SDSS Data Release 7
Sloan Digital Sky Survey

Sloan Digital Sky Survey Data Processing and Products

Introduction and Resources

The Early Data Release (EDR) paper is the fundamental resource for understanding the processing and data products from the SDSS, describing the pipelines and contents of generated data products. Successive data release papers: DR1, DR2, DR3, DR4, DR5, DR6 and DR7, describe changes between data releases. The technical summary provides more general information on the survey. The SDSS Project Book, written for a funding proposal early in the survey, is the most exhaustive description of the survey but was last updated in 1997. The SDSS publications web page includes a list of additional SDSS technical papers.

The algorithms page includes links to pages describing algorithms used by the data reduction pipelines, and the DAS quick reference page has a table of the most commonly useful files in the DAS.

The remainder of this page starts with a brief overview of data processing, followed by sections that describe the steps in data processing in detail. In addition to the more detailed description, each detail section prevedes references to papers that give additional details, and a table of the files associated with that step of the pipeline that can be found in the DAS. These tables include links to descriptions of the formats of those files and templates that can be used to generate DAS URLs for those files. The templates are in "C printf" format, and can be used in C, bash, Python, and many other languages to automatically generate URLs.

Most of the catalog data (but not the images themselves) have been loaded into the Catalog Archive Server (CAS) database. Users are often better off obtaining SDSS data through a carefully constructed CAS query than they are downloading the data files from the DAS. Simple queries can be used to select just the objects and parameters of interest, while more complex queries can be used to do complex calculations on many objects, thereby avoiding the need to download the data on them at all.

Overview

Imaging Observing
    We used three instruments when collecting imaging data: the imaging camera mounted on the primary 2.5m SDSS telescope, which collected the imaging data itself; the 0.5m photometric telescope, which collected images of photometric standard stars and reference fields; and a 10 micron all sky scanner (and later camera), used to detect clouds.

Imaging Data Reduction
    The SDSS data processing factory used a collection of pipelines to process and calibrate the data from the imaging camera and the photometric telescope, ultimately producing a variety of data products including images with instrumental signatures removed, a photometric solution for the night, and a catalog of objects found in the data.

Resolution and Calibration of Object Catalogs
    The resolve step declares one observation on an object the primary observation, and others secondary, thereby avoiding unintentional duplication of objects. This step ultimately produces an astrometrically and photometrically calibrated catalog of objects found in the data from the imaging camera.

Selection of Targets for Spectroscopy
    The SDSS spectrographs collect spectra through a set of 640 fibers plugged into holes in aluminum plates. To prepare for spectroscopy, we used software to select a set of targets from catalogs (generated from the imaging data), design the plates, and drill holes in the aluminum plates.

Spectroscopic Observing
    The spectrographs mounted on the primary 2.5m telescope collected spectra from each plate. There were two spectrographs, each of which collected data from 320 fibers. Each spectrograph had two CCDs, so the instrument produced a total of four images for each exposure.

Spectroscopic Data Reduction
    The spectroscopic pipelines extracted one dimensional spectra from the raw exposures produced by the spectrographs, calibrated them in wavelength and flux, measured features in these spectra, measured redshifts from these features, and classified the objects as galaxies, stars, or quasars.

Recalibration
    Improved astrometric and photometric calibrations became possible at the end of the survey; we re-ran the astrometric pipeline on all data using updated reference catalogs and improved centroiding, and used a separate pipeline to refine the photometric calibrations.

Data reduction could occur multiple times for both images and spectra. Each time we repeated a data reduction, we labeled the output from that reduction process with a distinct rerun number.

In the case of imaging rerun numbers, different decades in the rerun number designate significant differences in the data reduction software. For example, rerun 1 and rerun 2 of a given run would have been processed by identical (or at least very similar) versions of the data reduction software, while rerun 40 would have been reduced with a significantly different version of the pipeline.
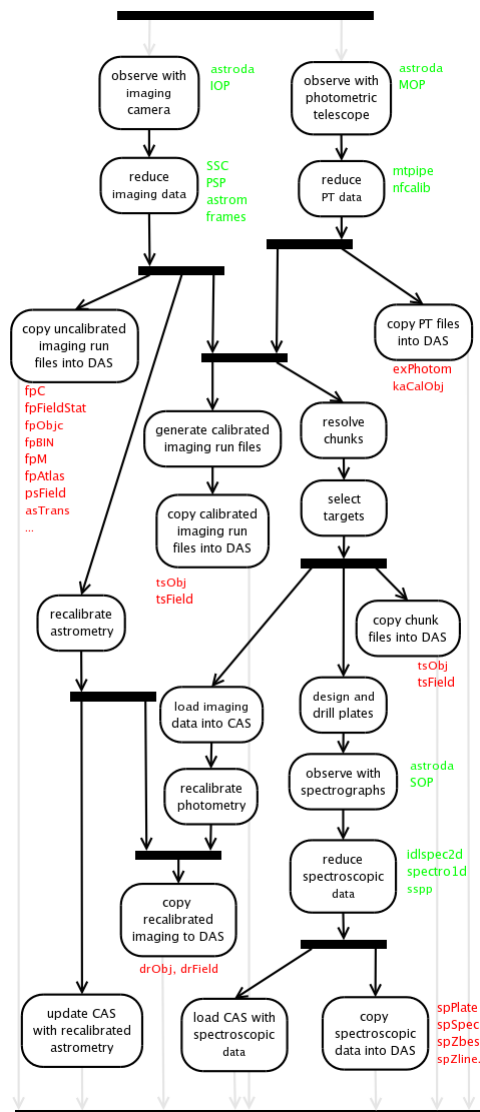
Imaging Observing

Imager
    The imager collected survey data from the imager in drift scan (also called TDI) mode. We use the term "run" to designate a single scan along a great circle. The data acquisition system system divided the data from each CCD into frames, stored as FITS files; the observatory sent data to be processed as a collection of FITS files, each corresponding to an arc along the great circle 1361 rows (539 arcseconds) long from a single CCD. In addition to the images themselves, the data acquisition system also generated a variety of metadata and other engineering files, which included pixel statistics and a catalog of bright stars for each field.

DAS files generated in imager data collection

File Type	in/out	Description	DAS URL format	format parameters
idReport	out	records runs collected on a night	http://das.sdss.org/nightly/%05d/idReport-%05d.par	mjd, mjd

idR	out	raw imaging frames	in http://das.sdss.org/unprocessed /imaging/%d/idR-Run-%d-Fields-%04d-%04d.tar	run, run, field$_{first}$, field$_{last}$
idGang	out	assorted data gathered by the data acquisition system	in http://das.sdss.org/unprocessed /imaging/%d/idGang-Run-%d-%s-%d-%d.tar	run, run, (rows/cols), start, end
idFrameLog	out	camera position information for each frame	http://das.sdss.org/nightly /%05d/idFrameLog-%06d-%d.par	mjd, run, crate
opCamera	out	imaging camera geometry	http://das.sdss.org/nightly /%05d/opCamera-%05d.par	mjd, mjd (of generation)
opConfig	out	CCD readout configurations	http://das.sdss.org/nightly /%05d/opConfig-%05d.par	mjd, mjd
opECalib	out	CCD electronic calibrations	http://das.sdss.org/nightly /%05d/opECalib-%05d.par	mjd, mjd (of generation)

Photometric Telescope
The photometric telescope collected images of standard stars ("primary standards") at a variety of airmasses throughout the night to measure the photometric solution for the night, and images that sample the survey area for each imaging run ("secondary patches") that can be used to calibrate the runs from the imager using photometric solutions generated by the photometric telescope.

DAS files generated in photometric telescope data collection

File Type	in/out	Description	DAS URL format	format parameters
mdReport	out	records exposures collected on a night	http://das.sdss.org/nightly/%05d/mdReport-%05d.par	mjd, mjd

Infrared All-Sky Camera
Clouds can be clearly seen at night in a 10 micron all-sky camera. We used two such cameras at different times in the survey to monitor the sky for cloud (and therefore non-photometric conditions).

DAS files generated by the infrared all sky camera or scanner

File Type	in/out	Description	DAS URL format	format parameters
IRSC	out	A movie of the clouds for the night (original scanner)	http://das.sdss.org/nightly/%05d/irsc-%05d.mpg	mjd, mjd
IRCam movie	out	A movie of the clouds for the night (new camera)	http://das.sdss.org/nightly/%05d/ircam-%05d.mpg	mjd, mjd
IRCam plot	out	A plot of the sky sigma (useful for identifying clouds) with time	http://das.sdss.org/nightly/%05d/ircam-%05dgraph.png	mjd, mjd
IRCam data	out	A log of statistics on ircam frames	http://das.sdss.org/nightly/%05d/ircam-%05d.log	mjd, mjd

Other metadata
The observatory produces an assortment of engineering and other metadata.

Other DAS files generated in observing

File Type	in/out	Description	DAS URL format	format parameters
night log	out	A prose account of the night	http://das.sdss.org/nightly/%05d/nightLog-%05d.txt	mjd, mjd
idWeather	out	A log of weather data	http://das.sdss.org/nightly/%05d/idWeather-%05d.par	mjd, mjd

Imaging Data Reduction

Serial Stamp Collecting Pipeline (SSC)
The SSC repackages some of the data produced by the data acquisition system and produces postage stamps of bright reference stars.

DAS files read by the SSC pipeline

File Type	in/out	Description	DAS URL format	format parameters
scPlan	in	the SSC processing plan	http://das.sdss.org/imaging/%d/%d/ssc/scPlan-%d.par	run, rerun, camcol
idReport	in	records runs collected on a night	http://das.sdss.org/nightly/%05d/idReport-%05d.par	mjd, mjd
opCamera	in	imaging camera geometry	http://das.sdss.org/nightly/%05d/opCamera-%05d.par	mjd, mjd (of generation)
opConfig	in	CCD readout configurations	http://das.sdss.org/nightly/%05d/opConfig-%05d.par	mjd, mjd
opECalib	in	CCD electronic calibrations	http://das.sdss.org/nightly/%05d/opECalib-%05d.par	mjd, mjd (of generation)
opBC	in	CCD bad pixel file	http://das.sdss.org/nightly/%d/opBC-%d.par	mjd, mjd$_{bp}$ (see fpPlan)
idR	in	raw imaging frames	in http://das.sdss.org/unprocessed/imaging/%d/idR-Run-%d-Fields-%04d-%04d.tar	run, run, field$_{first}$, field$_{last}$
idGang	in	assorted data gathered by the data acquisition system	in http://das.sdss.org/unprocessed/imaging/%d/idGang-Run-%d-%s-%d-%d.tar	run, run, (rows/cols), start, end
koCat	in	the catalog of known bright stars	http://das.sdss.org/imaging/%d/%d/ssc/koCat-%06d.fit	run, rerun, run

Postage Stamp Pipeline (PSP) [2002AJ....123..485S, section 4.3]
The PSP measures the bias and global sky level, and fits a model for the point spread function for each field.

DAS files used or generated by the PSP pipeline

File Type	in/out	Description	DAS URL format	format parameters
psParam	in	PSP tunable parameters	http://das.sdss.org/imaging/%d/%d/photo /psParam.par	run, rerun
psPlan	in	the PSP processing plan	http://das.sdss.org/imaging/%d/%d/photo /psPlan-%d.par	run, rerun, camcol
opCamera	in	imaging camera geometry	http://das.sdss.org/nightly /%05d/opCamera-%05d.par	mjd, mjd (of generation)
opConfig	in	CCD readout configurations	http://das.sdss.org/nightly /%05d/opConfig-%05d.par	mjd, mjd
opECalib	in	CCD electronic calibrations	http://das.sdss.org/nightly /%05d/opECalib-%05d.par	mjd, mjd (of generation)
opBC	in	CCD bad pixel file	http://das.sdss.org/nightly/%d/opBC-%d.par	mjd, mjd$_{bp}$ (see fpPlan)
idB	in	bias vector	http://das.sdss.org/imaging/%d/%d/photo/calib /idB-%06d-%c%d.fit	run, rerun, run, filter, camcol
exPhotom	in	photometric solutions	http://das.sdss.org/pt/solutions /%s/exPhotom-%05d.par	version, mjd
kaCalObj	in	calibrated objects	http://das.sdss.org/pt/objects/%s/%d /kaCalObj-%08d.fit	version, stripe, sequenceId
psField	out	the initial photometric calibration and point spread function fit by field (see the extracting PSF images	http://das.sdss.org/imaging/%d/%d/objcs /%d/psField-%06d-%d-%04d.fit	run, rerun, camcol, run, camcol, field

| | | page) | | | |

Astrometric Pipeline (astrom) [2003AJ....125.1559P]

The astrometric pipeline calculates the astrometric solution. The astrometry and astrometry QA web pages provide more information on the algorithms used and the proper interpretation of the output.

DAS files used or generated by the astrom pipeline

File Type	in/out	Description	DAS URL format	format parameters
asParam	in	astrom tunable parameters	http://das.sdss.org/imaging/%d/%d/astrom/asParam.par	run, rerun
asPlan	in	the astrom processing plan	http://das.sdss.org/imaging/%d/%d/astrom/asPlan.par	run, rerun
opConfig	in	CCD configuration, specifying the readout characteristics for each CCD	http://das.sdss.org/nightly/%d/opConfig-%d.par	mjd, mjd
opCamera	in	positions of the CCDs in the camera	http://das.sdss.org/nightly/%d/opCamera-%d.par	mjd, mjd$_{cam}$
idReport	in	records runs collected on a night	http://das.sdss.org/nightly/%05d/idReport-%05d.par	mjd, mjd
idWeather	in	A log of weather data	http://das.sdss.org/nightly/%05d/idWeather-%05d.par	mjd, mjd
asTrans	out	tranformation coefficients from row, column to great circle coordinates	http://das.sdss.org/imaging/%d/%d/astrom /asTrans-%06d.fit	run, rerun, run

Frames Pipeline (frames) [2002AJ....123..485S, section 4.4]

The frames pipeline applies flat field and bias corrections to each frame, and interpolates values for pixels in bad columns and bleed trails and those corrupted by cosmic rays to produce a "corrected frame" (fpC file). It then detects bright objects and estimates the varying sky background, detects fainter objects, and measures a variety of properties for each object. Several algorithms pages describe details of the processing performed by frames.

- Measures of flux and magnitudes describes the variety of methods frames uses to measure the magnitude of each object, including radial profiles, fiber, model, cModel, Petrosian and PSF magnitudes and when to use each.
- Classification and Morphology describes other measurements of objects, including star/galaxy separation, model fits, surface brightnesses, ellipticities, adaptive moments and isophotal quantities.
- IMPORTANT! Photometric processing flags describes the variety of flags frames sets for each object, essential for properly interpreting the catalog.
- Flat field creation and quality
- Sky measurement
- Deblending describes how the frames pipeline decides if an initial single detection is in fact a blend of multiple overlapping objects, and, if so, how it separates (or "deblends") them.
- Creation of imaging masks

DAS files used or generated by the frames pipeline

File Type	in/out	Description	DAS URL format	format parameters
fpParam	in	frames tunable parameters	http://das.sdss.org/imaging/%d/%d /photo/fpParam.par	run, rerun
fpPlan	in	frames precessing plan	http://das.sdss.org/imaging/%d/%d /photo/fpPlan-%d.par	run, rerun, camcol
idReport	out	records runs collected on a night	http://das.sdss.org/nightly /%05d/idReport-%05d.par	mjd, mjd
koCat	in	the catalog of known bright stars	http://das.sdss.org/imaging/%d/%d /ssc/koCat-%06d.fit	run, rerun, run
opConfig	in	CCD configuration, specifying the readout characteristics for each CCD	http://das.sdss.org/nightly /%d/opConfig-%d.par	mjd, mjd
opECalib	in	CCD calibration file, specifying the electronic characteristics (read noise, gain, full-well, bias level, and linearity corrections) for each CCD	http://das.sdss.org/nightly /%d/opECalib-%d.par	mjd, mjd$_{cal}$ (see fpPlan)
opBC	in	CCD bad pixel file	http://das.sdss.org/nightly /%d/opBC-%d.par	mjd, mjd$_{bp}$ (see fpPlan)
idB	in	bias vector	http://das.sdss.org/imaging/%d/%d /photo/calib/idB-%06d-%c%d.fit	run, rerun, run, filter, camcol
psField	in	the initial photometric calibration and point spread function fit by field	http://das.sdss.org/imaging/%d/%d /objcs/%d/psPlan-%06d-%d-%04d.fit	run, rerun, camcol, run, camcol, field
asTrans	in	tranformation coefficients from row, column to great circle coordinates	http://das.sdss.org/imaging/%d/%d /astrom/asTrans-%06d.fit	run, rerun, run
fpFieldStat	out	field statistics	http://das.sdss.org/imaging/%d/%d /objcs/fpFieldStat-%06d-%d-%04d.fit	run, rerun, run, camcol, field
fpObjc	out	the (uncalibrated) object catalog	http://das.sdss.org/imaging/%d/%d /objcs/fpObjc-%06d-%d-%04d.fit	run, rerun, run, camcol, field
fpC	out	the image itself, bias subtracted, flat fielded, and with bad pixels replaced by interpolated values (the "corrected frame")	http://das.sdss.org/imaging/%d/%d /corr/fpC-%06d-%c%d-%04d.fit	run, rerun, run, filter, camcol, field
fpBIN	out	a 4x4 binned version of the corrected image after masking of objects and subtraction of sky, an image of the estimate of the sky, an image of the uncertainty in the sky estimate, and a table of bright star wings	http://das.sdss.org/imaging/%d/%d /objcs/fpBIN-%06d-%c%d-%04d.fit	run, rerun, run, filter, camcol, field
fpM	out	the frame masks (read using readAtlasImages)	http://das.sdss.org/imaging/%d/%d /objcs/fpM-%06d-%c%d-%04d.fit	run, rerun, run, filter, camcol, field
fpAtlas	out	the atlas images for all objects detected (read using readAtlasImages)	http://das.sdss.org/imaging/%d/%d /objcs/fpAtlas-%06d-%d-%04d.fit	run, rerun, run, camcol, field

Monitor Telescope Pipeline (mtpipe) [2006AN....327..821T]

On nights the primary SDSS telescope collects imaging data, the photometric telescope (PT), a second telescope at the same site, collects images of two types of standard star fields: primary and secondary. The primary fields contain standard stars with well established magnitudes, and are used to determine a photometric solution for the night. Secondary fields contain stars that overlap imaging runs, and allow calibration of those runs. (The survey originally planned to use a 0.6m telescope, the Monitor Telescope (MT), for these observations. We replaced the MT with a 0.5m telescope before the start of data collection. We called this new telescope the photometric telescope (PT) to distinguish it from the original 0.6m MT, but most of the reduction software, file formats and file name standards remained the same, and retained their original names.)

DAS files used or generated by the mtpipe pipeline

File Type	in/out	Description	DAS URL format	format parameters
mdReport	in	records exposures collected on a night	http://das.sdss.org/nightly/%05d/mdReport-%05d.par	mjd, mjd
metaFC	in	table of reference standard stars	http://das.sdss.org/pt/metaFC.fit	(none)
exPhotom	out	photometric solutions	http://das.sdss.org/pt/solutions/%s/exPhotom-%05d.par	version, mjd
kaCalObj	out	calibrated objects in the PT images	http://das.sdss.org/pt/objects/%s/%d/kaCalObj-%08d.fit	version, stripe, sequenceId

"Final" Calibration Pipeline (nfcalib) [2002AJ....123..485S, section 4.5.3]

fcalib generates the photometric calibration for a run based on photometric telescope data (the output of the monitor telescope pipeline). This was originally

considered the "final" calibration of a run, but now the "ubercal" calibrations supersede these "final" calibrations.

The photometric flux calibration algorithms page describes the calibration and use of calibrated quantities in more detail, and includes sections on assessment of photometric calibration, converting SDSS counts to SDSS (asinh) magnitudes (and *vice versa*), converting SDSS to AB magnitudes, and converting SDSS asinh magnitudes to fluxes. Another page describes conversion between SDSS magnitudes and $UBVR_cI_c$, and ugriz colors of Vega and the Sun.

You can determine which version of the mt calibrations (the "version" parameters in the formats in the table describing the monitor telescope pipeline outputs) by looking at the mtVerPhotom parameter of the fpPlan file, below.

DAS files used or generated by the nfcalib pipeline

File Type	in/out	Description	DAS URL format	format parameters
nfpParam	in	fcalib tunable parameters	http://das.sdss.org/imaging/%d/%d/nfcalib/fpParam.par	run, rerun
fpPlan	in	fcalib processing plan	http://das.sdss.org/imaging/%d/%d/nfcalib/fpPlan-%d.par	run, rerun, camcol
idReport	in	records runs collected on a night	http://das.sdss.org/nightly/%05d/idReport-%05d.par	mjd, mjd
asTrans	in	tranformation coefficients from row, column to great circle coordinates	http://das.sdss.org/imaging/%d/%d/astrom/asTrans-%06d.fit	run, rerun, run
exPhotom	in	photometric solutions	http://das.sdss.org/pt/solutions/%s/exPhotom-%05d.par	version, mjd
kaCalObj	in	calibrated objects	http://das.sdss.org/pt/objects/%s/%d/kaCalObj-%08d.fit	version, stripe, sequenceId
fpObjc	in	the (uncalibrated) object catalog	http://das.sdss.org/imaging/%d/%d/objcs/fpObjc-%06d-%d-%04d.fit	run, rerun, run, camcol, field
fcPCalib	out	the photometric calibration of a run	http://das.sdss.org/imaging/%d/%d/nfcalib/fcPCalib-%06d-%d.fit	run, rerun, run, camcol

Imaging Quality Assurance

The imaging QA algorithms page describes imaging quality assurance performed on the outputs of the imaging pipeline.

Resolve Multiple Detections and Produce Calibrated Catalogs

A given area on the sky may be observed by multiple runs. The final calibrated catalogs contain a field declaring whether the the specific observation of the object is "primary," and the canonical measurement of the object, or "secondary," a duplicate. These catalogs are generated twice, once based on the single run in isolation by exportChunk, and again in the resolve step. The catalogs produced by exportChunk declare an object primary or secondary based on position alone, introducing the possibility of inconsistencies due to errors in position; it is possible, for example, that two separate observation of an object be declared primary if the position measured for the object is slightly different in each detection.

The catalog generated by the resolve step, on the other hand, uses an operational database to search for other detections, and guarantees that one and only one detection be declared primary.

The catalogs produced by exportChunk can be found in the run directory of each run:

DAS files used or generated by the exportChunk

File Type	in/out	Description	DAS URL format	format parameters
tsObj	out	the calibrated object catalogs	http://das.sdss.org/imaging/%d/%d/calibChunks/%d/tsObj-%06d-%d-%d-%04d.fit	run, rerun, camcol, run, camcol, rerun, field
tsField	out	the calibrated field statistics	http://das.sdss.org/imaging/%d/%d/calibChunks/%d/tsField-%06d-%d-%d-%04d.fit	run, rerun, camcol, run, camcol, rerun, field

The catalogs produced by the resolve step are completed during target selection, and the table in target selection section gives their location. Note that the catalogs produced by target selection includes fields that flag which objects were selected for spectroscopy and why, while those generated by exportChunk do not.

See the EDR paper, 2002AJ....123..485S, section 4.7 for details on how objects are resolved.

Selection of Targets for Spectroscopy and Tiling

The target selection algorithms page describes how the pipeline performs target selection, including selection of Main Galaxy Sample, Luminous Red Galaxies (LRG), Quasars, Stars, ROSAT All-Sky Survey sources, Serendipity, and SEGUE targets. The target selection pipeline extracts calibrated catalogs of objects and corresponding field by field statistics from the operations database (which is itself loaded with data from the imaging data reduction pipelines):

DAS files used or generated by the target selection pipeline

File Type	in/out	Description	DAS URL format	format parameters
tsObj	out	the calibrated object catalogs	http://das.sdss.org/imaging/inchunk_%s/stripe%d_mu%d_%d/%d/tsObj-%06d-%d-%d-%04d.fit	(target or best), stripe, start mu, rerun type, camcol, run, camcol, rerun, field
tsField	out	the calibrated field statistics	http://das.sdss.org/imaging/inchunk_%s/stripe%d_mu%d_%d/%d/tsField-%06d-%d-%d-%04d.fit	(target or best), stripe, start mu, rerun type, camcol, run, camcol, rerun, field

The "rerun type" is 1 for best, 0 for target.

The tiling algorithms page describes the process by which the spectroscopic plates are designed and placed relative to each other.

Spectroscopic Observing

Plate Plugging (plug)

When the observatory is ready to observe a plate, the observatory staff plugs optical fibers into the holes drilled into the plates, and maps which fiber correponds to which hole (and therefor which object) by shining light through each fiber.

DAS files generated in plate plugging

File Type	in/out	Description	DAS URL format	format parameters
plPlugMapM	out	records which fiber corresponds to which hole in a plate (and therefore objects, and what coordinates on the sky)	http://das.sdss.org/spectro/1d_%d/%04d/1d/plPlugMapM-%04d-%d-%02d.par	rerun, plate, plate, mjd, plugging index

Data Collection

Observers mount cartridges containing the drilled, plugged plates on the telescope, and collected exposures on each plate until it reached a threshold estimated signal to noise and at least three exposures had been collected.

DAS files generated in spectroscopic data collection

File Type	in/out	Description	DAS URL format	format parameters

sdReport	out	records exposures collected on a night	http://das.sdss.org/nightly/%05d/sdReport-%05d.par	mjd, mjd
sdR	out	raw spectroscopic data frames	http://das.sdss.org/unprocessed/spectro/%d/sdR-%c%d-%08d.fit.gz	mjd, CCD (r or b), camera, exposure id

Spectroscopic Data Reduction

Two-dimensional Pipeline (spectro2d, also called idlspec2d) [2002AJ....123..485S, section 4.10.1]
The spectro2d pipeline reads science and calibration exposures from the spectrographs, reduces and calibrates the science exposures, extracts the one dimensional spectra from the two dimensional exposures, stacks multiple exposures into combined spectra, and produces corresponding masks and noise estimates.

DAS files used or generated by the spectro2d pipeline

File Type	in/out	Description	DAS URL format	format parameters
spPlan	in	the spectro2d processing plan	http://das.sdss.org/spectro/2d_%d/%04d/spPlan-%04d-%d.par	rerun, plate, plate, mjd
spPlancomb	in	the processing plan for combining spectra	http://das.sdss.org/spectro/2d_%d/%04d/spPlancomd-%04d-%d.par	rerun, plate, plate, mjd
plPlugMapM	in	records which fiber corresponds to which hole in a plate (and therefore objects, and what coordinates on the sky)	http://das.sdss.org/spectro/1d_%d/%04d/1d/plPlugMapM-%04d-%d-%02d.par	rerun, plate, plate, mjd, plugging index
sdReport	in	records exposures collected on a night	http://das.sdss.org/nightly/%05d/sdReport-%05d.par	mjd, mjd
sdR	in	raw spectroscopic readouts	in http://das.sdss.org/spectro/%d/spectroRaw.%d.tar	mjd, mjd
spCFrame	out	calibrated spectra for a single CCD and exposure	http://das.sdss.org/spectro/2d_%d/%04d/spCFrame-%c%d-%08d.par	rerun, plate, CCD (r or b), camera, exposure id
spPlate	out	the 640 combined flux- and wavelength-calibrated spectra over all exposures (potentially spanning multiple nights) for a given mapped plate	http://das.sdss.org/spectro/2d_%d/%04d/spPlate-%04d-%d.par	rerun, plate, plate, mjd

The idlspec2d product incorporates specBS (also called the Princeton-1D pipeline), an alternative to the standard spectro1d pipeline. specBS produces the following files:

DAS files generated by the specBS

File Type	in/out	Description	DAS URL format	format parameters
spZline	out	emission line fits	http://das.sdss.org/spectro/2d_%d/%04d/spZline-%04d-%d.par	rerun, plate, plate, mjd
spZall	out	all spectroscopic classifications and redshifts	http://das.sdss.org/spectro/2d_%d/%04d/spZall-%04d-%d.par	rerun, plate, plate, mjd
spZbest	out	spectroscopic classifications and redshifts	http://das.sdss.org/spectro/2d_%d/%04d/spZbest-%04d-%d.par	rerun, plate, plate, mjd

One-dimensional Pipeline (spectro1d) [2002AJ....123..485S, section 4.10.2]
The spectro1d pipeline measures emission and absorption lines and classifies the objects based on the spectrum; algorithms web pages describe the emission and absorption line fitting and the spectral type and redshift measurement algorithms. The redshift templates page provides the template spectra used for redshift measurement.

DAS files used or generated by the spec1d pipeline

File Type	in/out	Description	DAS URL format	format parameters
spPlan1d	in	spectro1d processing plan	http://das.sdss.org/spectro/1d_%d/%d/spPlan1d-%d-%04d.par	rerun, plate, mjd, plate
spParam1d	in	tunable software parameters for the spectro1d pipeline	http://das.sdss.org/spectro/1d_%d/%d/1d/spParam1d-%d-%04d.par	rerun, plate, mjd, plate
spManLog	in	a record of which classifications were corrected by hand	http://das.sdss.org/spectro/1d_%d/%d/1d/spManLog-%d-%04d.par	rerun, plate, mjd, plate
spPlate	in	the 640 combined flux- and wavelength-calibrated spectra over all exposures (potentially spanning multiple nights) for a given mapped plate	http://das.sdss.org/spectro/2d_%d/%04d/spPlate-%04d-%d.par	rerun, plate, plate, mjd
plPlugMapM	in	records which fiber corresponds to which hole in a plate (and therefore objects, and what coordinates on the sky)	http://das.sdss.org/spectro/1d_%d/%04d/1d/plPlugMapM-%04d-%d-%02d.par	rerun, plate, plate, mjd, plugging index
spDiag	in	spectro1d diagnostics	http://das.sdss.org/spectro/1d_%d/%d/1d/spDiag-%d-%04d.par	rerun, plate, mjd, plate
spSpec	out	line measurements and redshift determinations, as well as the spectrum, for a single object, summing over all of its exposures through a given mapped plate	http://das.sdss.org/spectro/1d_%d/%d/1d/spSpec-%d-%04d-%03d.par	rerun, plate, mjd, plate, fiber

Stellar Parameters Pipeline (sspp) [2007arXiv0710.5645L 2007arXiv0710.5778L 2007arXiv0710.5780A]
The SEGUE stellar parameters pipeline produces a number of files, stored together:

DAS files used or generated by the SSPP pipeline

File Type	in/out	Description	DAS URL format	format parameters
sspp gzipped tar files	out	Output of the sspp pipeline	http://das.sdss.org/spectro/sspp_%d/%04d-%05d.tgz	rerun, plate, mjd

Recalibration

Astrometric Recalibration
We recalibrated the astrometry for the final data release, using updated reference catalogs and improved centroiding:

DAS files used or generated in astrometric recalibration

File Type	in/out	Description	DAS URL format	format parameters
asParam	in	astrom tunable parameters	http://das.sdss.org/imaging/%d/%d/fastrom/asParam.par	run, rerun
asPlan	in	the astrom processing plan	http://das.sdss.org/imaging/%d/%d/fastrom/asPlan.par	run, rerun
opConfig	in	CCD configuration, specifying the readout characteristics for each CCD	http://das.sdss.org/nightly/%d/opConfig-%d.par	mjd, mjd
opCamera	in	positions of the CCDs in the camera	http://das.sdss.org/nightly/%d/opCamera-%d.par	mjd, mjd$_{cam}$
idReport	in	records runs collected on a night	http://das.sdss.org/nightly/%05d/idReport-%05d.par	mjd, mjd
idWeather	in	A log of weather data	http://das.sdss.org/nightly/%05d/idWeather-%05d.par	mjd, mjd

asTrans	out	tranformation coefficients from row, column to great circle coordinates	http://das.sdss.org/imaging/%d/%d/fastrom /asTrans-%06d.fit	run, rerun, run

Photometric Recalibration (Ubercal) [2008ApJ...674.1217P]

The "ubercal" recalibration recalibrates the survey by simultaneously solving for the calibration parameters and relative stellar fluxes using overlapping observations. The algorithm used decouples the problem of relative calibrations from that of absolute calibrations; the absolute calibration is reduced to determining a few numbers for the entire survey. See the ubercal section of the photometric calibration algorithms page.

DAS files generated in photometric recalibration

File Type	in/out	Description	DAS URL format	format parameters
drObj	out	the final "ubercal" and astrometrically recalibrated object catalogs	http://das.sdss.org/imaging/%d/%d/dr/%d /drObj-%06d-%d-%d-%04d.fit	run, rerun, camcol, run, camcol, rerun, field
drField	out	the final "ubercal" field statistics	http://das.sdss.org/imaging/%d/%d/dr/%d /drField-%06d-%d-%d-%04d.fit	run, rerun, camcol, run, camcol, rerun, field

SuperNova Photometric Calibration [follows method of 2008MNRAS.386..887B]

DAS files generated in photometric calibration of SuperNova data

File Type	in/out	Description	DAS URL format	format parameters
tsObj	out	the calibrated object catalogs	http://das.sdss.org/imaging/%d/%d/calibChunks/%d/tsObj-%06d-%d-%d-%04d.fit	run, rerun, camcol, run, camcol, rerun, field
tsField	out	the calibrated field statistics	http://das.sdss.org/imaging/%d/%d/calibChunks/%d/tsField-%06d-%d-%d-%04d.fit	run, rerun, camcol, run, camcol, rerun, field

Submit your questions to the SDSS helpdesk