

The Harmonie mini-SMS system

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On some nodes, this jobstep has used more than % of the
allocated amount of memory.

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Ulf Andræ

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Conclusions:

**Harmonie mSMS will improve the NWP
aspects of your life**

Because:

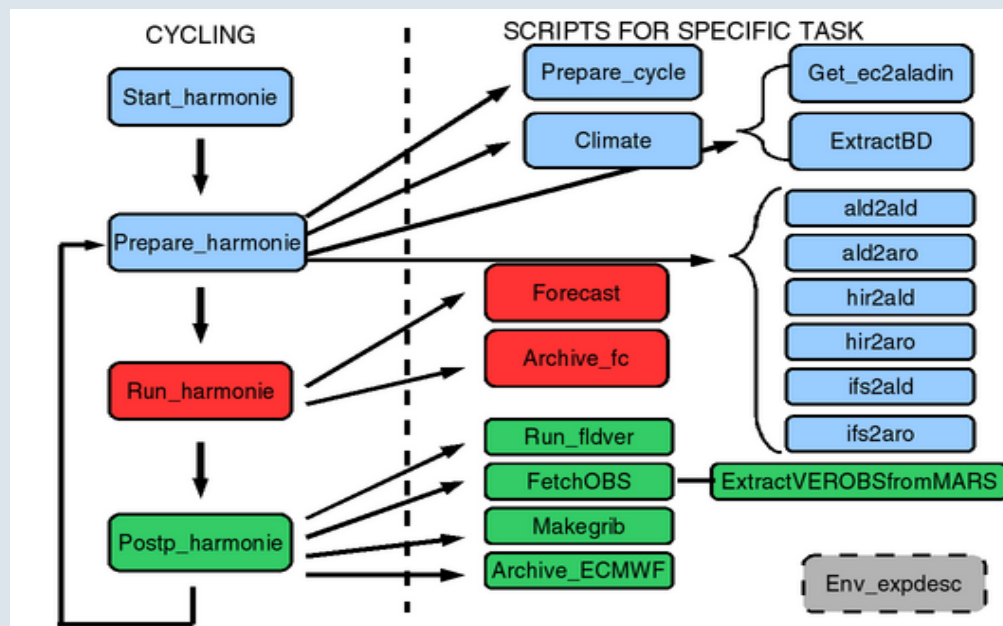
System as presented at ASM in Oslo ...

We could indeed run forecast experiments, but compilation and updates was a nightmare.

User comment from January 2008:

... I tried the system a couple of months ago, but gave up ...

An urgent need for a more complete and a bit more user friendly system.



The HIRLAM mini-SMS system as the inspiration

HIRLAM mSMS was introduced around Y2K

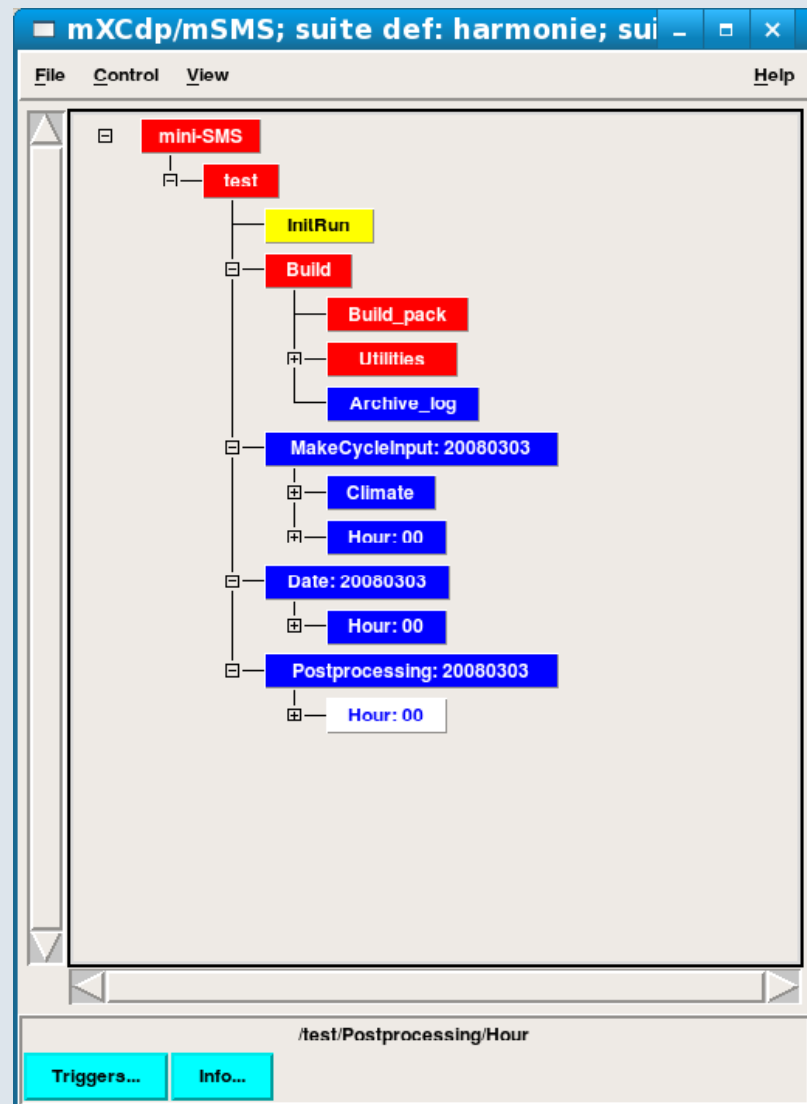
- (m)SMS handles dependencies between different tasks/time loops.
- Can handle a multi host environment
- Job are submitted as background or batch (scalar/parallel) jobs
- Graphical display where you can stop/pause/rerun jobs.

mSMS vs SMS

- SMS is more powerful but less portable
- XCdp/mXCdp
- Some syntax differences exists, perhaps something we should work on?

SMS is used in many countries (Finland, Slovenia),
mSMS is used by all HIRLAM countries.

First introduced in HARMONIE in cy32h3 (Dec 2007)



The HARMONIE repository

<https://hirlam.org/trac/browser/trunk/harmonie>

- System configuration files
- Mini-SMS scripts and SMS definition files
- Scripts Namelists
- ARPEGE/IFS code, cy33t0 at the moment
- Utilities (gmkpack/gl/monitor/oulan/...)
- Constant files (DA files)

Nothing extra needed expect the normal external libraries (emoslib/libec/...)

The trunk is tagged (cy33hX) whenever a new Toulouse cycle is available. The new cycle will then enter the trunk

root / **trunk** / **harmonie**

Name ▲



../



config-sh



const



msms



nam



scr



sms



src



util

Installing/building

- A copy of the repository (trunk/tags)

svn co <https://svn.hirlam.org/trunk/harmonie>

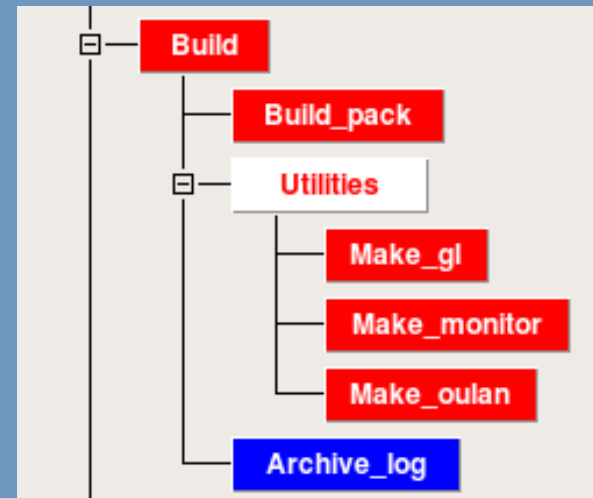
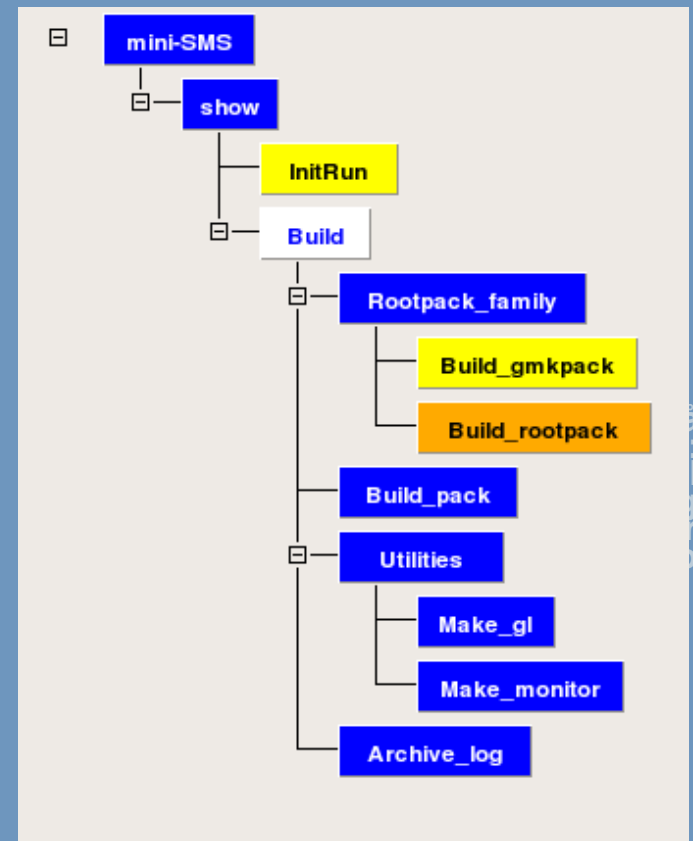
- For the IFS code we compile with gmckpack. Gmckpack is part of the system and needs not to be installed separately.

- The HARMONIE specific code (gl,monitor,...) is compiled separately.

Define the environment for your HOST in config-sh/config.\$HOST and how to submit jobs in config-sh/submit.\$HOST

```
mkdir -p $HOME/hm_home/$EXP
Harmonie setup -r REVISION -h HOST
```

Gives you some basic files needed for your experiment



Installing/building 2

```
Harmonie start DTG=YYYYMMDDHH \  
PLFAYFILE=Install_rootpack
```

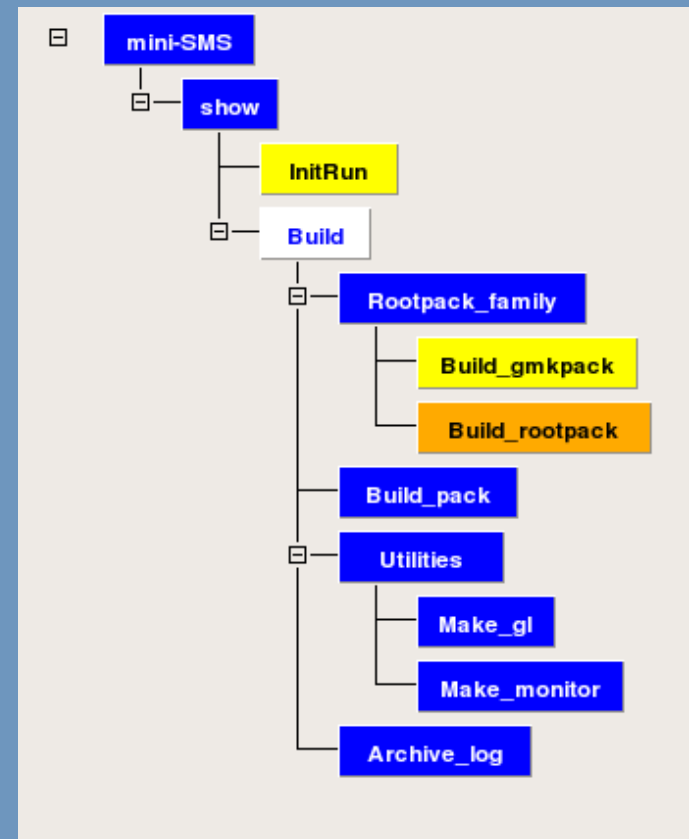
Go for coffee, dinner, sauna ...

Creates a rootpack directory

```
32t3_trunk.01.INTEL10_1_008.g  
32t3_trunk.01.INTEL10_1_008.x  
32t3_trunk.01.INTEL9_1_039.g  
33h1_test.01.INTEL9_1_039.w  
33h1_trunk.01.INTEL9_1_039.x
```

Builds the main libraries and the binaries defined in sms/config_exp.h

```
# ROOTPACK definitions, should fit with hm_rev  
BUILD_ROOTPACK=yes # Only active for the Install_rootpack playfile, (yes|no)  
BUILD=yes # Turn on or off the compilation and binary build ( yes|no)  
REVISION=33h1 # Revision ( or cycle ) number, has to be set even for the trunk!  
BRANCH=trunk # Rootpack branch  
VERSION=01 # Version of revision/branch to use  
OPTION=x # Which gmckpack/arch/SYSTEM.HOST.OPTION file to use  
PROGRAM=aromodb # Main MODEL Program to compile gmckpack  
OTHER_PROGRAMS="odbtools bator ioassign ddhc ddhr ddht"
```



Preparing the experiment

An experiment would be setup in a similar way as a HIRLAM experiment under \$HOME/hm_home/\$EXP

```
Harmonie setup -r REVISION -h HOST
```

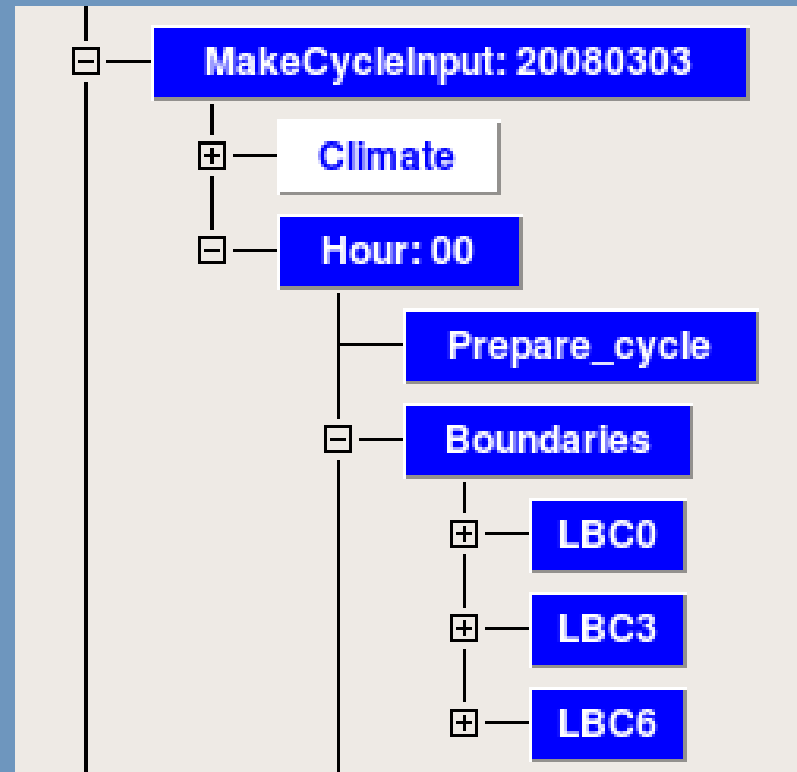
```
edit sms/config_exp.h
```

```
Harmonie start DTG=2008040700 \  
DTGEND=2008041012 LL=30
```

Climate generation

- ALADIN and SURFEX climate files are created if the databases are available. **But**, the SURFEX generation part is not yet at part of the system, only works at ECMWF.

Meso-scale -> smaller domains -> more different domains -> **Climate generation should be easy and work well locally**



```
;;  
NORWAY)  
TSTEP=300  
NLON=270  
NLAT=405  
VLEV=ECMWF_60  
EZONE=11  
LONC=14.0  
LATC=66.2  
LON0=-40.0  
LAT0=66.2  
GSIZE=11000.  
SINLAT0=0.91496  
ROT=0.0  
NSMAX_LINE=202  
NMSMAX_LINE=134
```


Preparations cont.

Model choices in HARMONIE

```
# **** Namelist options ****
FLAG="ald_h" # Model/NH flag for finding right namelist etc
# ald_h      Hydrostatic aladin
# ald_nh     NON-Hydrostatic aladin
# ald_nh_sfx NON-Hydrostatic aladin
#           + surfex (cy32t2 and higher)
# arome     Arome
# alaro_h   ALARO Hydrostatic
PHFLAG="" # flag for physics switch
# "hlm" for hirlam
# "" for default or AROME
```

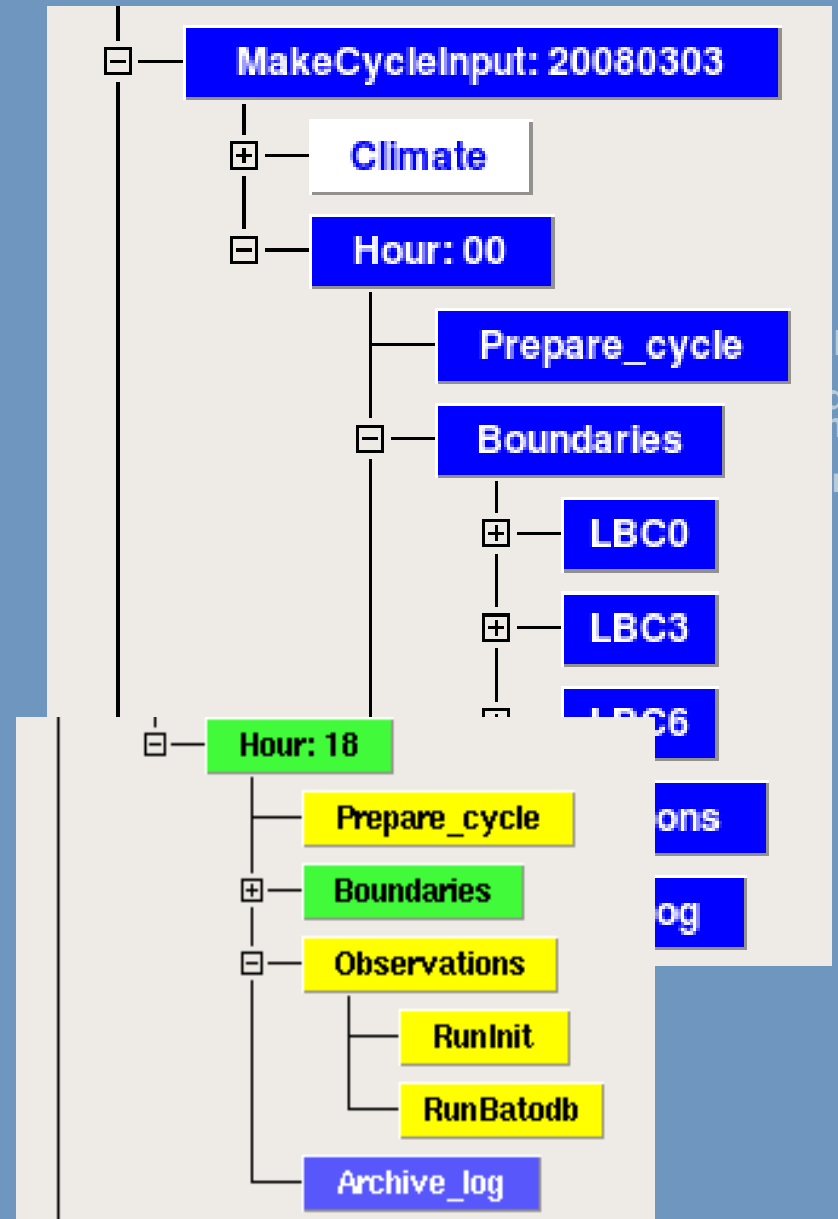
Boundaries

```
# **** Nesting settings ****
HOST_MODEL="ifs" # Host model (hir|ifs|ald)
TRGT_MODEL="ald" # Target model (ald|aro)
```

It is possible to run HARMONIE from IFS/HIRLAM/ALADIN. But, It is not yet possible to create SURFEX initial files from IFS/HIRLAM (within HARMONIE)

Arpege is not included as boundary option but could of course be added

Assimilation preparations are included (remember Roger's talk) This is yet only tested at HPCE which is regarded as the reference platform for HARMONIE.



The main cycle

- Surface and upper air analysis can be turned on and off.
- Start data (first guess) is adjusted accordingly.

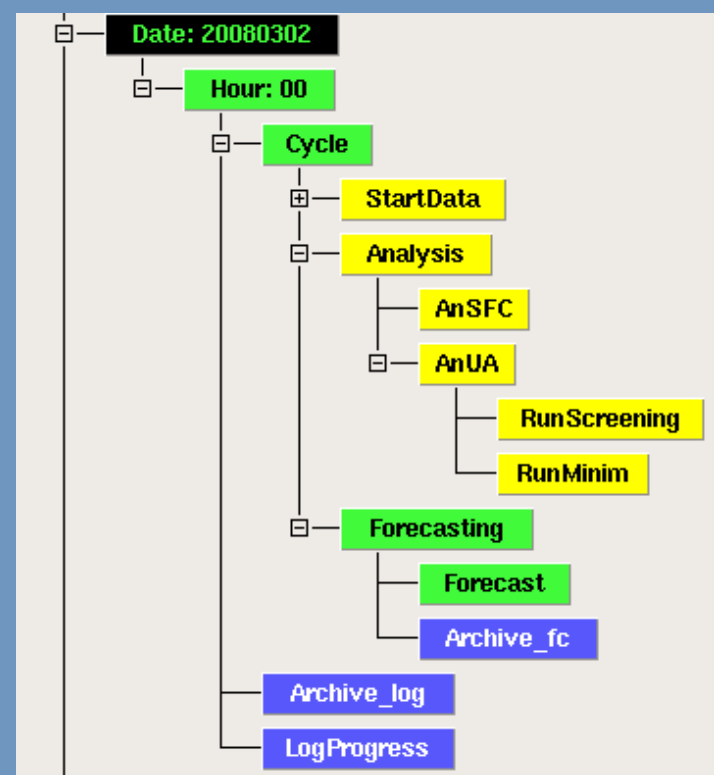
```
# **** Assimilation
INT_FIRST_FG=yes
ANAATMO=no
ANASURF=no

# **** General settings ****
LL=${LL-06}
FCINT=06
BDINT=3
ARCHINT=01

TFLAG="h"

OUTINT=""
```

■



```
# Interpolate first first guess. (yes|no)
# Atmospheric analysis (3DVAR|no)
# Surface analysis (yes|no)
```

```
# Forecast length [h]
# Forecast interval [h]
# Boundary interval [h]
# Archive interval [h]
```

```
# Time flag for model output. (h|min)
# h = hourly output
# min = specified minute output
# Output interval in minutes.
# Used only if TFLAG="min".
```

Postprocessing

- Extract model/obs data for verification
- Verification
- Postprocessing with fullpos
- Conversion of FA/LFI files to GRIB
- At ECMWF archiving at ECFS/ECTMP
- Cleaning of working directories

```
# **** Postprocessing ****
```

```
POSTP="no"
PPTYPE=""
```

```
# **** GRIB ****
```

```
MAKEGRIB=no
TOGRIB="his "$PPTYPE
```

```
# **** Verification ****
```

```
VERIFY=no
OBSEXTR=no
USE_STNLIST=yes
```

```
VERINT=01
```

```
# Postprocessing by Fullpos (yes|no)
```

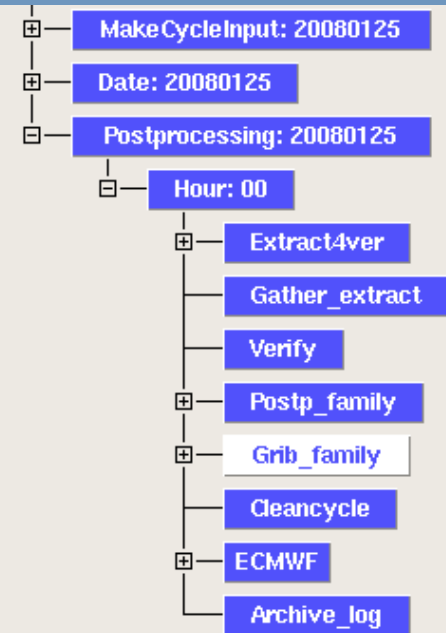
```
# Postprocessing type, space separated list
# pp = pressure levels
# md = model level diagnostics
# zz = height levels
```

```
# Conversion to GRIB (yes|no)
```

```
# GRIB file types to be converted, space separated list
# his = history (+ surfex) files
# pp = pressure levels
# md = model level diagnostics
# zz = height levels
```

```
# Run verification (yes|no)
```

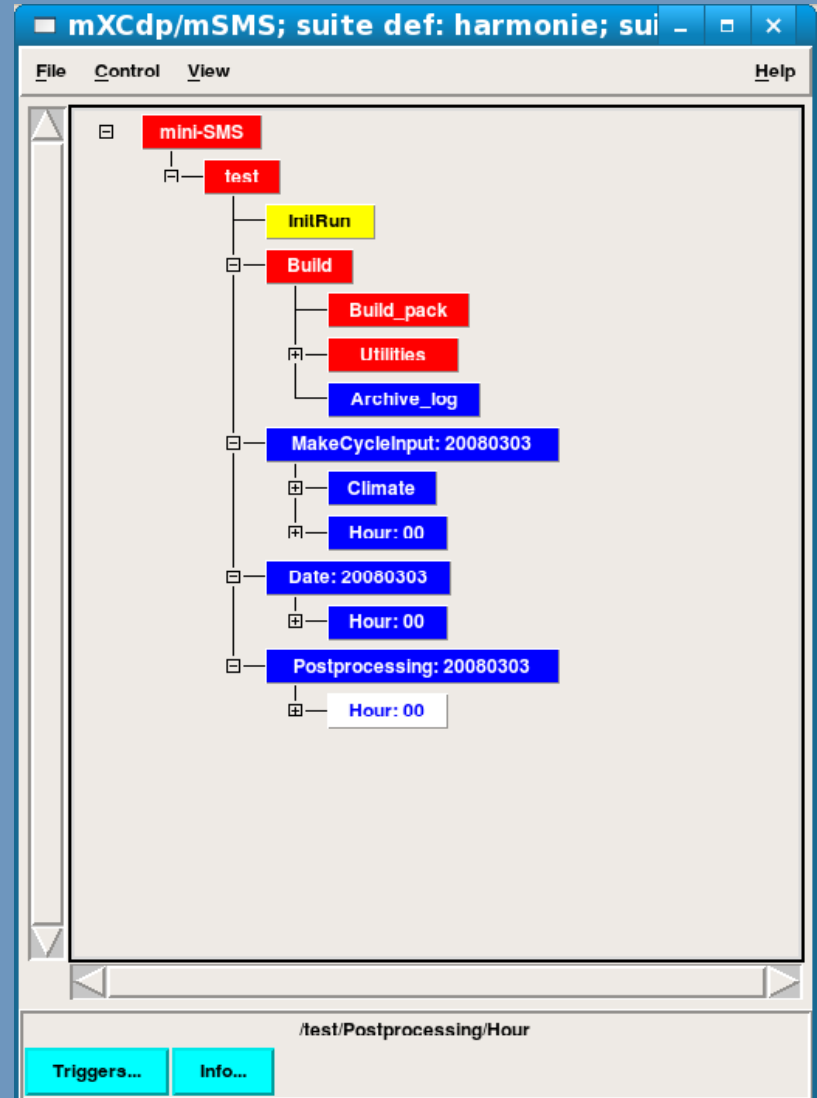
```
# Extract observations from BUFR
# Use predefined station list (yes) or use what is
# in the BUFR files
# Verification interval in hours ( 01/03/06/ )
```



inblå fält
öger:
för bild-
diagram,
andra
rationer

Good to know

- Local changes are should be kept in your home directory in the same structure as in the repository. e.g. src/xrd/lfi/lfifra.F
- You don't need to restart your experiment if you have changed the code.
 - Update the code in your \$HOME
 - Rerun InitRun and Build and the task you have changed code for
- It is possible to recompile manually or even point the BINDIR to some other experiment.
- The trunk is a sandbox where anything can happen. If you would like to have a stable system stick to a stable release.
- There is some documentation on <https://hirlam.org/trac/wiki>



Cooperational aspects

Initial presentations and coffee break discussions suggests that there are room for a tighter cooperation.

- The HARMONIE system is of course open to be used by everyone**
- The HARMONIE system is of course open to be changed by anyone (in principle)**

Summary and future

- **We have a mSMS NWP system that works (according to some norm)**
- **DA only tested at ECMWF needs to be ported to other platforms**
- **Important parts connected to SURFEX is still missing.**
- **Cycling of variables in absence of DA?**
- **EPS?**
- **An experiment configuration tool like Olive/PrepIFS is indeed needed. Should be PORTABLE!**
- **Documentation, documentation, documentation**

Most important summary

On ecgate

```
mkdir -p $HOME/hm_home/test ; cd $HOME/hm_home/test
```

```
~nhz/harmonie_release/trunk/config-sh/Harmonie setup
```

```
~nhz/harmonie_release/trunk/config-sh/Harmonie start DTG=2008040800
```

Questions?