) 2(AAAA) 3(AAAA) 4(AAAA)	16/16
Running(kaibm02)	: 7(BBBBBBBBBBBBBBBBB)	16/16
Queued	: 5(AAAA) 6(AAAA)	

### 3. User C submits two q1 jobs. The q4 job in low priority and most recently submitted will be queued.

Status	Job	CPU Cores Used
Running(kaibm01)	: 1(AAAA) 2(AAAA) 3(AAAA) 8(C) 9(C)	14/16
Running(kaibm02)	: 7(BBBBBBBBBBBBBBBBB)	16/16
Queued	: 4(AAAA) 5(AAAA) 6(AAAA)	

### 4. After first to third jobs are finished, queued q4 jobs will be run.

Status	Job	CPU Cores Used
Running(kaibm01)	: 4(AAAA) 5(AAAA) 6(AAAA) 8(C) 9(C)	14/16
Running(kaibm02)	: 7(BBBBBBBBBBBBBBBBB)	16/16
Queued	:	

## 4.2.5 Handling of jobs in the maintenance

For the following reasons, if any system maintenance is planned, we recommend that you delete your jobs before the maintenance and re-submit your jobs after the maintenance.

When batch processing data analysis servers are rebooted in a maintenance, running and queued jobs will be killed, but will be re-submitted automatically after reboot. However, the re-submitting process should be failed because the LDAP client is not started yet. This process is repeated 21 times, and you will receive a lot of mails from PBS to inform you that your jobs are failed when you set a “PBS -m” option. After that, jobs will be held by the system. The held jobs cannot be released with the general privilege, but user can delete it.

## 4.3 How to use the MDAS terminals

The MDAS terminals<sup>2</sup> are computers constructed for SSH connection to the interactive data analysis servers and light processing. The large volume file system (/lfs[01-16]) and NFS areas for data migration (/ext\_nfs[1-3]) are NFS mounted, so that data can be downloaded to the terminals efficiently.

### 4.3.1 System configuration

The MDAS terminals consist of 10 computers located in the Subaru building open-use room (sbt[01-10].ana.nao.ac.jp) and 8 computers located in the ALMA building room 101 (alt[01-08].ana.nao.ac.jp). There are desktop PCs and compact PCs in each room. The Rocky Linux 9 is installed as the Operating System.

Table 4.7: **Specification of the MDAS terminals(desktop PC)**

Host name	sbt([01-05]—alt[01-05]).ana.nao.ac.jp
Machine	DELL Precision 3650
Quantity	10
OS	Rocky Linux 9
CPU	Intel Xeon E5 W-1950 3.3 GHz 6 core
RAM	DDR4-3200 RDIMM 16GB

Table 4.8: **Specification of the MDAS terminals(compact PC)**

Host name	(sbt[06-10]—alt[06-08]).ana.nao.ac.jp
Machine	Minisforum UM580B
Quantity	8
OS	Rocky Linux 9
CPU	AMD Ryzen 7 5800H 8C/16T 3.2GHz
RAM	DDR4-3200 DIMM 16GB

### 4.3.2 How to log-in

The MDAS terminals require the MDAS account. The login steps are as follows.

1. Input your account into the username field.
2. After that, input your password into the password field.

### 4.3.3 Disk spaces

The following disk areas are available from the MDAS terminals.

Table 4.9: **Disk areas available from the MDAS terminals**

Area	Mount point	Size per a mount point	Soft/Hard limit	Retention period
Large volume file system (NFS)	/lfs[01-16]	102TB	30TB/32TB	12 months

<sup>2</sup>Operation of the terminal workstations was terminated at the end of February 2023.

NFS areas for data migration	/ext_nfs[1-2]	393TB	9TB/10TB	NA
NFS areas for data migration	/ext_nfs3	306TB	9TB/10TB	NA

- In the MDAS terminals, user home directories are created for each terminal. User home directories (NFS) accessible from the interactive data analysis servers are not mounted.
- Before using the large volume file system or local disk area, please create a directory named your account under the disk areas.
- If your data volume reaches the soft/hard limit, application may not work normally (refer to [Section 4.1.3 \(Disk quotas\)](#) for details).
- Files exceeding the retention period will be target of the periodic data deletion (refer to [Section 4.1.3 \(Periodic data deletion\)](#) for details).

#### 4.3.4 Network access control

SSH connection to the MDAS terminals is not permitted for a security measure. Access (i.e. ssh, scp, or rsync) from the terminals to devices on the NAOJ network is not permitted, either.



## Chapter 5

# Software configuration

### 5.1 Software configuration of the interactive/batch processing data analysis servers

Table 5.1: Operating system

Operating system	Host
Red Hat Enterprise Linux 7	kaim[01-20], kaih[01-12], kaibm[01-02]

Table 5.2: Development environment

Software	Version	Notes
kterm	6.2.0	
mlterm	3.8.4	
rxvt	2.7.10	
xterm	7.6.0	
awk	4.0.2	
make	3.82	
patch	2.7.1	
sed	4.2.2	
tar	1.26	
bzip2	1.0.6	
gzip	1.5	
less	458	
lz4	1.7.3	

Table 5.3: Web browser

Software	Version	Notes
Google Chrome	Latest Ver.	
Firefox	latest version	

Table 5.4: **Word processing and Japanese input system**

Software	Version	Notes
emacs	22.3, 24.3	
xemacs	21.5.34	
nvi	1.79	
vim	7.4	
latex	3.14159265	
platex	3.14159265	Notes: <a href="#">Section 5.2.11.</a>
TeX Live	2017	
bibtex	0.99d	
pandoc	–	
pdvips	5.997	
a2ps	4.14	
ghostview	3.7.4	
ghostscript	9.07	
anthy	9100h	
canna	3.7	
freewnn	1.1.1-a023	
nkf	2.1.3	
skk	16.1	

Table 5.5: **Video and image processing software**

Software	Version	Notes
evince	3.14.2	
tgif	4.2.2	
xfig	3.2.5	
gimp	2.8.16	
ImageMagick	6.7.8.9	
netpbm	10.61.02	
mpeg_play	2.4	
mpeg_encode	1.5c	

Table 5.6: **Programming language**

Software	Version	Notes
cpanm	1.6922	
devtoolset-11	–	
GCC(incl. g77)	3.4.6	End of support: 30 November 2020
GCC	4.8.5	
gdb	7.6.1	
Java SE Develop- ment Kit	1.8.0	
Intel oneAPI	2023.0.0	
pdl	2.019	
perl	5.16.3	
php	5.4.16	
python	2.7.14	How to start: <code>python</code> or <code>python2</code> or <code>python2.7</code>
	3.5.4	How to start: <code>python3.5</code>

	3.8.3	How to start: python3 or python3.8
Modules for Python2.7		
astropy	2.0.3	
cosmology	0.1.104	
dustmaps	0.1a12	
healpy	1.11.0	
ipython	5.5.0	How to start: ipython or ipython2
matplotlib	2.1.1	
numpy	1.13.3	
pandas	0.21.1	
Pmw	2.0.1	
pymultinest	2.6	
pyraf	2.1.14	
pyregion	2.0	
pyspecKit	0.1.21	
requests	2.18.4	
rpy2	2.8.6	
scipy	1.0.0	
seaborn	0.9.0	
urwid	2.0.1	
Modules for Python3.5		
astropy	2.0.3	
dustmaps	0.1a12	
healpy	1.11.0	
ipython	6.2.1	How to start: /usr/local/python/3.5/bin/ipython
jupyter	1.0.0	Notes: <a href="#">Section 5.2.7</a> .
matplotlib	2.1.1	
numpy	1.13.3	
pandas	0.21.1	
Pmw	2.0.1	
pymultinest	2.6	
pyqtgraph	0.10.0	
PyQt5	5.14.0	
pyraf	2.1.14	
pyregion	2.0	
pyspecKit	0.1.21	
requests	2.18.4	
rpy2	2.9.1	
scipy	1.0.0	
seaborn	0.9.0	
urwid	2.0.1	
Modules for Python3.8		
APLpy	2.0.3	
astropy	4.0.1.post1	
dustmaps	1.0.4	
healpy	1.13.0	
ipython	7.16.1	How to start: ipython3
jupyter	1.0.0	Notes: <a href="#">Section 5.2.7</a> .
matplotlib	3.2.2	
numpy	1.18.5	
pandas	1.0.5	
Pmw	2.0.1	
pymultinest	2.9	
pyqtgraph	0.11.0	

PyQt5	5.15.0	
pyraf	2.1.15	
pyregion	2.0	
pyspecKit	0.1.23	
requests	2.24.0	
rpy2	3.3.5	
scipy	1.5.1	
seaborn	0.10.1	
stsci.tools	3.6.0	
urwid	2.0.1	
r	3.4.3	
ruby	2.0.0p648	
tcl/tk	8.5.13	
bash	4.1.46	
tcsh	6.18.01	

Table 5.7: Astronomy and science software

Software	Version	Notes
aips	31DEC17	How to use: <a href="#">Section 5.2.1</a> .
	31DEC19	
Astrometry.net	0.73	
CARTA	1.1, 1.2.1, 1.3, 1.4, 2.0, 3.0, 4.0beta, 4.0	How to start: <a href="#">Section 5.2.15</a>
CASA	6.6.0(Python3.8)	How to start: casa (Don't use CASA on the /lfs[01-16]. See <a href="#">Section 5.2.2</a> .)

	4.7.0-1, 4.7.1, 4.7.2, 5.0.0, 5.1.0, 5.1.1, 5.1.2, 5.3.0, 5.4.0, 5.4.1, 5.5.0, 5.6.1(pipeline), 5.6.2, 5.7.0, 5.7.2, 5.8.0, 6.1.0, 6.1.1(pipeline), 6.1.2(pipeline), 6.2.0, 6.2.1(pipeline), 6.3.0, 6.4.0(Python3.6), 6.4.0(Python3.8), 6.4.1(pipeline), 6.4.3(Python3.6), 6.4.3(Python3.8), 6.4.4(Python3.6), 6.4.4(Python3.8), 6.5.0(Python3.6), 6.5.0(Python3.8), 6.5.1(Python(3.6), 6.5.1(Python(3.8), 6.5.2(Python3.6), 6.5.2(Python3.8), 6.5.3(Python3.6), 6.5.3(Python3.8), 6.5.4(pipeline), 6.5.5(Python3.6), 6.5.5(Python3.8), 6.5.6(Python3.8), 6.6.0(Python3.8)	How to start: <a href="#">Section 5.2.2</a> .
CASA Analysis Utilities	1.3845	How to use: <a href="#">Section 5.2.3</a>
CDSclient	3.84	
COMICS q_series	4.2	
difmap	2.5e	
DisPerSE	0.9.24	
ds9	8.1	
FITSIO/CFITSIO	3.48	
fv	5.4	
getsf	220530	
GILDAS	dec17a	How to start: <a href="#">Section 5.2.4</a> .
gnuplot	5.2.8	
gsl	1.15	
HEALPix Facility	3.82	Installed in: /usr/local/Healpix_3.82
HEAsoft	6.22.1	
HyperZ	1.1	
IDL	8.8.1	29 licenses available. Can't start IDL: <a href="#">Section 5.2.5</a> .
IDL Astronomy User's Library	27-Feb-2020	
IRAF	2.14.1 2.16.1 2.17	How to start: <a href="#">Section 5.2.6</a> .
Java NewStar	20171120	

Karma	1.7.25	Notes: <a href="#">Section 5.2.14</a> .
Mathematica	13.0.1	2 licenses available.
MCSMDP	1.1.3	
MCSRED	20161125	How to start: <a href="#">Section 5.2.8</a> .
MCSRED2	20171125	Requirements: IRAF>2.16
MIDAS	17FEBpl1.2	
MIRIAD	4.3.8	How to start: <a href="#">Section 5.2.9</a>
Montage	5.0	
MSCRED	5.05	Only available on IRAF 2.16.1
MultiNest	3.1	
NewStar	20150422	Can't start NewStar: <a href="#">Section 5.2.10</a>
NOSTAR	20120528	
PBS Professional	2021.1.2	Software for batch system
Pgplot/Cpgplot	5.2.2	
Pgperl	2.21	
Scamp	2.0.4	
SDFRED	1.4.1	
	2.0.1	
SExtractor	2.19.5	
SkyCat	3.1.3	
starfinder	1.8.2	
STSDAS	3.17	
SWarp	2.38.0	
TABLES	3.17	
VEDA	–	
WCSTools	3.9.6	
XPA	2.1.17	
x11iraf	2.0beta	

## 5.2 How to use software

This section introduces the software that requires attention when using it.

1. [AIPS](#)
2. [CASA](#)
3. [CASA Analysis Utilities](#)
4. [GILDAS](#)
5. [IDL](#)
6. [IRAF](#)
7. [Jupyter Notebook](#)
8. [MCSRED](#)
9. [Miriad](#)
10. [NEWSTAR](#)
11. [pLaTeX](#)
12. [SDFRED](#)
13. [xdvi](#)
14. [Karma](#)
15. [CARTA](#)

### 1. AIPS

**Application** For those who want to use AIPS, please inform us (consult(at-mark)ana.nao.ac.jp) of your MDAS account. We will allocate an AIPS ID to each user. AIPS users can only use their own allocated

AIPS ID, but cannot use other user's AIPS ID.

If you do not have allocated AIPS IDs, only AIPS IDs between 2 and 9 can be used. Anyone can use these IDs, so someone may handle your data. We recommend that you get allocated AIPS IDs.

**Data storage location** The AIPS user data directory is set up in the home directory as AIPS IDs are allocated. Since the home directory is NFS, you can access same data from any interactive data analysis servers.

If you do not have allocated AIPS IDs, AIPS user data is stored into “/lfs01/aips/DATA/LOCALHOST\_1”. Since /lfs01 is a target of the periodic data deletion, the AIPS user data would be deleted.

**How to start AIPS** Please input commands below. AIPS(31DEC19) should be started.

```
$ source /usr/local/aips/LOGIN.SH
$ aips tv=local:0
```

If you want to use old versions, please execute following script by using a source command (bash).

```
31DEC17: /usr/local/aips-31DEC17/LOGIN.SH
```

## 2. CASA

**Don't use CASA on disks that are NFS mounted (/lfs[01-16:])** We strongly recommend that you use CASA on the home or local disk areas (/wkm[01-20], wkh[01-12]) because if you use CASA on disks that are NFS mounted (/lfs[01-16]), all tasks could not be run normally with all versions of CASA.

**How to start CASA** The default path of CASA is set to latest version basically. If you want to use old versions, please execute following lines.

```
4.7.0-1: /usr/local/casa/casa-release-4.7.0-1-el7/bin/casa
4.7.1: /usr/local/casa/casa-release-4.7.1-el7/bin/casa
4.7.2: /usr/local/casa/casa-release-4.7.2-el7/bin/casa
5.0.0: /usr/local/casa/casa-release-5.0.0-218.el7/bin/casa
5.1.0: /usr/local/casa/casa-release-5.1.0-74.el7/bin/casa
5.1.1: /usr/local/casa/casa-release-5.1.1-5.el7/bin/casa
5.1.2: /usr/local/casa/casa-release-5.1.2-4.el7/bin/casa
5.3.0: /usr/local/casa/casa-release-5.3.0-143.el7/bin/casa
5.4.0: /usr/local/casa/casa-release-5.4.0-70.el7/bin/casa
5.4.1: /usr/local/casa/casa-release-5.4.1-32.el7/bin/casa
5.5.0: /usr/local/casa/casa-release-5.5.0-149.el7/bin/casa
5.6.1(pipeline): /usr/local/casa/casa-pipeline-release-5.6.1-8.el7/bin/casa
5.6.2(pipeline): /usr/local/casa/casa-pipeline-release-5.6.2-2.el7/bin/casa
5.7.0: /usr/local/casa/casa-release-5.7.0-134.el7/bin/casa
5.7.2: /usr/local/casa/casa-release-5.7.2-4.el7/bin/casa
5.8.0: /usr/local/casa/casa-release-5.8.0-109.el7/bin/casa
6.1.0: /usr/local/casa/casa-6.1.0-118/bin/casa
6.1.1(pipeline): /usr/local/casa/casa-6.1.1-15-pipeline-2020.1.0.40/bin/casa
```

6.1.2(pipeline): /usr/local/casa/casa-6.1.2-7-pipeline-2020.1.0.36/bin/casa  
 6.2.0: /usr/local/casa/casa-6.2.0-124/bin/casa  
 6.2.1: /usr/local/casa/casa-6.2.1-7-pipeline-2021.2.0.128/bin/casa  
 6.3.0: /usr/local/casa/casa-6.3.0-48/bin/casa  
 6.4.0(Python3.6): /usr/local/casa/casa-6.4.0-16-py3.6/bin/casa  
 6.4.1(pipeline): /usr/local/casa/casa-6.4.1-12-pipeline-2022.2.0.64/bin/casa  
 6.4.1(pipeline): /usr/local/casa/casa-6.4.1-12-pipeline-2022.2.0.68/bin/casa  
 6.4.0(Python3.8): /usr/local/casa/casa-6.4.0-16-py3.8/bin/casa  
 6.4.3(Python3.6): /usr/local/casa/casa-6.4.3-27-py3.6/bin/casa  
 6.4.3(Python3.8): /usr/local/casa/casa-6.4.3-27-py3.8/bin/casa  
 6.4.3(Python3.6): /usr/local/casa/casa-6.4.4-31-py3.6/bin/casa  
 6.4.3(Python3.8): /usr/local/casa/casa-6.4.4-31-py3.8/bin/casa  
 6.5.0(Python3.6): /usr/local/casa/casa-6.5.0-15-py3.6/bin/casa  
 6.5.0(Python3.8): /usr/local/casa/casa-6.5.0-15-py3.8/bin/casa  
 6.5.1(Python3.6): /usr/local/casa/casa-6.5.1-23-py3.6/bin/casa  
 6.5.1(Python3.8): /usr/local/casa/casa-6.5.1-23-py3.8/bin/casa  
 6.5.2(Python3.6): /usr/local/casa/casa-6.5.2-26-py3.6/bin/casa  
 6.5.2(Python3.8): /usr/local/casa/casa-6.5.2-26-py3.8/bin/casa  
 6.5.3(Python3.6): /usr/local/casa/casa-6.5.3-28-py3.6/bin/casa  
 6.5.3(Python3.8): /usr/local/casa/casa-6.5.3-28-py3.8/bin/casa  
 6.5.4(pipeline): /usr/local/casa/casa-6.5.4-9-pipeline-2023.1.0.124/bin/casa  
 6.5.5(Python3.6): /usr/local/casa/casa-6.5.5-21-py3.6/bin/casa  
 6.5.5(Python3.8): /usr/local/casa/casa-6.5.5-21-py3.8/bin/casa  
 6.5.6(Python3.8): /usr/local/casa/casa-6.5.6-22-py3.8.el7/bin/casa  
 6.6.0(Python3.8): /usr/local/casa/casa-6.6.0-20-py3.8.el7/bin/casa

### 3. CASA Analysis Utilities

**How to use** CASA Analysis Utilities are installed in the following path: “/usr/local/src/casa/analysis\_scripts/”. Edit your casapy initializing file “~/casa/init.py” or create new file if it does not exist, and add the following.

```
import sys
aupath = '/usr/local/src/casa/analysis_scripts'
if aupath not in sys.path:
    sys.path.append(aupath)
import analysisUtils as aU
```



**checked functions** Operation of function on the following web site was confirmed.

Analysis Utilities in CASA Guide ([https://casaguides.nrao.edu/index.php/Analysis\\_Uilities](https://casaguides.nrao.edu/index.php/Analysis_Uilities))

Note following points:

- Functions of plotbandpass and plotweather are not confirmed because these functions are included in CASA. Use the CASA tasks of the same name.
- The following function was found not to work properly in some cases.
  - obslist: It does not work properly when antenna ID is set for parameter cofa.
  - plotWVRsolutions: Error when field is set by ID or name.
  - timeOnSource: Probably return incorrect results for mosaic observation data.

**About Antenna Pad Information** Because antenna pad information is not installed, functions that require it can not work properly.

**When you install into your home directory** You can install CASA Analysis Utilities also into your home directory. In that case, deploy the tools referring to the following site and change the path described in the init.py to the appropriate one.

Analysis Utilities in CASA Guide ([https://casaguides.nrao.edu/index.php/Analysis\\_Uilities](https://casaguides.nrao.edu/index.php/Analysis_Uilities))

## 4. GILDAS

**How to start GILDAS** You need to input the following command before starting the GILDAS.

```
$ gilenv
```

After executing the command, you should be able to start the GILDAS only on the terminal emulator.

## 5. IDL

**Can't start IDL (1)** After you kill IDL forcibly, you may have a trouble to restart IDL. The IDL configuration files may be damaged due to the forced termination. You may solve the problem with the following operation. However, the configuration file will be lost, and the IDL environment will be initialized.

```
Rename "~/IDLWorkspace8?"
Rename "~/.idl"
```

**Can't start IDL (2)** If you change the shell after you log-in to the MDAS, you cannot start the IDL because IDL cannot read configuration files. Please use a following command if you want to change the shell.

```
$ modify_userinfo -s [Shell]
```

## 6. IRAF

**How to start IRAF 2.14** The default path is IRAF 2.16. If you want to use IRAF 2.14, please append following lines into your configuration files.

```
[sh, bash]
Append following script to both "~/.bashrc" and "~/.bash_profile".
if [ -r /usr/local/iraf2141/iraf/unix/hlib/setup.sh ]; then
export IRAFARCH=redhat
export iraf=/usr/local/iraf2141/iraf/
. $iraf/unix/hlib/setup.sh
fi

[csh, tcsh]
Append following script to "~/.cshrc".
if ( -r /usr/local/iraf2141/iraf/unix/hlib/setup.csh ) then
    setenv IRAFARCH redhat
    setenv iraf /usr/local/iraf2141/iraf/
    source $iraf/unix/hlib/setup.csh
endif
```

**How to start IRAF 2.17** If you want to use IRAF 2.17, please execute the following command first.

```
[sh, bash]
source /usr/local/iraf217/iraf.sh

[csh, tcsh]
source /usr/local/iraf217/iraf.csh
```

## 7. Jupyter Notebook

When you launch the jupyter notebook with “–no-browser” option on the interactive data analysis servers and use the notebook from the user’s PC on the NAOJ network, we strongly recommend to use the SSH port forwarding because the communication between the user’s PC and the server is not encrypted.

If you use the MDAS vpn service, the SSH port forwarding is not required because the VPN encrypts the communication.

### How to use the SSH port forwarding for Jupyter Notebook

1. Launch the jupyter notebook on the interactive data analysis server with “–no-browser” option.

```
$ jupyter notebook --no-browser

--> URL to access the notebook is displayed.
e.g.: http://localhost:8888/?token=...
```

2. Execute SSH connection from the user’s PC .

```
$ ssh -L 8888:localhost:8888 your_account@server_name(executing jupyter)
```

Note: If the port number in the URL differs from 8888,  
match the number in SSH option to the port number.

3. Launch a web browser on user’s PC, enter the URL in address bar, and access the URL.

## 8. MCSRED

**How to start the MCSRED** When the mcsred is loaded from the IRAF, the MCSRED2 will be started by default. Those who want to use the MCSRED need to modify the following files.

```
<modification of the login.cl>
task $mcsred=/usr/local/subaru/MCSRED/mcsred.cl
set dir_mcsred="/usr/local/subaru/MCSRED/"
```

```
<modification of the sh/csh setting files>
[sh, bash]
Add the following line into the ~/.bashrc and ~/.bash_profile.
export MCSRED_DIR=/usr/local/subaru/MCSRED

[csh, tcsh]
Add the following line into ~/.cshrc.
setenv MCSRED_DIR /usr/local/subaru/MCSRED
```

## 9. Miriad

**How to use Miriad** The following list is aliases of the Miriad environment setting scripts for each telescope. You need to call one of the following aliases before starting the Miriad.

```
[sh, bash]
alias mirenv="source /usr/local/miriad/miriad_start.sh" (for CARMA)
alias mirenv-sma="source /usr/local/miriad/miriad-sma/lib/miriad/automiriad.sh"
(for SMA)
alias mirenv-ata="source /usr/local/miriad/miriad-ata/lib/miriad/automiriad.sh"
(for ATA)
alias mirenv-bima="source /usr/local/miriad/miriad-bima/lib/miriad/automiriad.sh"
(for BIMA)
alias mirenv-gmrt="source /usr/local/miriad/miriad-gmrt/lib/miriad/automiriad.sh"
(for GMRT)
alias mirenv-wsrt="source /usr/local/miriad/miriad-wsrt/lib/miriad/automiriad.sh"
(for WSRT)
alias mirenv-atnf="source /usr/local/miriad/miriad-atnf/miriad/MIRRC.sh" (for ATNF)
alias mirenv-atnf2="source /usr/local/miriad/miriad-atnf2/lib/miriad/automiriad.sh"
(for ATNF, old version)
alias mirenv-fasr="source /usr/local/miriad/miriad-fasr/miriad_start.sh" (for FASR)
alias mirenv-lofar="source /usr/local/miriad/miriad-lofar/miriad_start.sh" (for LOFAR)
```

```
[Example: to start Miriad for SMA]
$ mirenv-sma
$ miriad
```

- If you call an unsuitable alias, the Miriad would output incorrect results.
- We have prepared two ATNF aliases because a part of tasks did not work in the old version. If you want to use old the version, please call the “mirenv-atnf2”.

## 10. NEWSTAR

**Can’t start NEWSTAR** If empty temporary files such as “nsmmmlock”, “mmm\*”, “pops\*”, “AIPS\*”, and “ttt\*” exist in your home directory, then you can’t open a login window or “AIPS can’t start” would be displayed after you push a “ok” in the login window of the NEWSTAR. You can start NEWSTAR normally

after removing the temporary files.

## 11. pLaTeX

**Compilation error** There is a case where EUC-JP LaTeX files can not be compiled using pLaTeX. The default character code of the LaTeX installed in the MDAS is UTF-8, so if you want to compile a EUC-JP LaTeX file, please use `-kanji` option.

```
$ platex -kanji=euc hoge.tex
```

## 12. SDFRED

**How to start SDFRED** The default path of the SDFRED is a latest version. If you want to use SDFRED 1.4.1, please append following lines into your configuration files.

```
[sh, bash]
1) Append the following lines to both "~/.bashrc" and "~/.bash_profile".
   PATH=/usr/local/subaru/sdfred20100528/bin:$PATH export PATH
   export PATH
2) Execute "source ~/.bashrc"
```

```
[csh, tcsh]
1) Append the following line to "~/.cshrcf".
   set path=(/usr/local/subaru/sdfred20100528/bin $path)
2) Execute "source ~/.cshrc".
3) Execute "rehash".
```

## 13. xdvi

**Text garbling** Files compiled with EUC-JP would be garbled by xdvi. Please use `-kanji` option if you compile EUC-JP files.

```
$ platex -kanji=euc hoge.tex
```

## 14. Karma

**Environment setting** You need to execute the following command before starting Karma.

```
[sh, bash]
$ source /usr/local/karma/.karmarc
```

```
[csh, tcsh]
$ source /usr/local/karma/.login
```

**(Notice)** The reference of the “convert” command will be changed from “/usr/bin/convert” to “/usr/local/karma/bin/convert” after executing the command above. Please check a full-path of the “convert” command if you use “/usr/bin/convert”.

## 15. CARTA

**How to start CARTA** Please follow the steps below when you use CARTA 2.0 or later. It may not be started by the “carta” command alone.

- (1) Start CARTA with ‘no browser’ option.  
\$ carta --no\_browser &
- (2) Start any browser on user’s PC.
- (3) The following message is displayed in step (1).  
[info] CARTA is accessible at [http://...]  
Copy the URL and paste it into the browser.  
CARTA starts when you open the link.

The default path of CARTA is set to latest version basically. If you want to use old versions, please execute following lines.

- [1.1] /usr/local/carta/CARTA-v1.1-RedHat7.AppImage
- [1.2.1] /usr/local/carta/CARTA-v1.2.1.AppImage
- [1.3] /usr/local/carta/CARTA-v1.3.AppImage
- [1.4] /usr/local/carta/CARTA-v1.4.AppImage
- [2.0] /usr/local/carta/CARTA-v2.0-redhat.AppImage
- [3.0] /usr/local/carta/carta-3.0-x86\_64.AppImage
- [4.0beta] /usr/local/carta/carta-v4.0.0-beta.1-x86\_64.AppImage
- [4.0] /usr/local/carta/carta-4.0-x86\_64.AppImage



## Chapter 6

# MDAS dedicated commands

### 6.1 How to use the MDAS dedicated commands

The following commands are available on MDAS.

Table 6.1: List of unique commands

Command	Outline
lpall	Output files to a printer
userinfo	Display user information
hline modify_userinfo	Modify user information

#### 6.1.1 lpall

The lpall command makes it easy to print single and double-sided PS, PDF and text files.

```
Usage
$ lpall -d <printer_name> [-L|-K] <file_name>
Option
-d: Specify a printer (nwp-m1,nwp-sb,nwp-al). The following printers are available:
    nwp-m1 (South building open-use room B)
    nwp-sb (Subaru building open-use room)
    nwp-al (ALMA building room 101)
-L: Double-sided printing (long edge binding)
-K: Double-sided printing (short edge binding)
Example
$ lpall -d nwp-m1 test.ps
    # Single-sided printing of test.ps with nwp-m1
$ lpall -d nwp-m1 -L test.pdf
    # Double-sided printing (long edge binding) of test.pdf with nwp-m1
```

- This command automatically identifies the type of input file by the contents of the file, not by its extension.
- If the “-d” option is omitted, data is output to the default printer(see [Section 7.1.2](#)).

#### 6.1.2 userinfo

The userinfo command displays the current login shell(default shell is bash), registered e-mail address, and name(GECOS). This command requires your MDAS password.

```
Usage
$ userinfo
Example
$ userinfo
Enter LDAP Password:
loginshell: /bin/bash
mail: your_account@nao.ac.jp
gecos: Your Name
```

### 6.1.3 modify\_userinfo

The `modify_userinfo` command can be used to modify your MDAS password, registered e-mail address, and current login shell.

```
Usage
$ modify_userinfo (-h|-p|-m <your_e-mail_address>|-s <login_shell>|-v)
Option
-h Display help message and exit
-p Modify the password
-m Modify the e-mail address
-s Modify the current login shell. The following shells are available:
  /bin/bash (/usr/local/bin/bash)
  /bin/tcsh (/usr/local/bin/tcsh)
  /bin/csh
  /bin/ksh
  /bin/sh
  /bin/zsh (/usr/local/bin/zsh)
-v Display version information and exit
```

Set up your password according to the following policy. Users who wish to reset their passwords need to contact us ((consult(at-mark)ana.nao.ac.jp)).

```
Password policy:
The password shall be a combination of 2 types or more of English lowercase
letters, English uppercase letters, numbers, and symbols, and it must be of the
length of 12 characters or more.
```



## Chapter 7

# How to use peripherals

This section introduces the peripherals available on MDAS.

### 7.1 Network printers

#### 7.1.1 List of network printers

There are network printers(Fujifilm ApeosPrint C5240) in the South building open-use room B, Subaru building open-use room, and the ALMA building room 101. A4-size print outs can be made from the interactive data analysis servers.

Note that operation of the A3/A4 printers, Fuji Xerox Docuprint C5000 d, was terminated at the end of February, 2023.

Table 7.1: **List of network printers**

Host name	IP address	Place
nwp-m1.ana.nao.ac.jp	133.40.130.137	South building open-use room B
nwp-sb.ana.nao.ac.jp	133.40.130.139	Subaru building open-use room
nwp-al.ana.nao.ac.jp	133.40.130.140	ALMA building room 101

#### 7.1.2 How to use the network printers from the interactive data analysis servers

Data can be output from the interactive data analysis servers to the printers([Table 7.1](#)). The following printers are set as default output destinations.

Table 7.2: **The default output destinations**

Source	Target	Place
kaim[01-20].ana.nao.ac.jp	nwp-sb.ana.nao.ac.jp	Subaru building open-use room
kaih[01-12].ana.nao.ac.jp	nwp-al.ana.nao.ac.jp	ALMA building room 101

Use the “lpall” command to output data to a network printer. Please refer to [Section 6.1.1](#) for details.



## Chapter 8

# How to use open-use rooms

### 8.1 About open-use rooms

There are open-use rooms in the South building and Subaru building on the NAOJ Mitaka campus. These rooms are provided to support user's researches. Users can analyze astronomy data using computers and make posters using large-format printers. Every afternoon from Monday to Friday, an operator is in each open-use room and supports users.

Note that ADC also manages computers and printers in the ALMA building room 101, but the room is owned by the NAOJ Chile observatory. You need to get permission from the NAOJ Chile observatory before entering the room. Please ask the NAOJ Chile observatory if you have any question about the room 101.

Table 8.1: List of open-use rooms

	South building open-use room A and B	Subaru building open-use room
<b>Place</b>	2F, South building	1F, Subaru building
<b>Extension number</b>	3578	3505
<b>Opening hours of operator desk</b>	At 13:00 - 17:30 from Monday to Friday	
<b>Usable machines</b>	Open-use linux terminals (13 units), open-use computers (4 units), A4 printers (1 unit), Large-format printers (2 units)	MDAS terminals(5 units), Open-use PCs (3 units), A4 printer (1 unit), Large-format printer (1 unit)

- Please refer to [Section 4.3](#) for details on how to use the MDAS terminals.

### 8.2 How to use open-use linux terminals

Open-use linux terminals are computers constructed for SSH connection to the interactive data analysis servers and light processing. Note that the terminals have been renamed from the remote login terminal computers since March 2023.

#### 8.2.1 System configuration

The open-use linux terminals consist of 13 computers located in the South building open-use room A. The CentOS Release 7 is installed as the Operating System.

Table 8.2: Specification of the open-use linux terminals

Host name	new-r[01-13].adc.nao.ac.jp
Machine	HP Z4 G4 Workstation
Quantity	13
OS	CentOS Release 7
CPU	Intel Xeon W-2123 3.6 GHz 4 core
RAM	16GB

### 8.3 Software configuration of the open-use linux terminals

Table 8.3: List of the software configuration of the open-use linux terminals

Software	Version	Notes
anaconda3	2019.03	
ds9	7.8.0.1	
emacs	24.3.1	
fv	5.5	
gcc	4.8.5	
gnuplot	4.6 patchlevel 2	
Google Chrome	Latest Ver.	
imagemagick	6.7.8-9	
iraf	2.16.1	
jupyter-notebook	6.0.0	
python	2.7,3.7	
<b>Python modules(except)</b>		
astropy	3.2.1	
ipython	7.6.1	
matplotlib	3.1.0	
nose	1.3.7	
numpy	1.16.4	
pyraf	2.1.15	
urwid	2.0.1	
tcl/tk	8.5	
x11iraf	2.0beta	

#### 8.3.1 How to login

Only guest account “kyoudou” is available to login to the open-use linux terminals. Please click the “kyoudou” account on the display, and input the password “kyoudou”.

#### 8.3.2 Disk areas

The following disk areas are available on the open-use linux terminals.

Table 8.4: Disk areas available on the open-use linux terminals

Area	Mount point	Size per a mount point	Soft/Hard limit	Retention period
Local disk space	/home	1.9TB	–	–

### 8.3.3 Usage notes

- SSH connection to the open-use linux terminals is not permitted for a security measure.
- It is prohibited to use more than one computer by one user simultaneously.

## 8.4 How to use open-use PCs

There are open-use PCs in the South building open-use room B and Subaru building open-use room. Users can make poster data and output the data to large-format printers using the open-use PCs. Windows or Macintosh is installed in each PC. You do not need to apply for using the open-use PCs.

### 8.4.1 System configuration

The open-use PCs are intended to be used for the production and printing of posters. Each PC has RAMs over 32GB to handle large size poster data having many images. Note that the language setting of the mnwin2 and mnmac2 is English.

Table 8.5: List of the open-use PCs in the South building open-use room B

Host	Machine	OS	CPU	RAM
mnwin1	EPSON Endeavor MR8400	Windows	Intel Core i5-12600K	32GB
mnwin2	EPSON Endeavor MR8100	Windows	Intel Core i7-8700K	64GB
mnmac1	Apple iMac 2020	macOS	Intel Core i5 3.1GHz	32GB
mnmac2	Apple iMac 2017	macOS	Intel Core i7 4.2GHz	64GB

Table 8.6: List of shared PCs in the Subaru building open-use room

Host	Machine	OS	CPU	RAM
sbwin1	EPSON Endeavor Pro5700-M	Windows	Intel Core i7-6700K	32GB
sbwin2	EPSON Endeavor MR7300	Windows	Intel Core i7-9700K	32GB
sbmac1	Apple iMac Retina	OSX El Capitan	Intel Core i7 4.0GHz	32GB

### 8.4.2 Software configuration of the open-use PCs

Table 8.7: List of the software configuration of the open-use PCs in the South building open-use room B

mnwin1	
Software	Notes
Adobe Creative Cloud	Acrobat, Illustrator, Photoshop, Premiere Pro, Media Encoder, Camera Raw

Microsoft Office Home and Buisness 2021	Word, Excel, PowerPoint
Firefox	
Gnuplot	
MobaXterm	
PeaZip	
PowerShell	
VNC Viewer	
WinSCP	
EPSON Scan	Driver for DS-70000
Yonde!!koko	
<b>mnwin2</b>	
<b>Software</b>	<b>Notes</b>
Adobe Creative Cloud	Acrobat, Illustrator, Photoshop, Premiere Pro
Microsoft Office 2016	Word, Excel, PowerPoint, Access, Publisher
CyberLink PowerDVD 14	
ESET Endpoint AntiVirus	
Firefox	
Tera Term	
WinSCP	
Lhaplus	
<b>mnmac1</b>	
<b>Software</b>	<b>Notes</b>
Adobe Creative Cloud	Acrobat, Photoshop, Illustrator, Premiere Pro, Media Encoder, Camera Raw
Microsoft Office	Word, Excel, PowerPoint
iWork	Pages, Numbers, Keynote
Xcode	
<b>mnmac2</b>	
<b>Software</b>	<b>Notes</b>
Adobe Creative Cloud	Acrobat, Adobe Color, After Effects, Behance, Bridge, Character Animator, Illustrator, InDesign, Lightroom, Media Encoder, Photoshop, Portfolio, Premiere Pro, Spark
Microsoft Office	Word, Excel, PowerPoint
iWork	Pages, Numbers, Keynote
GIMP	
ParaView	
StuffIt Expander	
Xcode	

Table 8.8: List of the software configuration of the open-use PCs in the Subaru building open-use room

<b>sbwin1</b>	
<b>Software</b>	<b>Notes</b>
Adobe Creative Cloud	Acrobat, After Effects, Character Animator, Illustrator, InDesign, Media Encoder, Photoshop, Premiere Pro
Microsoft Office 2016	Word, Excel, PowerPoint
CyberLink PowerDVD 12	

Firefox	
GIMP	
Gnuplot	
Google Chrome	
IDL 8.1	
Nero Express	
PuTTY	
ScanSnap Manager	
Tera Term	
WinSCP	
Xming	
+Lhaca	
<b>sbwin2</b>	
<b>Software</b>	<b>Notes</b>
Adobe Creative Cloud	Acrobat, After Effects, Bridge, Character Animator, Illustrator, Media Encoder, Photoshop, Premiere Pro
Microsoft Office 2013	Word, Excel, PowerPoint
ASTEC-X	
CyberLing PowerDVD 10	
Firefox	
GIMP	
Gnuplot	
IDL 8.1	
Nero Express	
PuTTY	
Tera Term Y	
WinSCP	
+Lhaca	
<b>sbmac1</b>	
<b>Software</b>	<b>Notes</b>
Adobe Creative Cloud	Acrobat, After Effects, Character Animator, Illustrator, InDesign, Media Encoder, Photoshop, Premiere Pro
Microsoft Office 2019	Word, Excel, PowerPoint
iWork	Pages, Numbers, Keynote
FileZilla	
GIMP	
Gnuplot	
ParaView	
StuffIt Expander	
Xcode	

### 8.4.3 How to use open-use PCs

The open-use PCs are always logged-in by user “kyoudou”. If logged-out, please log-in with the following account and password.

Account: kyoudou  
Password: kyoudou

Note that you should delete your files on the open-use PC after use because these PCs are used by unspecified users. If user’s files remain, operators delete the files once a month.

## 8.5 How to use printers and scanners

There are A4 network printers, large-format printers, and scanners in the South building open-use room B, and the Subaru building open-use room. Users can input/output documents using these devices. You do not need to apply for using these devices.

### 8.5.1 System configuration

Table 8.9: List of printers

South building open-use room B			
Host	IP address	Format	Printer
nwp-m1.ana.nao.ac.jp	133.40.130.137	A3	Fujifilm ApeosPrint C5240
lfp-m2	—	Large-format	EPSON SC-P1005PS
lfp-m3	—	Large-format	EPSON SC-P1005PS
Subaru building open-use room			
Host	IP address	Format	Printer
nwp-sb.ana.nao.ac.jp	133.40.130.139	A4	Fujifilm ApeosPrint C5240
lfp-sb	—	Large-format	EPSON SC-P1005PS

- Large-format printers are available only from the open-use PCs.
- The lfp-m3 is a dedicated printer to use cloth paper.

### 8.5.2 How to use the network printers

There are A4 network printers in the South building open-use room B and Subaru building open-use room. A4 papers are loaded in the network printers. Users can output data from the open-use PCs or user's PC on the NAOJ network. Please refer to an instruction manual of each application for printing procedure. To use the network printer from the user's PC, the network printer driver must be installed.

#### How to install a network printer driver

Following URL is a link to the network printer driver. Please install the driver according to the instructions on the link.

- Driver: <https://www.fujifilm.com/fb/download/eng/aprt/c5240>

#### About printer supplies

Printer supplies such as papers and toners are prepared near the network printer. Operators exchange supplies with new ones, but in the case that operators are absence, you have to exchange the supplies yourself. After exchanging supplies, please fill in a form in the record book near the network printer.

### 8.5.3 How to use large-format printers

There are large-format printers in the South building open-use room B and Subaru building open-use room. Super A0 or super B0 roll papers with glossy or plain are available. The “lfp-m3” located in the South building open-use room B is a dedicated printer to use cloth papers, so super A0 or super B0 cloth roll paper. Users can output data only from the open-use PCs (output from the user's PC is prohibited). After using the large-format printer, please fill in a form in the record book near the printers.

The following description is how to use the large-format printer from Windows and Macintosh open-use PCs. Usually, a super A0 glossy roll paper is loaded in the “lfp-m2”, and “lfp-sb”, and super A0 cloth roll paper is loaded in the “lfp-m3”, respectively. If you want to use other papers, operators exchange the paper, but in the case that operators are absence, you have to exchange the paper yourself.



## From Windows

The following description is the way to output data from the Adobe Acrobat on the Windows open-use PC(mnwin2) to a large-format printer.

1. Click the “File” tab and click the “Print”.
2. In the “Printer” select box, select a printer name. The choice is depending on whether the print size is defined size (e.g. A and B series paper sizes) or not (e.g. long-size printing). Note that the “lfp-m3” and “lfp-m3\_PostScript” are the dedicated printer to use cloth papers.
  - Defined paper size: lfp-m2, lfp-m3, lfp-sb
  - Undefined paper size: lfp-m2\_PostScript, lfp-m3\_PostScript, lfp-sb\_PostScript
3. Click the “Properties”.
4. In the “Media Type” select box of the “Main” tab, select a type as follows:
  - When a glossy role paper is loaded: EPSON Pro Photo <Glossy>
  - When a plain role paper is loaded: EPSON Plain Paper <Singleweight>
  - When a cloth role paper is loaded: EPSON MC/PM Cloth
5. In the “Source” select box, select a “Roll paper”.
6. In the “Size” select box, select a print size you want .
7. In the “Output Paper” select box of “Paper Layout” tab, select a paper size loaded (super A0 or super B0).
8. Set the “Scale” to 100% or any scale.
9. Click the “OK”.
10. Click the “Print”.

The “lfp-XX\_PostScript” in the “Printer” select box can perform long-size printing but cannot display a print preview window. Depending on the application used, the print dialog box may vary, so if you have any questions, please contact operators.

## About printer supplies

Printer supplies such as papers and toners are prepared near the large-format printers. Operators exchange supplies with new ones, but in the case that operators are absence, you have to exchange the supplies. After exchanging supplies, please fill in a form in the record book near the large-format printers.

### 8.5.4 How to use scanners

There are scanners in the South building open-use room B and Subaru building open-use room. Each scanner can be available from the open-use PCs.

Table 8.10: List of scanners

Place	Machine	Max. available paper	Connected PC
South building open-use room B	EPSON DS-70000	A3	mnwin1
Subaru open-use room	Fujitsu ScanSnap iX500	A4	sbwin1

Each scanner is connected to a open-use PC with Japanese setting. If you want to use scanners, please contact an operator.

## 8.6 Network connection

The NAOJ network and the Internet are available in the NAOJ Mitaka campus. Accesses from the NAOJ network to the Internet is permitted, but in contrast, from the Internet to the NAOJ network is not permitted for a security measure. This section introduces a usage of the NAOJ network and the Internet in the open-use rooms.

### 8.6.1 NAOJ network

In the open-use rooms, Wi-Fi of the NAOJ network is available, but only the NAOJ staffs can use it. Please refer to a website of the NAOJ NETWORK SERVICE HELP CENTER (<https://nethelp.mtk.nao.ac.jp/contents/>) for usage of the NAOJ network(this web site is not accessible from the Internet).

### 8.6.2 Internet

The Internet can be used in the NAOJ Mitaka campus. Wired LAN is available in the open-use rooms, and Wi-Fi is available throughout the NAOJ Mitaka campus. In order to access the interactive data analysis servers or to use network printers, VPN connection to the NAOJ network must be established in advance.

#### Wired LAN

There are network hubs for connecting the Internet in the South building open-use room A,B and Subaru building open-use room. IP addresses are allocated by DHCP.

#### Wireless LAN

Wi-Fi is available throughout the NAOJ Mitaka campus. The SSID of the Wi-Fi is “naoj-open”. Please ask NAOJ staffs for the password or see the digital information signage in each building. The password is updated once a week.

# Update history

2023-10-17	Added “CASA6.5.4(pipeline)” into Section 5.1. “CASA6.4.1(pipeline)(casa-6.4.1-12-pipeline-2022.2.0.68)” “CASA6.5.4(pipeline)” into Section 5.3.	Added and
2023-10-11	Added “CASA6.6.0” into Section 5.1.	
2023-09-25	Added “CARTA4.0” into Section 5.1.	
2023-08-16	Modified CARTA’s instruction in Section 5.2.15.	
2023-07-20	Added “CASA6.5.6” into Section 5.1.	
2023-05-26	Added “CARTA3.0”, “CARTA4.0beta”, “HEALPix Facility”, Pgperl into Section 5.1. Added Section 5.2.15. Added compact PC into Section 4.3.1.	
2023-05-19	Revised documents. Removed Section 5.2. Added “CASA6.5.5” and “IRAF2.17”, and replaced “Intel Parallel Studio XE Composer Edition” to “Intel oneAPI” in Section 5.1.	
2023-03-24	Revised sections because the load balancer(kaim.ana.nao.ac.jp, kaih.ana.nao.ac.jp), large format printer(lfp-m1, lfp-al), A3 printer(nwp*), and terminal workstations(sbt*, alt*) are no longer in operation.	
2023-02-09	Corrected the full path of CASA6.4.1 in Section 5.3.	
2023-02-07	Added “CASA6.5.3” into Section 5.1.	
2022-12-23	Added “NFS areas for data migration” into Section 4.1.3. Removed “nfsdf” command from Section 6 because it is not implemented.	
2022-11-02	Added “CASA6.5.1”, “CASA6.5.2” and “CASA6.4.1” into Section 5.1.	
2022-06-07	Added “CASA6.5.0” and “getsf” into Section 5.1.	
2022-05-23	Added “CASA 6.4.4” into Section 5.1. Upgraded “IDL” from 8.8 to 8.8.1, “Intel Parallel Studio XE Composer Edition” from 2020 update4 to 2022.1.2, “Mathematica” from 12.2.0 to 13.0.1, and “PBS” from 2021.1.0 to 2021.1.2.	
2022-04-04	Added “DisPerSE” and “devtoolset-11” into Section 5.1.	
2022-02-02	Added “CASA 6.4.3” into Section 5.1.	
2021-12-23	Added “CASA 6.4.0” into Section 5.1.	
2021-10-13	Added “CASA 6.2.1” into Section 5.1.	
2021-09-09	Added “CASA 6.3.0” into Section 5.1.	
2021-08-19	Revised “How to start IRAF 2.14” in Section 5.3.	
2021-08-04	Revised Section 4.2.5, 6.1.2 and 6.1.3.	
2021-06-18	Added “CARTA 2.0” into Section 5.1. Revised Section 5.3.2.	
2021-06-11	Added “CASA 5.8.0” and “6.2.0” into Section 5.1.	
2021-04-19	Added “CASA 6.1.1” into Section 5.1. Upgraded “IDL” from 8.7.3 to 8.8, “Intel Parallel Studio XE Composer Edition” from 2020 Update 1 to 2020 Update 4, “Mathematica” from 12.0.0 to 12.2.2 in Section 5.1.	
2020-12-24	Added “CASA 5.7.0”, “CASA 5.7.2”, “CASA 6.1.0”, “CASA 6.1.2”, and “CARTA 1.4” into Section 5.1.	
2020-11-27	Revised Section 4.2.4.7.	
2020-10-16	Revised Section 4.2.4.7. Modified “xmacs” to “xemacs” and gcc to GCC in Section 5.1.	
2020-08-26	Revised Section 4.2.	
2020-08-03	Added “CARTA 1.3” into Section 5.1.	

- 2020-07-20 Revised Section 4.2. Added “AIPS(31DEC19)”, Python3.8, and modules of Python3.8 (APLpy 2.0.3, astropy 4.0.1.post1, dustmaps 1.0.4, healpy 1.13.0, ipython 7.16.1, jupyter 1.0.0, matplotlib 3.2.2, notebook 6.0.3, numPy 1.18.5, pandas 1.0.5, Pmw 2.0.1, pymultinest 2.9, pyqtgraph 0.11.0, PyQt5 5.15.0, pyraf 2.1.15, pyregion 2.0, pyspeckit 0.1.23, requests 2.24.0, rpy2 3.3.5, scipy 1.5.1, seaborn 0.10.1, stsci.tools 3.6.0, urwid 2.1.0) into Section 5.1. Upgraded “CFITSIO” from 3.42 to 3.48, “Gnuplot” from 5.2.2 to 5.2.8, ds9 from 8.0.1 to 8.1, IDL Astronomy User’s Library from 21-Nov-2017 to 27-Feb-2020, WCSTools from 3.9.4 to 3.9.6 in Section 5.1. Revised Section 5.3 (AIPS).
- 2020-05-28 Added “Google Chrome” into Section 5.1.
- 2020-05-11 Revised Section 5.3 (AIPS).
- 2020-04-20 Removed “Google Chrome” from Section 5.1.
- 2020-03-11 Added “PyQt5” and “pyqtgraph” into Section 5.1.
- 2020-02-14 Updated software configuration of sbmac1 in Section 8.2.2.
- 2020-02-13 Removed “PyFITS” From Section 5.1 because “PyFITS” is included in “Astropy”.
- 2020-01-28 Added description of Karma into Section 5.3.
- 2020-01-22 Removed “Pgperl” From Section 5.1 because “Pgperl” does not exist in this system. Updated Section 4.1.3 and 4.3.3.
- 2019-12-24 Added “CASA 5.6.2” and “CARTA 1.2.1” into Section 5.1.
- 2019-12-23 Updated “List of shared PCs in the South building open-use room B” in Section 8.2.1.
- 2019-12-03 Added “CASA 5.6.1” into Section 5.1.
- 2019-11-26 Added “Karma” into Section 5.1.
- 2019-10-23 Updated difmap from 2.5a to 2.5e in Section 5.1.
- 2019-10-21 Updated Section 5.2.
- 2019-10-18 Updated Section 5.2.
- 2019-08-23 Corrected full path of CASA in Section 5.3.
- 2019-07-19 Added descriptions of qhold and qrls commands into Section 4.2.4. Added Section 4.2.5.
- 2019-07-16 Added “CASA 5.5.0” and “CARTA” into Section 5.1.
- 2019-07-04 Proofreading this document.
- 2019-07-02 Corrected the information of the NAOJ VPN service in Section 3.2, revised Section 4.1.3 and 4.3.3 because of change policy of the periodic deletion, revised Section 4.4.1, 4.4.2, 4.4.3 and 5.2 because of a replace of the remote login terminal computers.
- 2019-04-18 Updated the information of mnmac2 in Section 8.2.
- 2019-04-15 Added Chapter 8. In Section 5.1, added “CASA 5.4.1”, updated IDL from 8.6.1 to 8.7.2, updated PBS from 14.2.4 to 18.2.3, updated Intel Parallel Studio Composer Edition from 2018 update 1 to 2019 update 3, updated Mathematica from 11.2.0 to 11.3.0, and updated ds9 from 7.5 to 8.0.1. Added a full-path of CASA 5.4.0 into the description of CASA in Section 5.3. Updated the information of mnwin2 in Section 8.2.
- 2019-02-21 Added “PySpecKit” into Section 5.1. We added precautions for use of Jupyter Notebook. Added a full-path of CASA 5.4.0 into the description of CASA in Section 5.3.
- 2018-11-19 Corrected URLs of links.
- 2018-10-31 Added “CASA 5.4.0” into Section 5.1. Added a full-path of CASA 5.3.0 into the description of CASA in Section 5.3.
- 2018-09-05 Added “pandoc” and “seaborn” into Section 5.1.
- 2018-08-20 Added “difmap” into Section 5.1.
- 2018-07-31 Revised Section 4.3.2. Added “2. How to write to BD medias using the CUI commands” and “3. How to use tape device” into Section 7.2.2.
- 2018-07-04 Added CASA 5.3.0 into Section 5.1. Added a full-path of CASA 5.1.2 into the description of CASA in Section 5.3. Added description of MCSRED into Section 5.3. Removed description of CFITSIO in Section 5.3. Added Section 7.2.2.

2018-06-25	Revised Section 7.2.1 and Section 5.3 (AIPS, GILDAS, and Miriad).
2018-06-08	Added Section 7.2.
2018-05-25	Added sentences into “How to use remote login terminal computers”. Added PDL and cpanm into “Software configuration of the interactive/batch processing data analysis servers and terminal workstations”.
2018-05-18	Revised the structure of the chapters.
2018-04-27	Added “How to use interactive data analysis servers”. Added “How to use network printers”. Added CosmoloPy, dustmaps, GCC 3.4.6, Healpy, Montage, pyregion, urwid, Requests, and Jupyter Notebook into “Software in the interactive/batch processing data analysis servers and terminal workstations”.
2018-04-25	Added CASA Analysis Utilities into “Software configuration of the interactive/batch processing data analysis servers and terminal workstations”. Added “how to use the CASA Analysis Utilities” into “How to use software”.
2018-04-13	Added CASA 5.1.2 and lz4 into “Software configuration of the interactive/batch processing data analysis servers and terminal workstations”. Revised “How to use batch processing data analysis servers”.
2018-03-12	We added “nfsdf” into “Unique commands of the MDAS”. Added “Peripherals” and “How to use batch processing data analysis servers”.
2018-03-05	Revised sentences in “How to access the Multi-wavelength Data Analysis System”.
2018-03-02	Specified that CosmoloPy, Healpy, pyregion, urwid, Requests, APLpy, and lz4 have not yet been installed.
2018-02-26	Revised sentences in “Application of the Group ID service”. Added CosmoloPy, Healpy, pyregion, urwid, Requests, APLpy, and lz4 into “Software in the interactive/batch processing data analysis servers and terminal workstations”. Added “How to use software”.
2018-02-16	Removed an incorrect explanation in “Access from the client terminal on the NAOJ network”. Added an explanation about the MDAS VPN service into “How to use the MDAS VPN service”.
2018-02-15	First edition was issued.