

WOPS - Explorations 045. Incorporate UKIDSS and unWISE Data Into DVO

Modification History

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1. Overview

Now I and Gene start incorporating the UKIDSS and unWISE data into the DVO database.

The procedures are:

1. **ZJ derives a mapping from the UKIDSS/unWISE data columns to the DVO schema fields**
2. **Gene download the data and use ZJ's mapping to make UKIDSS and unWISE data accessible by DVO functions**

2. Mapping UKIDSS Data Columns to DVO Schema

2.1 UHS

The UHS data are accessible via [this link](http://surveys.roe.ac.uk/hips71/UHS/uhsSourceDR1.csv) (<http://surveys.roe.ac.uk/hips71/UHS/uhsSourceDR1.csv>). These data correspond to the uhsSource data, whose column descriptions could be found [here](http://wsa.roe.ac.uk/www/wsa_browser.html) (http://wsa.roe.ac.uk/www/wsa_browser.html) and summarized below.

UHS Column	Type	Length	Unit	Default Value	Description	DVO Field
sourceID	bigint	8			UID of the merged detection	extID
cuEventID	int	4			UID of curation event giving rise to this record	?

frameSetID	bigint	8		UID of the set of frames that this merged source comes from	imageID
ra	float	8	degrees	RA	R
dec	float	8	degrees	DEC	D
cx	float	8		unit vector of spherical co-ordinates	?
cy	float	8		unit vector of spherical co-ordinates	?
cz	float	8		unit vector of spherical co-ordinates	?
htmID	bigint	8		Hierarchical Triangular Mesh (HTM) index, 20 deep, for equatorial co-ordinates	?
l	float	8	degrees	Galactic longitude	?
b	float	8	degrees	Galactic latitude	?
lambda	float	8	degrees	<u>SDSS "survey longitude"</u> (https://www.sdss.org/dr12/algorithms/surveycoords/)	?
eta	float	8	degrees	<u>SDSS "survey latitude"</u> (https://www.sdss.org/dr12/algorithms/surveycoords/)	?
priOrSec	bigint	8	-99999999	Seam code for a unique (=0) or duplicated (!=0) source (eg. flags overlap duplicates); (priOrSec = 0) or (priOrSec = frameSetID) extracts the unique sources and the best detections (if duplicated)	primary_bit
mergedClassStat	real	4	-0.9999995e9	N(0,1) stellarness-of-profile statistic	?
mergedClass	smallint	2		a final class flag for the merged source, by combining all individual detections via a Bayesian statistics +1: Galaxy 0: Noise -1: Star -2: Probable Star -3: Probable Galaxy -9: Saturated	psfQFperf/photFlags2
pStar	real	4		probability that the source is a star	psfChisq
pGalaxy	real	4		probability that the source is a galaxy	extNsigma
pNoise	real	4		probability that the source is noise	?
pSaturated	real	4		probability that the source is saturated	?

eBV	real	4		-0.9999995e9	The galactic dust extinction value measured from the Schlegel, Finkbeiner & Davis (1998) maps	?
aJ	real	4	mag	-0.9999995e9	The galactic extinction correction in the J band for extragalactic objects	?
jHallMag	real	4	mag	-0.9999995e9	total point source J-band magnitude	?
jHallMagErr	real	4	mag	-0.9999995e9	error in total point source J-band magnitude	?
jPetroMag	real	4	mag	-0.9999995e9	extended source J-band magnitude (Petrosian)	?
jPetroMagErr	real	4	mag	-0.9999995e9	error in extended source J-band magnitude (Petrosian)	?
jPsfMag	real	4	mag	-0.9999995e9	PSF-fitted J-band magnitude	M
jPsfMagErr	real	4	mag	-0.9999995e9	error in PSF-fitted J-band magnitude	dM
jSerMag2D	real	4	mag	-0.9999995e9	extended source J-band magnitude (profile-fitted)	?
jSerMag2DErr	real	4	mag	-0.9999995e9	error in extended source J-band magnitude (profile-fitted)	?
jAperMag3	real	4	mag	-0.9999995e9	default point source J aperture corrected mag (2.0 arcsec aperture diameter)	Map
jAperMag3Err	real	4	mag	-0.9999995e9	error in default point source J aperture corrected mag (2.0 arcsec aperture diameter)	dMap
jAperMag4	real	4	mag	-0.9999995e9	point source J aperture corrected mag (2.8 arcsec aperture diameter)	Mkron
jAperMag4Err	real	4	mag	-0.9999995e9	error in point source J aperture corrected mag (2.8 arcsec aperture diameter)	dMkron
jAperMag6	real	4	mag	-0.9999995e9	point source J aperture corrected mag (5.7 arcsec aperture diameter)	?
jAperMag6Err	real	4	mag	-0.9999995e9	error in point source J aperture corrected mag (5.7 arcsec aperture diameter)	?
jGausig	real	4	pixels	-0.9999995e9	RMS of axes of ellipse fit in J	?
jEll	real	4		-0.9999995e9	1-b/a, where a/b=semi-major/minor axes in J	?
jPA	real	4	degrees	-0.9999995e9	ellipse fit celestial orientation in J	posangle
jErrBits	int	4		-99999999	a count of the number of zero confidence pixels in the default (2 arcsec diameter) aperture	?
jDeblend	int	4		-99999999	placeholder	?

jClass	smallint	2	-9999	discrete image classification flag in J	psfQF
jClassStat	real	4	-9999	N(0,1) stellarness-of-profile statistic in J	?
jppErrBits	int	4	0	additional WFAU post-processing error bits in J see XppErrBits for description	photFlags
jSeqNum	int	4	-99999999	the running number of the J detection	detID

41 CSV columns

(columns with strikethrough are not counted)

16 DVO columns

per band

(columns with strikethrough are not counted)

UHS Caution

- Columns with strikethrough ~~jPsfMag~~, ~~jPsfMagErr~~, ~~jSerMag2D~~, ~~jSerMag2DErr~~ should have been included in the CSV file (as indicated by the online documentation) but not.

2.2 UGCS

The UGCS data (62,892,395 rows) are accessible via [this link](http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GCSDR10.csv) (<http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GCSDR10.csv>). These data correspond to the `gcsSource` data, whose column descriptions could be found [here](http://wsa.roe.ac.uk/www/wsa_browser.html) (http://wsa.roe.ac.uk/www/wsa_browser.html) and summarized below.

UGCS Column	Type	Length	Unit	Default Value	Description	DVO Field
sourceID	bigint	8			UID of the merged detection	extID
cuEventID	int	4			UID of curation event giving rise to this record UID of the set of frames that this merged source	?

frameSetID	bigint	8		comes from	imageID
ra	float	8	degrees	RA	R
dec	float	8	degrees	DEC	D
sigRa	real	4	degrees	uncertainty in RA	?
sigDec	real	4	degrees	uncertainty in DEC	?
epoch	float	8	years	epoch of position measurement	t
muRa	real	4	mas/yr	RA proper motions	?
muDec	real	4	mas/yr	DEC proper motions	?
sigMuRa	real	4	mas/yr	error in RA proper motions	?
sigMuDec	real	4	mas/yr	error in DEC proper motions	?
chi2	real	4		chi2 values of the proper-motion solution	?
nFrames	tinyint	1		number of frames used for the proper motion calculations	?
cx	float	8		unit vector of spherical co-ordinates	?
cy	float	8		unit vector of spherical co-ordinates	?
cz	float	8		unit vector of spherical co-ordinates	?
htmID	bigint	8		Hierarchical Triangular Mesh (HTM) index, 20 deep, for equatorial co-ordinates	?
l	float	8	degrees	Galactic longitude	?
b	float	8	degrees	Galactic latitude	?
lambda	float	8	degrees	<u>SDSS "survey longitude"</u> (https://www.sdss.org/dr12/algorithms/surveycoords/)	?
eta	float	8	degrees	<u>SDSS "survey latitude"</u> (https://www.sdss.org/dr12/algorithms/surveycoords/)	?
priOrSec	bigint	8	-99999999	Seam code for a unique (=0) or duplicated (!=0) source (eg. flags overlap duplicates); (priOrSec = 0) or (priOrSec = frameSetID) extracts the unique sources and the best detections (if duplicated)	primary_bit

zmyPnt	real	4	mag	Z-Y point source colour (using aperMag3)	?	
zmyPntErr	real	4	mag	error in Z-Y point source colour (using aperMag3)	?	
ymjPnt	real	4	mag	Y-J point source colour (using aperMag3)	?	
ymjPntErr	real	4	mag	error in Y-J point source colour (using aperMag3)	?	
jmhPnt	real	4	mag	J-H point source colour (using aperMag3)	?	
jmhPntErr	real	4	mag	error in J-H point source colour (using aperMag3)	?	
hmk_1Pnt	real	4	mag	H-K_1 point source colour (using aperMag3)	?	
hmk_1PntErr	real	4	mag	error in H-K_1 point source colour (using aperMag3)	?	
zmyExt	real	4	mag	Z-Y extended source colour (using aperMag3)	?	
zmyExtErr	real	4	mag	error in Z-Y extended source colour (using aperMag3)	?	
ymjExt	real	4	mag	Y-J extended source colour (using aperMag3)	?	
ymjExtErr	real	4	mag	error in Y-J extended source colour (using aperMag3)	?	
jmhExt	real	4	mag	J-H extended source colour (using aperMag3)	?	
jmhExtErr	real	4	mag	error in J-H extended source colour (using aperMag3)	?	
hmk_1Ext	real	4	mag	H-K_1 extended source colour (using aperMag3)	?	
hmk_1ExtErr	real	4	mag	error in H-K_1 extended source colour (using aperMag3)	?	
mergedClassStat	real	4	-0.9999995e9	N(0,1) stellarness-of-profile statistic	?	
				a final class flag for the merged source, by combining all individual detections via a Bayesian statistics		
mergedClass	smallint	2	+1: Galaxy 0: Noise -1: Star -2: Probable Star -3: Probable Galaxy -9: Saturated			psfQFperf/photFlags2
pStar	real	4	probability that the source is a star			psfChisq
pGalaxy	real	4	probability that the source is a galaxy			extNsigma
pNoise	real	4	probability that the source is noise			?

pSaturated	real	4			probability that the source is saturated	?
z/y/j/h/k_1/k_2HallMag	real	4	mag	-0.9999995e9	total point source Z/Y/J/H/K_1/K_2-band magnitude	?
z/y/j/h/k_1/k_2HallMagErr	real	4	mag	-0.9999995e9	error in total point source Z/Y/J/H/K_1/K_2-band magnitude	?
z/y/j/h/k_1/k_2PetroMag	real	4	mag	-0.9999995e9	extended source Z/Y/J/H/K_1/K_2-band magnitude (Petrosian)	?
z/y/j/h/k_1/k_2PetroMagErr	real	4	mag	-0.9999995e9	error in extended source Z/Y/J/H/K_1/K_2-band magnitude (Petrosian)	?
z/y/j/h/k_1/k_2PsfMag	real	4	mag	-0.9999995e9	PSF-fitted Z/Y/J/H/K_1/K_2-band magnitude	M
z/y/j/h/k_1/k_2PsfMagErr	real	4	mag	-0.9999995e9	error in PSF-fitted Z/Y/J/H/K_1/K_2-band magnitude	dM
z/y/j/h/k_1/k_2SerMag2D	real	4	mag	-0.9999995e9	extended source Z/Y/J/H/K_1/K_2-band magnitude (profile-fitted)	?
z/y/j/h/k_1/k_2SerMag2DErr	real	4	mag	-0.9999995e9	error in extended source Z/Y/J/H/K_1/K_2-band magnitude (profile-fitted)	?
z/y/j/h/k_1/k_2AperMag3	real	4	mag	-0.9999995e9	default point source Z/Y/J/H/K_1/K_2 aperture corrected mag (2.0 arcsec aperture diameter)	Map
z/y/j/h/k_1/k_2AperMag3Err	real	4	mag	-0.9999995e9	error in default point source Z/Y/J/H/K_1/K_2 aperture corrected mag (2.0 arcsec aperture diameter)	dMap
z/y/j/h/k_1/k_2AperMag4	real	4	mag	-0.9999995e9	point source Z/Y/J/H/K_1/K_2 aperture corrected mag (2.8 arcsec aperture diameter)	Mkron
z/y/j/h/k_1/k_2AperMag4Err	real	4	mag	-0.9999995e9	error in point source Z/Y/J/H/K_1/K_2 aperture corrected mag (2.8 arcsec aperture diameter)	dMkron
z/y/j/h/k_1/k_2AperMag6	real	4	mag	-0.9999995e9	point source Z/Y/J/H/K_1/K_2 aperture corrected mag (5.7 arcsec aperture diameter)	?
z/y/j/h/k_1/k_2AperMag6Err	real	4	mag	-0.9999995e9	error in point source Z/Y/J/H/K_1/K_2 aperture corrected mag (5.7 arcsec aperture diameter)	?
z/y/j/h/k_1/k_2Gausig	real	4	pixels	-0.9999995e9	RMS of axes of ellipse fit in Z/Y/J/H/K_1/K_2	?
z/y/j/h/k_1/k_2Ell	real	4		-0.9999995e9	1-b/a, where a/b=semi-major/minor axes in Z/Y/J/H/K_1/K_2	?
z/y/j/h/k_1/k_2PA	real	4	degrees	-0.9999995e9	ellipse fit celestial orientation in Z/Y/J/H/K_1/K_2	posangle

z/y/j/h/k_1/k_2ErrBits	int	4	-99999999	a count of the number of zero confidence pixels in the default (2 arcsec diameter) aperture	?
z/y/j/h/k_1/k_2Deblend	int	4	-99999999	placeholder	?
z/y/j/h/k_1/k_2Class	smallint	2	-9999	discrete image classification flag in Z/Y/J/H/K_1/K_2	psfQF
z/y/j/h/k_1/k_2ClassStat	real	4	-9999	N(0,1) stellarness-of-profile statistic in Z/Y/J/H/K_1/K_2	?
z/y/j/h/k_1/k_2ppErrBits	int	4	0	additional WFAU post-processing error bits in Z/Y/J/H/K_1/K_2 see XppErrBits for description	photFlags
z/y/j/h/k_1/k_2SeqNum	int	4	-99999999	the running number of the Z/Y/J/H/K_1/K_2 detection	detID
z/y/j/h/k_1/k_2ObjID	int	4	-99999999	not included by the online documentation	?
z/y/j/h/k_1/k_2Xi	int	4	-99999999	Offset of Z/Y/J/H/K_1/K_2 detection from master position (+east/-west)	?
z/y/j/h/k_1/k_2Eta	int	4	-99999999	Offset of Z/Y/J/H/K_1/K_2 detection from master position (+north/-south)	?

177 CSV columns

(columns with strikethrough are not counted)

17 DVO columns per band

(columns with strikethrough are not counted)

UGCS caution

- Columns with strikethrough ~~z/y/j/h/k_1/k_2PsfMag~~, ~~z/y/j/h/k_1/k_2PsfMagErr~~, ~~z/y/j/h/k_1/k_2SerMag2D~~, ~~z/y/j/h/k_1/k_2SerMag2DErr~~, ~~hmk_2Pnt~~, ~~hmk_2PntErr~~, ~~hmk_2Ext~~, ~~hmk_2ExtErr~~ should have been included in the CSV file (as indicated by the online documentation) but not.
- Columns ~~z/y/j/h/k_1/k_2ObjID~~ are in the CSV file, but are not included by the online documentation.

2.3 ULAS

The ULAS data (84,440,794 rows) are accessible via [this link \(http://surveys.roe.ac.uk/hips71/UKIDSSDR10/LASDR10.csv\)](http://surveys.roe.ac.uk/hips71/UKIDSSDR10/LASDR10.csv). These data correspond to the `lasSource` data, whose column descriptions could be found [here \(http://wsa.roe.ac.uk/www/wsa_browser.html\)](http://wsa.roe.ac.uk/www/wsa_browser.html) and summarized below.

ULAS Column	Type	Length	Unit	Default Value	Description	DVO Field
sourceID	bigint	8			UID of the merged detection	extID
eventID	int	4			UID of curation event giving rise to this record	?
frameSetID	bigint	8			UID of the set of frames that this merged source comes from	imageID
ra	float	8	degrees		RA	R
dec	float	8	degrees		DEC	D
sigRa	real	4	degrees		uncertainty in RA	?
sigDec	real	4	degrees		uncertainty in DEC	?
epoch	float	8	years		epoch of position measurement	t
muRa	real	4	mas/yr		RA proper motions	?
muDec	real	4	mas/yr		DEC proper motions	?
sigMuRa	real	4	mas/yr		error in RA proper motions	?
sigMuDec	real	4	mas/yr		error in DEC proper motions	?
chi2	real	4			chi2 values of the proper-motion solution	?
nFrames	tinyint	1			number of frames used for the proper motion calculations	?
cx	float	8			unit vector of spherical co-ordinates	?
cy	float	8			unit vector of spherical co-ordinates	?
cz	float	8			unit vector of spherical co-ordinates	?
htmID	bigint	8			Hierarchical Triangular Mesh (HTM) index, 20 deep, for equatorial co-ordinates	?
l	float	8	degrees		Galactic longitude	?

b	float	8	degrees	Galactic latitude	?
lambda	float	8	degrees	SDSS "survey longitude" (https://www.sdss.org/dr12/algorithms/surveycoords/)	?
eta	float	8	degrees	SDSS "survey latitude" (https://www.sdss.org/dr12/algorithms/surveycoords/)	?
priOrSec	bigint	8	-99999999	Seam code for a unique (=0) or duplicated (!=0) source (eg. flags overlap duplicates); (priOrSec = 0) or (priOrSec = frameSetID) extracts the unique sources and the best detections (if duplicated)	primary_bit
ymj_1Pnt	real	4	mag	Y-J_1 point source colour (using aperMag3)	?
ymj_1PntErr	real	4	mag	error in Y-J_1 point source colour (using aperMag3)	?
j_1mhPnt	real	4	mag	J_1-H point source colour (using aperMag3)	?
j_1mhPntErr	real	4	mag	error in J_1-H point source colour (using aperMag3)	?
hmkPnt	real	4	mag	H-K point source colour (using aperMag3)	?
hmkPntErr	real	4	mag	error in H-K point source colour (using aperMag3)	?
ymj_1Ext	real	4	mag	Y-J_1 extended source colour (using aperMag3)	?
ymj_1ExtErr	real	4	mag	error in Y-J_1 extended source colour (using aperMag3)	?
j_1mhExt	real	4	mag	J_1-H extended source colour (using aperMag3)	?
j_1mhExtErr	real	4	mag	error in J_1-H extended source colour (using aperMag3)	?
hmkExt	real	4	mag	H-K extended source colour (using aperMag3)	?
hmkExtErr	real	4	mag	error in H-K extended source colour (using aperMag3)	?
mergedClassStat	real	4	-0.9999995e9	N(0,1) stellarness-of-profile statistic	?
				a final class flag for the merged source, by combining all individual detections via a Bayesian statistics	
mergedClass	smallint	2		+1: Galaxy 0: Noise -1: Star -2: Probable Star -3: Probable Galaxy -9: Saturated	psfQFperf/photFlags2

pStar	real	4			probability that the source is a star	psfChisq
pGalaxy	real	4			probability that the source is a galaxy	extNsigma
pNoise	real	4			probability that the source is noise	?
pSaturated	real	4			probability that the source is saturated	?
eBV	real	4		-0.9999995e9	The galactic dust extinction value measured from the Schlegel, Finkbeiner & Davis (1998) maps	?
aY/J/H/K	real	4	mag	-0.9999995e9	The galactic extinction correction in the Y/J/H/K band for extragalactic objects	?
y/j_1/j_2/h/kHallMag	real	4	mag	-0.9999995e9	total point source Y/J_1/J_2/H/K-band magnitude	?
y/j_1/j_2/h/kHallMagErr	real	4	mag	-0.9999995e9	error in total point source Y/J_1/J_2/H/K-band magnitude	?
y/j_1/j_2/h/kPetroMag	real	4	mag	-0.9999995e9	extended source Y/J_1/J_2/H/K-band magnitude (Petrosian)	?
y/j_1/j_2/h/kPetroMagErr	real	4	mag	-0.9999995e9	error in extended source Y/J_1/J_2/H/K-band magnitude (Petrosian)	?
y/j_1/j_2/h/kPsfMag	real	4	mag	-0.9999995e9	PSF-fitted Y/J_1/J_2/H/K-band magnitude	M
y/j_1/j_2/h/kPsfMagErr	real	4	mag	-0.9999995e9	error in PSF-fitted Y/J_1/J_2/H/K-band magnitude	dM
y/j_1/j_2/h/kSerMag2D	real	4	mag	-0.9999995e9	extended source Y/J_1/J_2/H/K-band magnitude (profile-fitted)	?
y/j_1/j_2/h/kSerMag2DErr	real	4	mag	-0.9999995e9	error in extended source Y/J_1/J_2/H/K-band magnitude (profile-fitted)	?
y/j_1/j_2/h/kAperMag3	real	4	mag	-0.9999995e9	default point source Y/J_1/J_2/H/K aperture corrected mag (2.0 arcsec aperture diameter)	Map
y/j_1/j_2/h/kAperMag3Err	real	4	mag	-0.9999995e9	error in default point source Y/J_1/J_2/H/K aperture corrected mag (2.0 arcsec aperture diameter)	dMap
y/j_1/j_2/h/kAperMag4	real	4	mag	-0.9999995e9	point source Y/J_1/J_2/H/K aperture corrected mag (2.8 arcsec aperture diameter)	Mkron
y/j_1/j_2/h/kAperMag4Err	real	4	mag	-0.9999995e9	error in point source Y/J_1/J_2/H/K aperture corrected mag (2.8 arcsec aperture diameter)	dMkron
y/j_1/j_2/h/kAperMag6	real	4	mag	-0.9999995e9	point source Y/J_1/J_2/H/K aperture corrected mag (5.7 arcsec aperture diameter)	?

y/j_1/j_2/h/kAperMag6Err	real	4	mag	-0.9999995e9	error in point source Y/J_1/J_2/H/K aperture corrected mag (5.7 arcsec aperture diameter)	?
y/j_1/j_2/h/kGausig	real	4	pixels	-0.9999995e9	RMS of axes of ellipse fit in Y/J_1/J_2/H/K	?
y/j_1/j_2/h/kEll	real	4		-0.9999995e9	1-b/a, where a/b=semi-major/minor axes in Y/J_1/J_2/H/K	?
y/j_1/j_2/h/kPA	real	4	degrees	-0.9999995e9	ellipse fit celestial orientation in Y/J_1/J_2/H/K	posangle
y/j_1/j_2/h/kErrBits	int	4		-99999999	a count of the number of zero confidence pixels in the default (2 arcsec diameter) aperture	?
y/j_1/j_2/h/kDeblend	int	4		-99999999	placeholder	?
y/j_1/j_2/h/kClass	smallint	2		-9999	discrete image classification flag in Y/J_1/J_2/H/K	psfQF
y/j_1/j_2/h/kClassStat	real	4		-9999	N(0,1) stellarness-of-profile statistic in Y/J_1/J_2/H/K	?
y/j_1/j_2/h/kppErrBits	int	4		0	additional WFAU post-processing error bits in Y/J_1/J_2/H/K see XppErrBits for description	photFlags
y/j_1/j_2/h/kSeqNum	int	4		-99999999	the running number of the Y.J_1/J_2/H/K detection	detID
y/j_1/j_2/h/kObjID	int	4		-99999999	not included by the online documentation	?
y/j_1/j_2/h/kXi	int	4		-99999999	Offset of Y.J_1/J_2/H/K detection from master position (+east/-west)	?
y/j_1/j_2/h/kEta	int	4		-99999999	Offset of Y.J_1/J_2/H/K detection from master position (+north/-south)	?

155 CSV columns

(columns with strikethrough are not counted)

17 DVO columns per band

(columns with strikethrough are not counted)

ULAS caution

- Columns with strikethrough ~~cuEventID~~, ~~y/j_1/j_2/h/kPsfMag~~, ~~y/j_1/j_2/h/kPsfMagErr~~, ~~y/j_1/j_2/h/kSerMag2D~~, ~~y/j_1/j_2/h/kSerMag2DErr~~ should have been included in the CSV file (as indicated by the online documentation) but not.

2. Columns y/j_1/j_2/h/kobjID are included in the CSV file, but are not included by the online documentation.

2.4 UGPS

The UGPS data (978,330,557 rows) are accessible via the following links:

- UGPS RA=30-45 (70169 rows): http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_30_45.csv
(http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_30_45.csv)
- UGPS RA=45-60 (11237599 rows): http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_45_60.csv
(http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_45_60.csv)
- UGPS RA=60-75 (24475014 rows): http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_60_75.csv
(http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_60_75.csv)
- UGPS RA=75-90 (29371836 rows): http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_75_90.csv
(http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_75_90.csv)
- UGPS RA=90-105 (40765393 rows): http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_90_105.csv
(http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_90_105.csv)
- UGPS RA=105-120 (19798215 rows): http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_105_120.csv
(http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_105_120.csv)
- UGPS RA=255-270 (52156106 rows): http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_255_270.csv
(http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_255_270.csv)
- UGPS RA=270-285 (348515960 rows): http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_270_285.csv
(http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_270_285.csv)
- UGPS RA=285-300 (282898165 rows): http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_285_300.csv
(http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_285_300.csv)
- UGPS RA=300-315 (104634527 rows): http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_300_315.csv
(http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_300_315.csv)
- UGPS RA=315-360 (64407573 rows): http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_315_360.csv
(http://surveys.roe.ac.uk/hips71/UKIDSSDR10/GPSDR10_315_360.csv)

These data correspond to the gpsSource data, whose column descriptions could be found [here](http://wsa.roe.ac.uk/www/wsa_browser.html) (http://wsa.roe.ac.uk/www/wsa_browser.html) and summarized below.

Default

UGPS Column	Type	Length	Unit	Value	Description	DVO Field
sourceID	bigint	8			UID of the merged detection	extID
cuEventID	int	4			UID of curation event giving rise to this record	?
frameSetID	bigint	8			UID of the set of frames that this merged source comes from	imageID
ra	float	8	degrees		RA	R
dec	float	8	degrees		DEC	D
sigRa	real	4	degrees		uncertainty in RA	?
sigDec	real	4	degrees		uncertainty in DEC	?
epoch	float	8	years		epoch of position measurement	t
muRa	real	4	mas/yr		RA proper motions	?
muDec	real	4	mas/yr		DEC proper motions	?
sigMuRa	real	4	mas/yr		error in RA proper motions	?
sigMuDec	real	4	mas/yr		error in DEC proper motions	?
chi2	real	4			chi2 values of the proper-motion solution	?
nFrames	tinyint	1			number of frames used for the proper motion calculations	?
cx	float	8			unit vector of spherical co-ordinates	?
cy	float	8			unit vector of spherical co-ordinates	?
cz	float	8			unit vector of spherical co-ordinates	?
htmID	bigint	8			Hierarchical Triangular Mesh (HTM) index, 20 deep, for equatorial co-ordinates	?
l	float	8	degrees		Galactic longitude	?
b	float	8	degrees		Galactic latitude	?
lambda	float	8	degrees		<u>SDSS "survey longitude"</u> (https://www.sdss.org/dr12/algorithms/surveycoords/)	?
eta	float	8	degrees		<u>SDSS "survey latitude"</u> (https://www.sdss.org/dr12/algorithms/surveycoords/)	?

priOrSec	bigint	8		-99999999	Seam code for a unique (=0) or duplicated (!=0) source (eg. flags overlap duplicates); (priOrSec = 0) or (priOrSec = frameSetID) extracts the unique sources and the best detections (if duplicated)	primary_bit
jmhPnt	real	4	mag		J-H point source colour (using aperMag3)	?
jmhPntErr	real	4	mag		error in J-H point source colour (using aperMag3)	?
hmk1Pnt	real	4	mag		H-K_1 point source colour (using aperMag3)	?
hmk1PntErr	real	4	mag		error in H-K_1 point source colour (using aperMag3)	?
h2mk1Pnt	real	4	mag		H_2-K_1 point source colour (using aperMag3)	?
h2mk1PntErr	real	4	mag		error in H_2-K_1 point source colour (using aperMag3)	?
mergedClassStat	real	4		-0.9999995e9	N(0,1) stellarness-of-profile statistic	?
					a final class flag for the merged source, by combining all individual detections via a Bayesian statistics	
mergedClass	smallint	2			+1: Galaxy 0: Noise -1: Star -2: Probable Star -3: Probable Galaxy -9: Saturated	psfQFperf/photFlags2
pStar	real	4			probability that the source is a star	psfChisq
pGalaxy	real	4			probability that the source is a galaxy	extNsigma
pNoise	real	4			probability that the source is noise	?
pSaturated	real	4			probability that the source is saturated	?
j/h/k_1/k_2/h2HallMag	real	4	mag	-0.9999995e9	total point source J/H/K_1/K_2/H2-band magnitude	?
j/h/k_1/k_2/h2HallMagErr	real	4	mag	-0.9999995e9	error in total point source J/H/K_1/K_2/H2-band magnitude	?
j/h/k_1/k_2/h2PetroMag	real	4	mag	-0.9999995e9	extended source J/H/K_1/K_2/H2-band magnitude (Petrosian)	?
					error in extended source J/H/K_1/K_2/H2-band	

j/h/k_1/k_2/h2PetroMagErr	real	4	mag	-0.9999995e9	magnitude (Petrosian)	?
j/h/k_1/k_2/h2PsfMag	real	4	mag	-0.9999995e9	PSF-fitted J/H/K_1/K_2/H2-band magnitude	M
j/h/k_1/k_2/h2PsfMagErr	real	4	mag	-0.9999995e9	error in PSF-fitted J/H/K_1/K_2/H2-band magnitude	dM
j/h/k_1/k_2/h2SerMag2D	real	4	mag	-0.9999995e9	extended source J/H/K_1/K_2/H2-band magnitude (profile-fitted)	?
j/h/k_1/k_2/h2SerMag2DErr	real	4	mag	-0.9999995e9	error in extended source J/H/K_1/K_2/H2-band magnitude (profile-fitted)	?
j/h/k_1/k_2/h2AperMag1	real	4	mag	-0.9999995e9	default point source J/H/K_1/K_2/H2 aperture corrected mag (1.0 arcsec aperture diameter)	?
j/h/k_1/k_2/h2AperMag1Err	real	4	mag	-0.9999995e9	error in default point source J/H/K_1/K_2/H2 aperture corrected mag (1.0 arcsec aperture diameter)	?
j/h/k_1/k_2/h2AperMag3	real	4	mag	-0.9999995e9	default point source J/H/K_1/K_2/H2 aperture corrected mag (2.0 arcsec aperture diameter)	Map
j/h/k_1/k_2/h2AperMag3Err	real	4	mag	-0.9999995e9	error in default point source J/H/K_1/K_2/H2 aperture corrected mag (2.0 arcsec aperture diameter)	dMap
j/h/k_1/k_2/h2AperMag4	real	4	mag	-0.9999995e9	point source J/H/K_1/K_2/H2 aperture corrected mag (2.8 arcsec aperture diameter)	Mkron
j/h/k_1/k_2/h2AperMag4Err	real	4	mag	-0.9999995e9	error in point source J/H/K_1/K_2/H2 aperture corrected mag (2.8 arcsec aperture diameter)	dMkron
j/h/k_1/k_2/h2Gausig	real	4	pixels	-0.9999995e9	RMS of axes of ellipse fit in J/H/K_1/K_2/H2	?
j/h/k_1/k_2/h2Ell	real	4		-0.9999995e9	1-b/a, where a/b=semi-major/minor axes in J/H/K_1/K_2/H2	?
j/h/k_1/k_2/h2PA	real	4	degrees	-0.9999995e9	ellipse fit celestial orientation in J/H/K_1/K_2/H2	posangle
j/h/k_1/k_2/h2ErrBits	int	4		-99999999	a count of the number of zero confidence pixels in the default (2 arcsec diameter) aperture	?
j/h/k_1/k_2/h2Deblend	int	4		-99999999	placeholder	?
j/h/k_1/k_2/h2Class	smallint	2		-9999	discrete image classification flag in J/H/K_1/K_2/H2	psfQF
j/h/k_1/k_2/h2ClassStat	real	4		-9999	N(0,1) stellarness-of-profile statistic in J/H/K_1/K_2/H2	?
					additional WFAU post-processing error bits in J/H/K_1/K_2/H2	

j/h/k_1/k_2/h2ppErrBits	int	4	0	see XppErrBits for description	photFlags
j/h/k_1/k_2/h2SeqNum	int	4	-99999999	the running number of the Y.J_1/J_2/H_K detection	detID
j/h/k_1/k_2/h2ObjID	int	4	-99999999	not included by the online documentation	?
j/h/k_1/k_2/h2Xi	int	4	-99999999	Offset of Y.J_1/J_2/H_K detection from master position (+east/-west)	?
j/h/k_1/k_2/h2Eta	int	4	-99999999	Offset of Y.J_1/J_2/H_K detection from master position (+north/-south)	?

125 CSV columns

(columns with strikethrough are not counted)

17 DVO columns per band

(columns with strikethrough are not counted)

UGPS caution

- Columns with strikethrough ~~j/h/k_1/k_2/h2HallMag~~, ~~j/h/k_1/k_2/h2HallMagErr~~, ~~j/h/k_1/k_2/h2PetroMag~~, ~~j/h/k_1/k_2/h2PetroMagErr~~, ~~j/h/k_1/k_2/h2PsfMag~~, ~~j/h/k_1/k_2/h2PsfMagErr~~, ~~j/h/k_1/k_2/h2SerMag2D~~, ~~j/h/k_1/k_2/h2SerMag2DErr~~ should have been included in the CSV file (as indicated by the online documentation) but not.
- Columns ~~y/j_1/j_2/h/kObjID~~ are included in the CSV file, but are not included by the online documentation.

2.5 XppErrBits Description

Byte	Bit	Detection quality issue	Threshold or bit mask	Applies to
0	4	Deblended	16 or 0x00000010	All VDFS catalogues
0	6	Bad pixel(s) in default aperture	64 or 0x00000040	All VDFS catalogues
1	15	Source in poor flat field region	32768 or 0x00008000	All but mosaics
2	16	Close to saturated	65536 or 0x00010000	All VDFS catalogues (though deeps excluded prior to DR8)
2	17	Photometric calibration probably subject to systematic error	131072 or 0x00020000	GPS only
2	19	Possible crosstalk artefact/contamination	524288 or 0x00080000	All but GPS
2	22	Lies within a dither offset of the stacked frame boundary	4194304 or 0x00400000	All but mosaics
4	30	failed quantitative QC, i.e. seeing, ellipticity, zero-point and depth	1073741824 or 0x40000000	used in UHS
4	31	failed eyeball QC eg trailed, poor flat fielding etc	2147483648 or 0x80000000	used in UHS

3. Mapping unWISE Data Columns to DVO Schema

The unWISE data (total 541GB) are accessible via

```
wget -I unwise/release/band-merged/ --reject "index.html*" -nH --recursive http://faun.rc.fas.harvard.edu/unwise/release/band-merged/
```

The catalog column descriptions could be found [here \(http://catalog.unwise.me/catalogs.html\)](http://catalog.unwise.me/catalogs.html) and [this paper \(https://arxiv.org/pdf/1901.03337.pdf\)](https://arxiv.org/pdf/1901.03337.pdf).

unWISE Column	Type	Length	Unit	Default Value	Description	DVO Field
unwise_objid	String	16			unique object ID	extID

ra12	float two-element (W1,W2)	8	degree	RA	?
dec12	float two-element (W1,W2)	8	degree	DEC	?
ra	float	8	degree	RA from W1 if available, otherwise from W2	R
dec	float	8	degree	DEC from W1 if available, otherwise from W2	D
coadd_id	string	8		unWISE/AllWISE coadd id of source	?
unwise_detid	string two-element (W1,W2)	36		detection ID, a unique ID in catalog	detID
x	float two-element (W1,W2)	8	pixel	X coordinate	Xccd
dx	float two-element (W1,W2)	4	pixel	uncertainty in X coordinate	dXccd
y	float two-element (W1,W2)	8	pixel	Y coordinate	Yccd
dy	float two-element (W1,W2)	4	pixel	uncertainty in Y coordinate	dYccd
fwhm	float two-element (W1,W2)	4	pixel	FWHM of PSF at source location	FWx/FWy
flux	float two-element (W1,W2)	4	nMgy	Vega flux	?
dflux	float two-element (W1,W2)	4	nMgy	formal Vega flux uncertainty	?
sky	float two-element (W1,W2)	4	nMgy	residual sky at source location	Sky

<code>fluxlbs</code>	float two-element (W1,W2)	4	nMgy	local-background-subtracted flux	?
<code>dfluxlbs</code>	float two-element (W1,W2)	4	nMgy	formal <code>fluxlbs</code> uncertainty	?
<code>qf</code>	float two-element (W1,W2)	4		PSF-weighted fraction of good pixels	?
<code>rchi2</code>	float two-element (W1,W2)	4		PSF-weighted average χ^2	<code>psfChisq</code>
<code>fracflux</code>	float two-element (W1,W2)	4		PSF-weighted fraction of flux from this source	<code>psfQF</code>
<code>spread_model</code>	float two-element (W1,W2)	4		SExtractor-like source size parameter	?
<code>dspread_model</code>	float two-element (W1,W2)	4		uncertainty in <code>spread_model</code>	?
<code>nm</code>	short	2		number of images in coadd at source	?
<code>primary12</code>	short two-element (W1,W2)	2		source located in primary region of coadd	?
<code>primary</code>	short	2		the <code>primary</code> value from W1 if available, otherwise from W2	?
<code>flags_unwise</code>	short two-element (W1,W2)	2		unWISE Coadd Flags flags at central pixel see <code>flags_unwise</code> for description	<code>photFlags</code>
<code>flags_info</code>	short two-element (W1,W2)	2		additional informational flags at central pixel see <code>flags_info</code> for description	<code>photFlags2</code>
<code>22.5 - 2.5 log10(flux)</code>	float two-element (W1,W2)			<i>manually computed as W1/W2 Vega magnitudes</i>	M

$2.5/\ln 10 * dflux/flux$

float
two-element
(W1,W2)

*manually computed as uncertainties in W1/W2 Vega
magnitudes*

dM

27 + 2 FITS columns

the 2 additional columns are
computed

16 DVO columns

flags_unwise Description

Bit	Description
0	In core or wings
1	In diffraction spike
2	In ghost
3	In first latent
4	In second latent
5	In circular halo
6	Saturated
7	In geometric diffraction spike

flags_info Description

Bit	Description
0	In PSF of bright star falling off coadd
1	In HyperLeda large galaxy
2	In "big object" (e.g., a Magellanic cloud)
3	Pixel may contain the centroid of a very bright star
4	crowdsources considers this pixel potentially affected by saturation
5	Pixel may contain nebulosity

- 6 Sources in this pixel will not be aggressively deblended
- 7 Candidate sources in this pixel must be "sharp" to be optimized

The End