

# SOP: Kk-Wz Intensive processing in Socorro

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## Purpose

This Standard Operating Procedure (SOP) document contains the instructions to follow for correlation of Kokee Park (Kk) to Wettzell, Germany (Wz) intensive observations. Starting in April 2021, these tests will happen on the first Wednesday of each month. There could be additional tests or operational use of this data transfer / correlation process outside these slots. It is expected that these instructions should be executed on a monthly cadence to ensure readiness.

## Points of Contact

Below are the relevant points of contact (POCs) and contact information for each organization that is involved. These POCs should be reviewed semiannually to ensure they remain up to date.

Org.	Name	Email	Phone	Role
NRAO	Jim Ogle	jogle@nrao.edu	575-835-7255	Ops. supervisor
NRAO	VLBA operators	vlbaops@nrao.edu	575-835-7250	Execute data transfer
NRAO	Mark Wainright	mwainrig@nrao.edu		Software support
USNO	Phillip Haftings	phillip.c.haftings.civ@mail.mil	202-762-1492	Correlation support
USNO	Andy Sargent	andrew.j.sargent2.civ@mail.mil		Correlation support
USNO	Roxanne Inniss	roxanne.a.inniss.civ@mail.mil		Correlation support
Kk	Kiah Imai	kimai@peraton.com	808-335-6495	Technical support
Kk	Christopher Coughlin	ccough01@peraton.com	808-335-6495	Site manager
Kk	Site distribution	dl-kpgo@peraton.com		Wide reaching list
Wz	Christian Plötz	christian.ploetz@bkg.bund.de		Technical support
Wz	Alexander Neidhardt	alexander.neidhardt@tum.de		Site manager

The IVS maintains the list of planned and executed intensive observations at <https://ivscc.gsfc.nasa.gov/sessions/intensive/2021/> (with the year portion to be replaced as appropriate).

## Electronic data transfer

The data to correlate will be electronically transferred from the two sites. Data from each site typically totals approximately 41GB. Separate instructions for data transfer from the two sites are provided

below. The data transfers can occur simultaneously only if different port numbers are used. At time of writing the port assignments are 46224 (for WZ) and 46225 (for KK) allowing simultaneous transfers. A preferred local (Socorro) destination for data from each site is specified in the instructions below, however other destinations can be used should insufficient disk space remain.

Except as specifically noted, these instructions are to be executed by VLBA staff, usually the VLBA operator on duty. Commands to be entered into a terminal window are printed in `blue fixed-space font`. Because multiple terminals are needed, the commands will be specified after a terminal designation that looks like `[1]` or similar so as to avoid potential for confusion.

### Which Experiment?

This data transfer exercise is intended to simulate a real need for low latency correlation. The observation to be transferred should be the one that is observed earlier on that same day. The project code is based on the date and is of the form `iyyddd` where `yy` is the last two digits of the year (currently 21) and `ddd` is the day of year. The day of year can be found in the VLBA "ce1gg" schedule or on many printed calendars. One can generate the full project code using the Linux "date" command:

```
date +i%y%j
```

If this is used, just make sure this is run on the same day as the experiment is to be run.

Starting in June 2021, VLBA will transfer data from these sites on the first Wednesday of each month.

### Data transfer from Kokee Park (Kk)

The following steps should be made to transfer data from Kk to Socorro.

Unless otherwise instructed it is best to avoid transfers from Kokee Park between 1700 and 2000 UTC.

1. Send an email to the Kk site distribution list requesting that data for a specified project (e.g., `i20317`) be made available for download by the VLBA. Specify in the email that port 46225 is requested. Best to send this email before 1700 on day of observation.
2. *(To be done by Kk personnel)* Configure a tsunami server to allow download of the requested project.
3. *(To be done by Kk personnel)* Respond to the VLBA request for data access. The response may include some additional details such as the time windows or data rate limitations or a specific port number to use (in lieu of 46225).
4. Start one terminal window, then log into `gygax` as user `difx`. Note that the first step is only needed if the terminal is not already logged on as user `difx`.

```
[1] ssh difx@swc000
```

```
[1] ssh gygax
```

5. Enter the standard destination directory, which for this data is `/home/datacopy-13/KK`.

```
[1] cd /home/datacopy-13/KK
```
6. Verify that sufficient disk space remains. If the reported "Avail" space is less than 50G, then an alternate destination should be chosen and the shortage of space should be written up as a JIRA ticket (see "Reporting problems" at the end of this document). A good alternate location would be within `/home/datacopy-18/KK`, or in `/home/swc/data/eTransfer` as a last resort.

```
[1] df -h .
```

7. Make and enter a directory for the project. Replace *<project code>* with the actual project code.
 

```
[1] mkdir <project code>
[1] cd <project code>
```
8. After receiving confirmation email from Kokee Park (step 3) data transfer can begin. First start the tsunami client. Note that if tsunami does not start, try entering the “Ops Trunk” environment by typing `ot` and try again.
 

```
[1] tsunami
```
9. Assuming tsunami started properly, you will be given a tsunami command prompt. Enter the following commands to begin data transfer:
 

```
[1: tsunami>] set port 46225
[1: tsunami>] set rate 500m
[1: tsunami>] set error 0
[1: tsunami>] connect 146.88.148.102
[1: tsunami>] get *
```
10. The data transfer should take approximately one hour. When complete, quit tsunami and perform a sanity check by determining how much data was transferred with the `du` command as follows. The output should indicate approximately 40 GB. Data transfer should take about 15 minutes.
 

```
[1: tsunami>] quit
[1] du -csh .
```
11. Upon completion, send an email to the Kk site distribution list indicating that the data transfer completed.

### Data transfer from Wettzell (Wz)

These instructions differ from those for Kokee because VLBA operations has been provided the credentials to log into the server at Wz to start the tsunami server rather than relying on site personnel for this. Also some of the parameters differ, so be sure not to mix the instructions, even though there are some clear similarities.

Unless otherwise instructed, it is best to avoid data transfers between 1930 and 2100 UTC.

1. Start two terminal windows, then log each into `gygax` as user `difx`. Note that the first step for each is only needed if the terminal is not already logged on as user `difx`.
 

```
[1] ssh difx@swc000
[1] ssh gygax

[2] ssh difx@swc000
[2] ssh gygax
```
2. In terminal number 2, you will log into the remote computer, enter the correct project directory, start the remote tsunami server. Replace *<project directory>* with the appropriate value. Usually this will be the project code followed by `wz`. For example, `i20317wz` .
 

```
[2] sshwz
[2: vlba@flexbuf] cd /raid/<project + wz>
[2: vlba@flexbuf] tsunamid --hbtimeout=360 --port=46224 *
```

Note that the `sshwz` command is an alias in the `.bashrc` file for the more wordy command:  
`ssh -i .ssh/vlba_wz_ecdsa_key vlba@141.74.6.97`

3. Switch back to terminal 1 and enter the standard destination directory for this data, which is `/home/datacopy-14/WZ` (with `/home/datacopy-19/WZ` as a second option and `/home/swc/data/eTransfer` as a last resort).  
`[1] cd /home/datacopy-14/WZ`
4. Verify that sufficient disk space remains. If the reported “Avail” space is less than 50G, then an alternate destination should be chosen.  
`[1] df -h .`
5. Make and enter a directory for the project. Replace `<project code>` with the actual project code.  
`[1] mkdir <project code>`  
`[1] cd <project code>`
6. Now data transfer can begin. First start the tsunami client. Note that if tsunami does not start, try entering the “Ops Trunk” environment by typing `ot` and try again.  
`[1] tsunami`
7. Assuming tsunami started properly, you will be given a tsunami command prompt. Enter the following commands to begin data transfer:  
`[1: tsunami>] set port 46224`  
`[1: tsunami>] set rate 300m`  
`[1: tsunami>] set error 0`  
`[1: tsunami>] connect 141.74.6.97`  
`[1: tsunami>] get *`
8. The data transfer should take approximately 25 minutes. When complete, quit tsunami and perform a sanity check by determining how much data was transferred with the `du` command as follows. The output should indicate approximately 40 GB.  
`[1: tsunami>] quit`  
`[1] du -csh .`
9. Note that there is generally no need to communicate with the Wettzell staff.

## Troubleshooting

### Tsunami Connection Error

Only one copy of tsunami can be running on the same computer with the same port number. The first thing to look for if there is a connection error is any previous tsunami sessions that may still be open. Close those and try again if so. If the failure happens at Wz, try changing the port number in both of the terminal windows to 46225. This is the same number used by Kk, so it will require you waiting for the Kk transfer to complete before proceeding.

## Correlation

Correlation will be performed by USNO staff. As soon as both Kk and Wz data are downloaded, please send an email to the USNO contacts (listed above) with the location of the data for the two sites.

## Data cleanup

The data copied into the `/home/datacopy-*/` areas should be retained for at least 1 week in the event that recorrelation is required. Data older than this can be deleted.

## Reporting problems

Problems experienced in the data transfer process, including shortage of space in the destination filesystem, should be reported by VLBA Operations to the “tsunami” component in the NRAO JIRA system.