



User Guide for the S-PolKa Web Cameras in DYNAMO



24-Jan-2012 RAR

Location: NCAR S-PolKa Radar, Addu Atoll, Maldives (73.102766 lon, -0.630447 lat)

Dates: 28-Sep-2011 through 16-Jan-2012

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Four NetCam XL 3MP cameras were set up at S-PolKa, pointed in the four cardinal directions. Period of operation was from 28-Sep-2011 through 16-Jan-2012 (some test data are available prior to the 28-Sep date). Cameras collected images every 6 seconds. For camera manufacturer technical details and support, see <http://www.stardottech.com>

Cameras were mounted on the west- and east-pointing containers of the main S-Pol structure. The two cameras on the west container were pointed to the west and south; those on the east container were pointed north and east. Cameras were mounted just below the roof of the containers (approx 3 meters AGL, ~5m MSL). Figure 1 in this report shows the cameras on the east container.

The cameras have an adjustable wide field of view (FOV), and were set to the maximum, nominally 90 degrees. The cameras also have an automatically adjusting iris. Due to this wide FOV, there should be common cloud elements visible in adjacent cameras, somewhere starting about half-way up the side of an image, and above that.

Image quality is good, although not as great as you might expect from an inexpensive point-and-shoot (image quality was limited by wide-angle lens effects). Image resolution is set to 1024x768 pixels, the manufacturer suggested optimum for color images. Each camera runs its own web server, and the linux operating system. Images are recorded in jpg format, with a JPEG image quality setting of 80. Image names are in the form *CAMNAME_CCYYMMDDhhmmss.jpg*. Images were sent to the data logging system via ftp.

Pointing and Alignment

There are no convenient adjustments for aligning the cameras. Adjustment is through gross repositioning of the camera mount, and tipping (or even bending!) of the white mounting bracket within the enclosure. So pointing is very fussy. An attempt was made to level the cameras and adjust the four camera horizons to be approximately equal across all cameras. The design of the mounting bracket for the north and south cameras prevents a full upward tilt of the camera (enclosure hits the sea container). The north and south cameras were therefore used as a

reference, and the east and west cameras were tilted to match these. Cameras were tilted up at about 25 degrees.

The north and west-pointing cameras were aligned using the S-Pol antenna by pointing the antenna in the north or west direction, walking about 250-feet away from the radar, and finding the best visual alignment with the radar bore sight. An orange mark was painted on the ground indicating the best subjective north and west alignments with the center of the radar. This could not be done for the south and east orientations due to the ocean.

For the east pointing camera, the position of the rising sun has been noted on the days surrounding the equinox. This provides a pretty good alignment for the east camera. The southern direction was determined through use of a full panoramic image, and simple linear interpolation of the south direction from the other known directions. (See the S-PolKa DYNAMO Users' Guide for this panoramic image)

About the Clocks

Clocks on each camera were set from the S-Pol Network Time Protocol Server (ntps), which was coordinated to GPS time. The UTC time zone was used. Images were taken every 6 seconds. The image times were monitored for several days at the start of the project to ensure that timestamps for the four cameras remained correct. It was not possible, however, to ensure exact image synchronization across cameras (time-of-image is not necessarily the same at all cameras, although image interval remained fixed at approximately 6 seconds).

Daily Data Collection Period and Image Interval

At the equator, days are all 12 hours long. Adding some time for twilight, and since all data were collected with UTC/GMT timestamps, camera images were logged from 00 through 14 UTC. While the cameras themselves have good low-light sensitivity, the floodlights used at S-PolKa prevented the cameras from recording any usable information at night.

There are no significant periods of missing data.

Data Set Size

Each camera logged an image every 6 seconds, and there were 8400 images collected per camera, per day. Each day of data totaled approximately 525 MB per camera. For the entire ~112 days of operation, each camera logged ~941,000 images and 60 GB (3.75 million images for the 4 cameras, and ~240 GB).

Data are packaged in daily, single camera tar archive files. Files are available from the NCAR High Performance Storage System (HPSS) through the CODIAC/EMDAC interface (http://data.eol.ucar.edu/master_list/?project=DYNAMO). Each file is approximately 525 MB in size.

Location of Cardinal Directions

Figures 2 thru 5 indicate the “best” determination of the cardinal directions. Estimated directional accuracy is likely better than +/- 2 degrees (image horizontal FOV is ~90 degrees).

Other Information

All other information pertaining to data access, S-PolKa in DYNAMO, and the DYNAMO project, may be found through links off of the NCAR/EOL maintained DYNAMO Project home page: <http://www.eol.ucar.edu/projects/dynamo>



Figure 1: Photo showing cameras mounted on the east-pointing container of the main S-PolKa structure. A similar arrangement appears on the west-pointing container for the south- and west-pointing cameras.

S-Pol North NetCam XL 2011-Sep-21 09:56:48 UTC
Exposure: 318 Internal Temp(F): 124.7

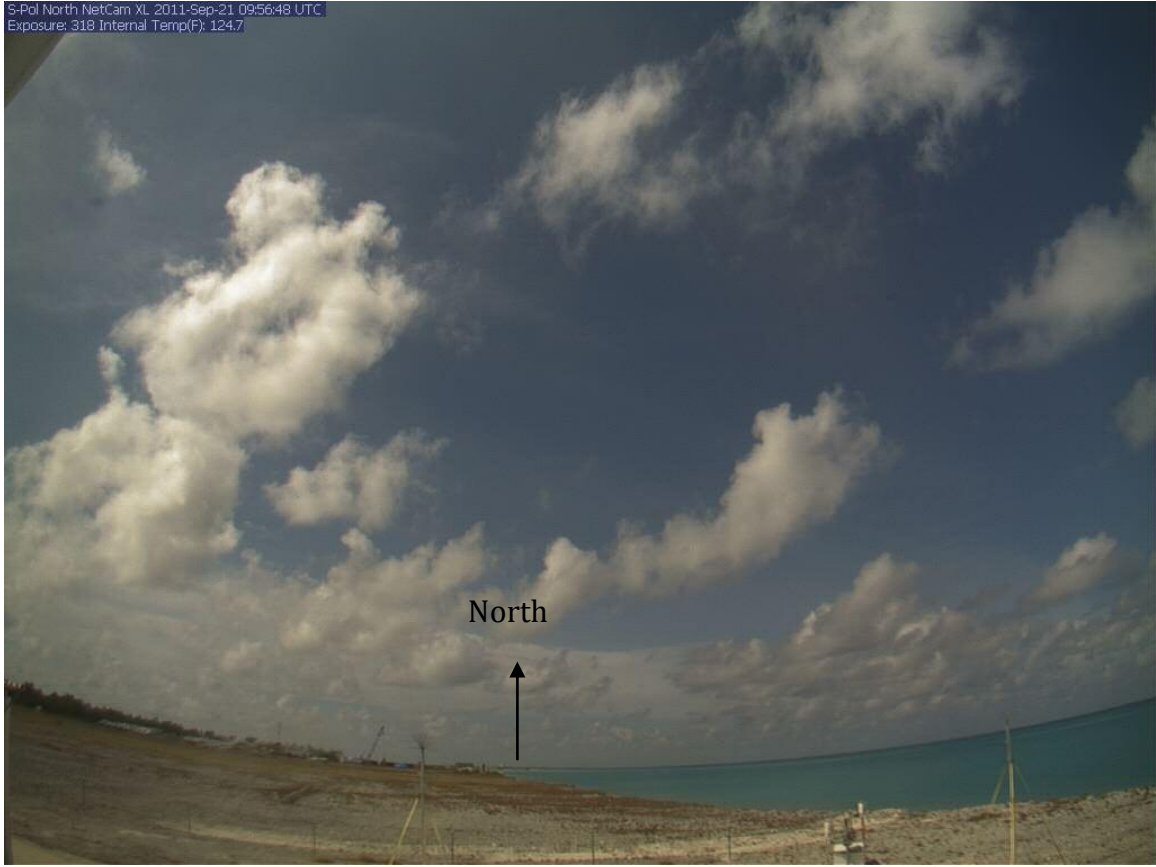


Figure 2 (above)

S-Pol East NetCam XL 2011-Sep-21 09:56:48 UTC
Exposure: 394 Internal Temp(F): 120.2



Figure 3.

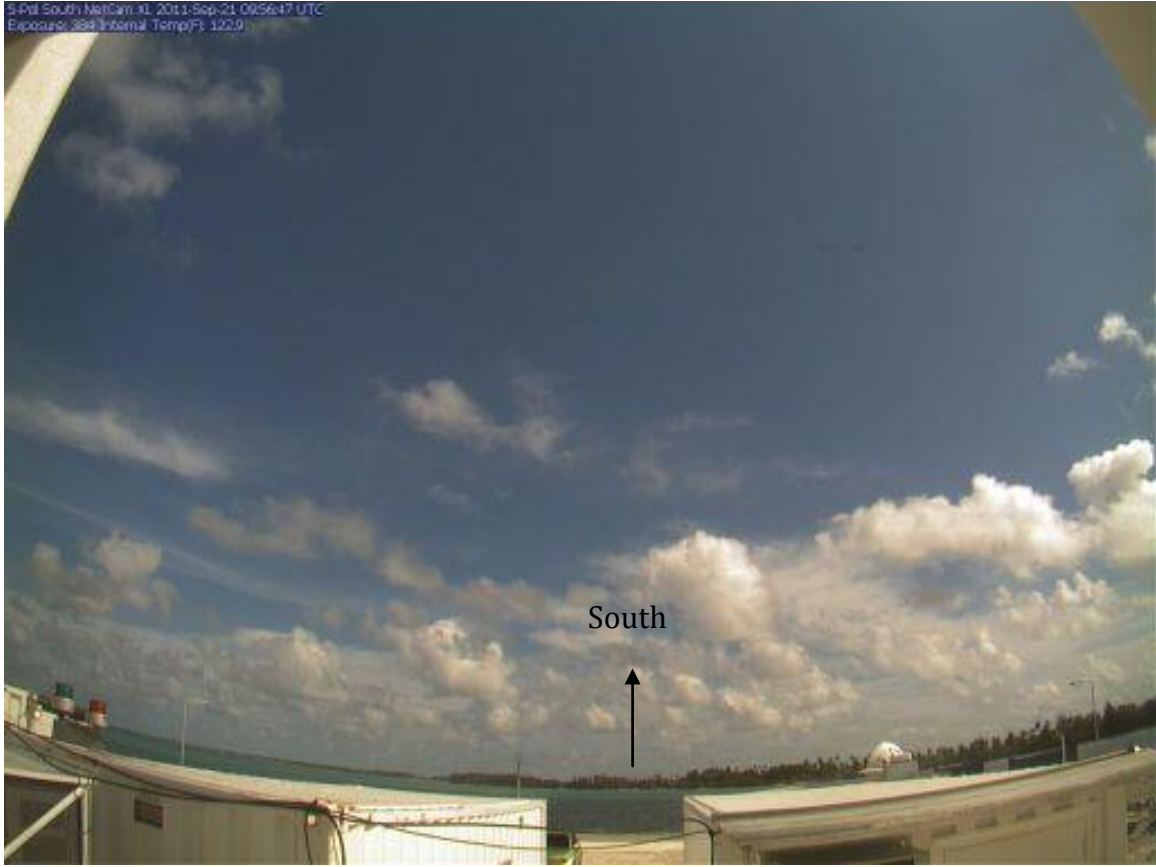


Figure 5.