HMI Far-side Imaging from Holography

Notes from the meeting

Stanford University -- March 7-9, 2007

Specify required pipeline input data products, including ancillary data and data products (e.g. inversion kernels)

- 2048 min series of HMI full disk calibrated dopplergrams

- Solar model
- Dispersion table
- Map of "ghost" signature (phase correction)

Describe output data products – format, organization, production schedule

- Postel projected far-side map
- Longitude-sin(lat)
- LOS
- North/South hemisphere views
- Combined far-side maps + magnetograms
- JPEG's files
- Temporal cadence?
- Keep ingression/egression calculations

Specify algorithms, parameters, and metadata as appropriate for pipeline analysis

- By now, reusing MDI far-side pipeline

- Considering:
  - Possibility of using fastrack to track and postel project the data
  - Inclusion of extra skips
  - Spherical Harmonic filter

Establish testing & validation procedures

- TBD

Name person(s) responsible for pipeline module implementation, including both algorithm experts and persons familiar with the pipeline system

Short-Term tasks:

- *Testing fastrack to generate the postel-projected data cube (P. Scherrer)*
  - *Solar rotation removal*
  - *Filling gaps*
  - *Interpolation*
- *Documenting "t_regress": C. Lindsey, D. Braun and I. González)*
  - *Detailed description of input and output.*

Research topics:

> *How to remove the "ghost" signature*
> *Does using different/more skips benefit the maps?*
> *Spherical Harmonic Decomposition filter*
> *Calibration with artificial data*

Establish implementation schedule

TBD
- *TBD*

GONG's Far Side Pipeline

makefsmap

Check if re-processing

makefsmerge → Merge GONG site images

Check duty cycle

runfs → Calculate Far Side map (same as MDI)

addMagnetogram → Combine FS map with front side magnetogram & add color

Add grid & labels
Create LOS version

Send status e-mail
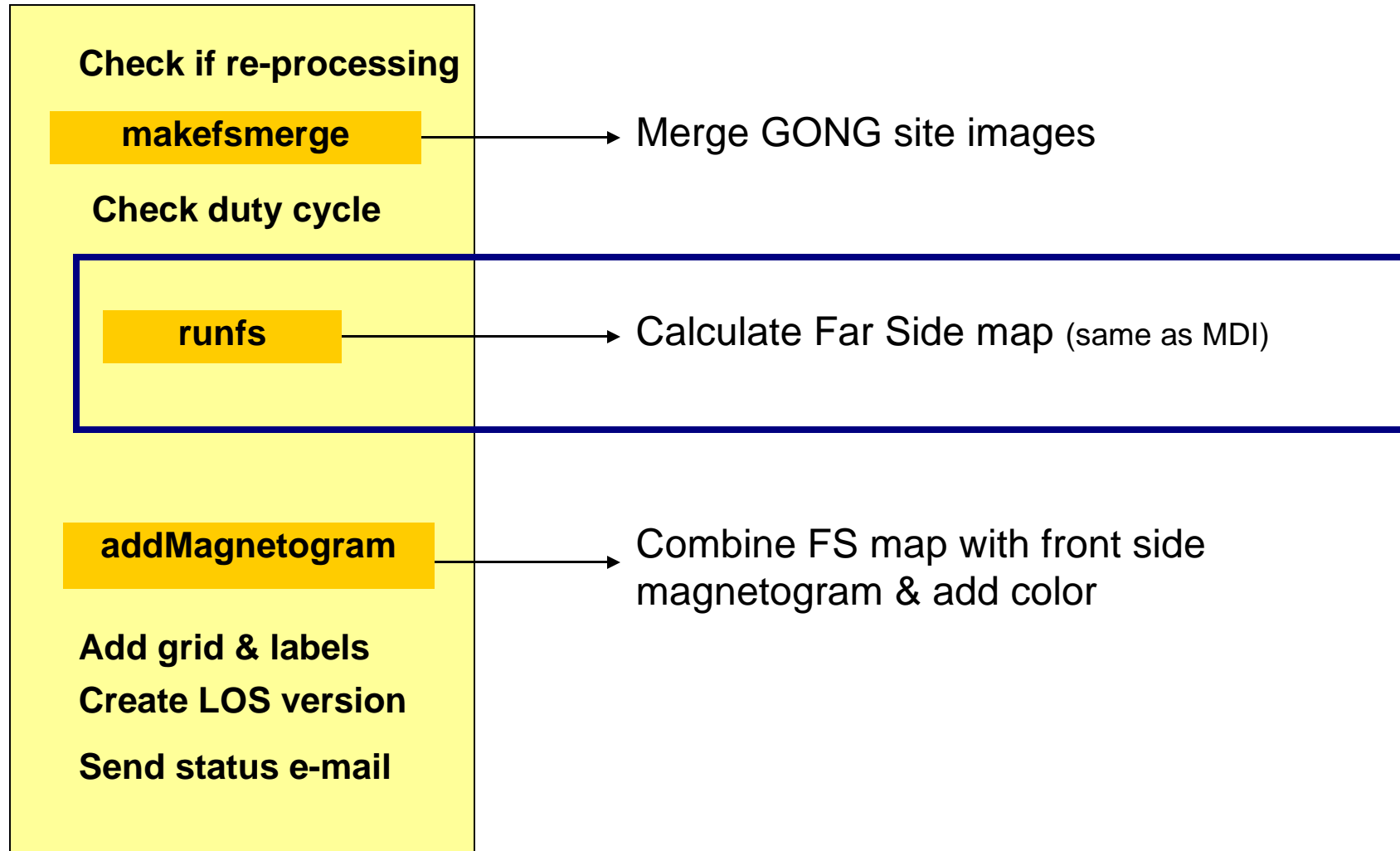
MDI/GONG core application

makestage1
- Track and postel project the images.
- Collapse (this is not done for GONG low res)

makestage2
- Stack the images into a cube
- Transpose to (t,x,y)
- De-trend and remove bad pixels
- Fourier transform and transpose back to (x,y,w)

makestage3
- Extract 2.5-4.5mHz frequency interval
- Transpose to (w,x,y)

makestage4
2x2
1x3
3x1
- Compute Green's functions:
    - Compute GF's parameters
    - Correct from dispersion (frequency dependent)
    - Create Green's functions file
- Fourier transform GF's
- Calculate Ingression & Egression core!!!
- Calculate correlation between Ingression and Egression

makestage5
- Smear map
- Phase correction
- Combination of 2x2 with (1x3 + 3x1)
- Longitude-sin(lat) re-projection of the map