

How to Construct a Burnham's List

The example we will use is the southern constellation of Pisces Austrinus.

Double and Multiple Stars

Here's the page from Burnham's with the entries for double and multiple stars:

PISCES AUSTRINUS						
LIST OF DOUBLE AND MULTIPLE STARS						
NAME	DIST	PA	YR	MAGS	NOTES	RA & DEC
6	6.8	59	27	6- 13	(B1009) Spect A0	21292s3410
B1013	0.2	101	39	8½- 9	PA dec, spect F8	21462s3552
h3059	25.2	253	30	7½- 10½	Relfix, spect B9	21479s2810
B1014	2.8	145	32	8 - 12	Spect A0	21537s3138
h5311	40.6	292	19	7 - 10	spect K0	21566s2918
	48.6	227	19	- 10½		
Sta 56	11.3	35	35	7½- 11	relfix, spect F0	21567s2752
η	1.6	116	55	5½- 6½	(β276) relfix, spect B8	21580s2842
B547	2.3	294	35	8 - 14	spect A2	22003s2718
B549	3.6	213	59	7 - 13	spect K0	22017s2608
Daw156	1.3	317	59	7½- 11	PA inc, spect G0	22076s3404
β769	0.9	352	52	7 - 8½	relfix, cpm pair, spect F2	22087s3443
B557	0.3	321	52	6 - 8	PA dec, spect F2	22191s3446
λ474	0.1		55	7 - 8	(h3118) spect K0;	22266s2855
	33.7	296	59	- 11	AB uncertain	
β	30.4	172	52	4½- 7½	(Δ240) nice cpm relfix pair, spect A0	22287s3236
B568	4.9	310	35	7½- 13	spect A3	22352s3344
h5356	86.6	160	51	6½- 7	(H VI 119) wide cpm	22370s2836
h5356b	3.2	67	59	7 - 8	pair, spect G0,F5; BC PA inc.	
Hd 301	0.2	91	54	7 - 7	Binary, 27 yrs; PA dec, spect F2	22472s3304
h5365	4.8	278	33	7½-12½	spect A3	22490s3608
	55.6	35	19	-11		
γ	4.3	262	57	4½- 8½	(h5367) PA slow dec, spect A0	22498s3308
δ	5.0	244	53	4½- 10	(Hwe 91) cpm pair, slight PA inc, spect gG8, G3	22532s3248
α	30.0	36	00	1 - 14	FOMALHAUT, Spect-A3	22549s2953
h5371	9.0	343	50	7½- 9	Optical (*) relfix, spect G0	22551s2622

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Most of these stars are to be found in the Washington Double Star Catalogue (WDS) or the Bright Star Catalogue. You will need these catalogues on hand. The first thing to tackle are the entries likely to appear in the WDS. These are pretty much all the entries that do not have either a Bayer classification (single Greek letter) or a Flamsteed number (an integer number). In this case we have one Flamsteed entry (6) and 5 Bayer entries (η, β, γ, δ, α). In order to use the WDS, the notation used by Burnham needs to be

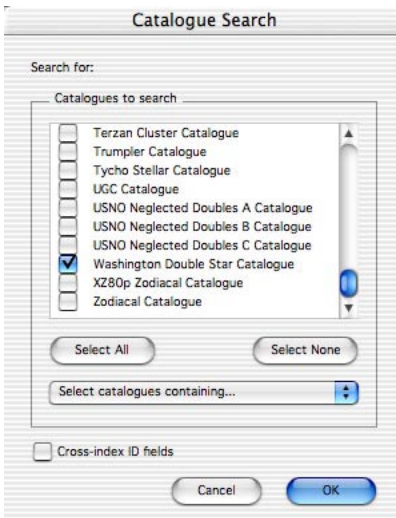
translated into that used in the WDS. The table below will help (latest version available on-line).

Observer	Burnham ID	WDS Name ID	Example
F.G.W.Struve	Σ	STF	Σ 265 $\equiv$ STF265
O.Struve	O Σ	STT	O Σ 1265 $\equiv$ STT1265
J.Herschel	h	HJ	h 45 $\equiv$ HJ45
J.Dunlop	Δ	DUN	Δ 93 $\equiv$ DUN93
S.W.Burnham	β	BU	β 99 $\equiv$ BU99
R.G.Aitken	A	A	A 88 $\equiv$ A88
Alvan Clark	AC	AC	AC 141 $\equiv$ AC141
R.A.Rossiter	Rst	RST	Rst 761 $\equiv$ RST761
F.Argelander	Arg	ARG	Arg 62 $\equiv$ ARG62
H.A.Howe	Hwe	HWE	Hwe 8 $\equiv$ HWE8
Cordoba Obsvt	Cor	COO	Cor258 $\equiv$ COO258
T.E.Espin	Es	ES	Es 7 $\equiv$ ES7
W.J.Hussey	Hu	HU	Hu 81 $\equiv$ HU81
R.T.Innes	I	I	I 66 $\equiv$ I66
T.J.J.See	λ	SEE	λ 113 $\equiv$ SEE113
C.Rumker	Rmk		
G.W.Hough	Ho	HO	Ho 72 $\equiv$ HO72
W.H.van den Bos	B	B	B 6 $\equiv$ B6
E.S.Holden	Hn, Hld	HN, HLD	Hn 83 $\equiv$ HN83, Hld 11 $\equiv$ HLD11
G.P.Kuiper	Kui	KUI	Kui 5 $\equiv$ KUI5
J.South	S	S	S 97 $\equiv$ S97
???	Sei	SEI	Sei 37 $\equiv$ SEI37
???	J	J	J 431 $\equiv$ J431
???	δ	DAW	δ 8 $\equiv$ DAW8
???	Gls	GLI	Gls 159 $\equiv$ GLI159
???	R	R	R 121 $\equiv$ R121
???	Slr	SLR	Slr 22 $\equiv$ SLR22
???	Φ	FIN	Φ 37 $\equiv$ FIN37
???	Hd	HDO	Hd 241 $\equiv$ HDO241
???	Cp	CPO	Cp 15 $\equiv$ CPO15
???	Mld	MLO	Mld1 $\equiv$ MLO1
???	NZ	NZO	NZ23 $\equiv$ NZO23
???	Hrg	HRG	Hrg 19 $\equiv$ HRG19

The first thing to do is create an empty plan document in AstroPlanner. You can also reuse an existing one by deleting all the entries. Select the Planning tab.

Click the **Lookup ID...** button. In the dialog, enter the double star IDs separated by commas and/or new lines. Note below that we used the table above to convert the entries where necessary. Click **Lookup**.

Select only the WDS catalogue entry for speed and to avoid finding spurious objects from elsewhere.



In the results window, you'll probably want to click the Add All button to add all the found entries.

Search Results

Search	ID	Name	Type	RA	Dec	Magnitude	Catalogue	Description
B1013	WDS21492-3...	B1013	Dbl	21h 49m	-35°38'	8.9	Washington	1st Obs: 1927(0.2",132deg),Last Obs: 1977(0.1",121d
HJ3059	WDS21508-2...	HJ3059	Dbl	21h 51m	-27°56'	7.5	Washington	ADS15365, 1st Obs: 1830(15.0",258deg),Last Obs: 19
B1014	WDS21567-3...	B1014	Dbl	21h 57m	-31°23'	7.9	Washington	1st Obs: 1928(2.7",144deg),Last Obs: 1960(2.4",143d
HJ5311	WDS21595-2...	HJ5311	Dbl	22h 00m	-29°03'	7.1	Washington	1st Obs: 1919(48.6",227deg),Last Obs: 1919(48.6",22
HJ5311	WDS21595-2...	HJ5311	Dbl	22h 00m	-29°03'	7.1	Washington	1st Obs: 1834(30.0",298deg),Last Obs: 1919(40.6",29
STN56	WDS21596-2...	STN56	Dbl	22h 00m	-27°38'	7.3	Washington	ADS15509, 1st Obs: 1878(12.1",38deg),Last Obs: 199
B547	WDS22031-2...	B547	Dbl	22h 03m	-27°03'	7.8	Washington	ADS15570, 1st Obs: 1925(2.4",295deg),Last Obs: 192
B549	WDS22045-2...	B549	Dbl	22h 05m	-25°53'	7.0	Washington	ADS15592, 1st Obs: 1926(3.4",208deg),Last Obs: 195
DAW156	WDS22105-3...	DAW156	Dbl	22h 11m	-33°50'	7.7	Washington	1st Obs: 1922(1.3",298deg),Last Obs: 1991(1.6",331d
BU769	WDS22116-3...	BU769	Dbl	22h 12m	-34°28'	7.1	Washington	1st Obs: 1879(0.6",349deg),Last Obs: 1991(0.8",358d
B557	WDS22220-3...	B557	Dbl	22h 22m	-34°31'	7.4	Washington	1st Obs: 1926(0.3",344deg),Last Obs: 1992(0.2",292d
SEE474	WDS22294-2...	SEE474	Dbl	22h 29m	-28°40'	7.9	Washington	ADS15978, 1st Obs: 1896(0.6",290deg),Last Obs: 1955(0.3",32
B568	WDS22380-3...	B568	Dbl	22h 38m	-33°28'	7.6	Washington	1st Obs: 1927(4.9",310deg),Last Obs: 1935(5.0",310d
HDO301	WDS22500-3...	HDO301	Dbl	22h 50m	-32°48'	6.3	Washington	1st Obs: 1897(0.4",90deg),Last Obs: 1996(0.3",149de
HJ5365	WDS22518-3...	HJ5365	Dbl	22h 52m	-35°53'	7.5	Washington	1st Obs: 1919(55.6",35deg),Last Obs: 1991(55.2",36d
HJ5365	WDS22518-3...	HJ5365	Dbl	22h 52m	-35°53'	7.5	Washington	1st Obs: 1835(2.5",272deg),Last Obs: 1991(4.9",276d
HJ5371	WDS22578-2...	HJ5371	Dbl	22h 58m	-26°07'	7.7	Washington	ADS16400, 1st Obs: 1834(5.0",346deg),Last Obs: 199

Search complete

Slew to Object Select Non-duplicates Add Selected Add All

☐ Keep window open 17 objects found

The entries then appear in the plan document.

New File [17 Objects]

Observing Field of View Sky Planning

ID	Name	Type	R.A.	Dec	Obs	Mag	Mag2	Separation	Size	Const	Catalogue	Spect
WDS21492-3538	B1013	Dbl	21h 49m 13s	-35°38'19"		8.9	9.0	0.1		PsA	Washington	F6/7V
WDS21508-2756	HJ3059	Dbl	21h 50m 46s	-27°55'57"		7.5	10.6	25.3		PsA	Washington	B8.5V
WDS21567-3123	B1014	Dbl	21h 56m 39s	-31°23'23"		7.9	12.2	2.4		PsA	Washington	A0
WDS21595-2903	HJ5311	Dbl	21h 59m 31s	-29°03'24"		7.1	10.9	48.6		PsA	Washington	
WDS21595-2903	HJ5311	Dbl	21h 59m 31s	-29°03'24"		7.1	10.6	40.6		PsA	Washington	G8/K0III
WDS21596-2738	STN56	Dbl	21h 59m 35s	-27°37'50"		7.3	10.5	11.4		PsA	Washington	F2V
WDS22031-2703	B547	Dbl	22h 03m 09s	-27°03'04"		7.8	14.2	2.1		PsA	Washington	ASVm
WDS22045-2553	B549	Dbl	22h 04m 30s	-25°53'00"		7.0	13.0	3.7		PsA	Washington	G8III
WDS22105-3350	DAW156	Dbl	22h 10m 32s	-33°49'39"		7.7	11.1	1.6		PsA	Washington	G3V
WDS22116-3428	BU769	Dbl	22h 11m 38s	-34°27'54"		7.1	8.2	0.8		PsA	Washington	
WDS22220-3431	B557	Dbl	22h 21m 58s	-34°31'13"		7.4	7.5	0.2		PsA	Washington	F3/5V
WDS22294-2840	SEE474	Dbl	22h 29m 26s	-28°39'34"		7.9	8.2	0.3		PsA	Washington	K2III
WDS22380-3328	B568	Dbl	22h 38m 02s	-33°28'13"		7.6	13.4	5.0		PsA	Washington	A3
WDS22500-3248	HDO301	Dbl	22h 49m 59s	-32°48'19"		6.3	6.5	0.3		PsA	Washington	F0V+F3V
WDS22518-3553	HJ5365	Dbl	22h 51m 46s	-35°53'19"		7.5	11.3	55.2		PsA	Washington	
WDS22518-3553	HJ5365	Dbl	22h 51m 46s	-35°53'19"		7.5	10.9	4.9		PsA	Washington	A3
WDS22578-2606	HJ5371	Dbl	22h 57m 48s	-26°06'30"		7.7	9.2	9.1		PsA	Washington	G3V

New Object Delete Object Add Special... Show catalogue... Select from catalogue... Delete...

ID: WDS22578-2606 Right Ascension: 22 h 57 m 48 s Type: Dbl Magnitude: 7.7 Notes: ADS16400, 1st Obs: 1834(5.0",346deg), Last Obs: 1994(9.1",343deg), #Obs:23, Dur:-2616395

Lookup ID... ☒ All Spectral: G3V Magnitude: 9.2

Name: HJ5371 Declination: -26 ° 06 ' 30 " Size: Separation: 9.1

Lookup Name... ☒ All Show Field of View

Click in the blank area underneath the last entry in order to deselect any selected entry. Click the Lookup ID... button again. This time we want to find the Bayer and Flamsteed entries. You can either enter them as "6 PsA, Delta PsA" etc. or use the shortcut shown below using the Suffix field (note the space before "PsA").

Lookup Items

Paste or type item/s, separated by new lines, tabs, and/or commas

6,eta,beta,gamma,delta,alpha

Prefix: Suffix: PsA

Prefix and suffix are added to beginning and end of each item above

Cancel Lookup

This time select only the Bright Star Catalogue for searching (to avoid lots of duplicates).

Search Results

Search	ID	Name	Type	RA	Dec	Magnitude	Catalogue	Description
6 PsA	HR8230	6 PsA	Dbl	21h 32m	-33°57'	6.0	Bright	SAO213078, HD204854, 6 PsA
eta PsA	HR8386	Eta PsA	Dbl	22h 01m	-28°27'	5.4	Bright	SAO190822, HD209014, Eta PsA, 12 PsA
beta PsA	HR8576	Bet PsA	Mult	22h 32m	-32°21'	4.3	Bright	SAO213883, HD213398, Bet PsA, 17 PsA
gamma PsA	HR8695	Gam PsA	Dbl	22h 53m	-32°53'	4.5	Bright	SAO214153, HD216336, Gam PsA, 22 PsA
delta PsA	HR8720	Del PsA	Dbl	22h 56m	-32°32'	4.2	Bright	SAO214189, HD216763, Del PsA, 23 PsA
alpha PsA	HR8728	Alp PsA	Star	22h 58m	-29°37'	1.2	Bright	SAO191524, HD216956, Alp PsA, 24 PsA

Search complete

Slew to Object Select Non-duplicates Add Selected Add All

☐ Keep window open 6 objects found

Using the **Add All** button adds these to the end of the list. Below shows the final list, reordered by dragging rows to reflect the order of the original Burnham list.

New File [23 Objects]

ID	Name	Type	R.A.	Dec	Obs	Mag	Mag2	Separation	Size	Const	Catalogue	Spect
HR8230	6 PsA	Dbl	21h 32m 15s	-33°56'41"		6.0	13.3	6.8		Psa	Bright	
WDS21492-3538	B1013	Dbl	21h 49m 13s	-35°38'19"		8.9	9.0	0.1		Psa	Washington	F6/7V
WDS21508-2756	HJ3059	Dbl	21h 50m 46s	-27°55'57"		7.5	10.6	25.3		Psa	Washington	B8.5V
WDS21567-3123	B1014	Dbl	21h 56m 39s	-31°23'23"		7.9	12.2	2.4		Psa	Washington	A0
WDS21595-2903	HJ5311	Dbl	21h 59m 31s	-29°03'24"		7.1	10.9	48.6		Psa	Washington	
WDS21595-2903	HJ5311	Dbl	21h 59m 31s	-29°03'24"		7.1	10.6	40.6		Psa	Washington	G8/K0III
WDS21596-2738	STN56	Dbl	21h 59m 35s	-27°37'50"		7.3	10.5	11.4		Psa	Washington	F2V
HR8386	Eta PsA	Dbl	22h 00m 50s	-28°27'13"		5.4	6.4	1.9		Psa	Bright	
WDS22031-2703	B547	Dbl	22h 03m 09s	-27°03'04"		7.8	14.2	2.1		Psa	Washington	A5Vm
WDS22045-2553	B549	Dbl	22h 04m 30s	-25°53'00"		7.0	13.0	3.7		Psa	Washington	G8III
WDS22105-3350	DAW156	Dbl	22h 10m 32s	-33°49'39"		7.7	11.1	1.6		Psa	Washington	G3V
WDS22116-3428	BU769	Dbl	22h 11m 38s	-34°27'54"		7.1	8.2	0.8		Psa	Washington	
WDS22220-3431	B557	Dbl	22h 21m 58s	-34°31'13"		7.4	7.5	0.2		Psa	Washington	F3/5V
WDS22294-2840	SEE474	Dbl	22h 29m 26s	-28°39'34"		7.9	8.2	0.3		Psa	Washington	K2III
HR8576	Beta PsA	Mult	22h 31m 30s	-32°20'46"		4.3	7.8	30.3		Psa	Bright	
WDS22380-3328	B568	Dbl	22h 38m 02s	-33°28'13"		7.6	13.4	5.0		Psa	Washington	A3
WDS22500-3248	HDO301	Dbl	22h 49m 59s	-32°48'19"		6.3	6.5	0.3		Psa	Washington	FOV+F3V
WDS22518-3553	HJ5365	Dbl	22h 51m 46s	-35°53'19"		7.5	11.3	55.2		Psa	Washington	
WDS22518-3553	HJ5365	Dbl	22h 51m 46s	-35°53'19"		7.5	10.9	4.9		Psa	Washington	A3
HR8695	Gamma PsA	Dbl	22h 52m 32s	-32°52'32"		4.5	8.1	4.2		Psa	Bright	
HR8720	Delta PsA	Dbl	22h 55m 57s	-32°32'23"		4.2	9.2	5.2		Psa	Bright	
HR8728	Alpha PsA	Star	22h 57m 39s	-29°37'20"		1.2				Psa	Bright	
WDS22578-2606	HJ5371	Dbl	22h 57m 48s	-26°06'30"		7.7	9.2	9.1		Psa	Washington	G3V

New Object Delete Object Add Special... Show catalogue... Select from catalogue... Delete...

ID: Right Ascension: Type: Magnitude: Notes:

h m s

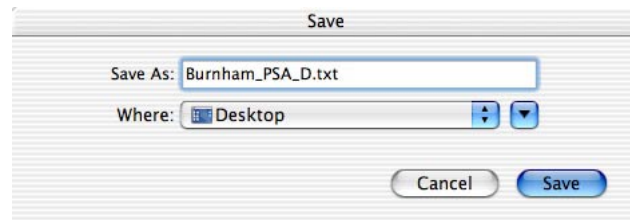
Lookup ID... ☒ All Spectral: Magnitude:

Name: Declination: Size: Separation:

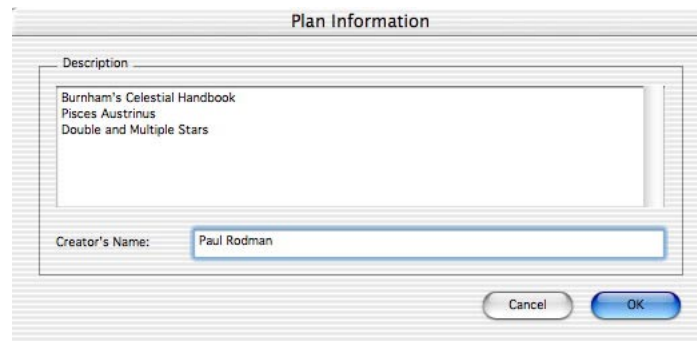
Lookup Name... ☒ All Show Field of View

Then use the Save As text... command in the File menu and save the file with the special "Burnham_xxx_y.txt" file name, where xxx is the constellation abbreviation and y is "D"

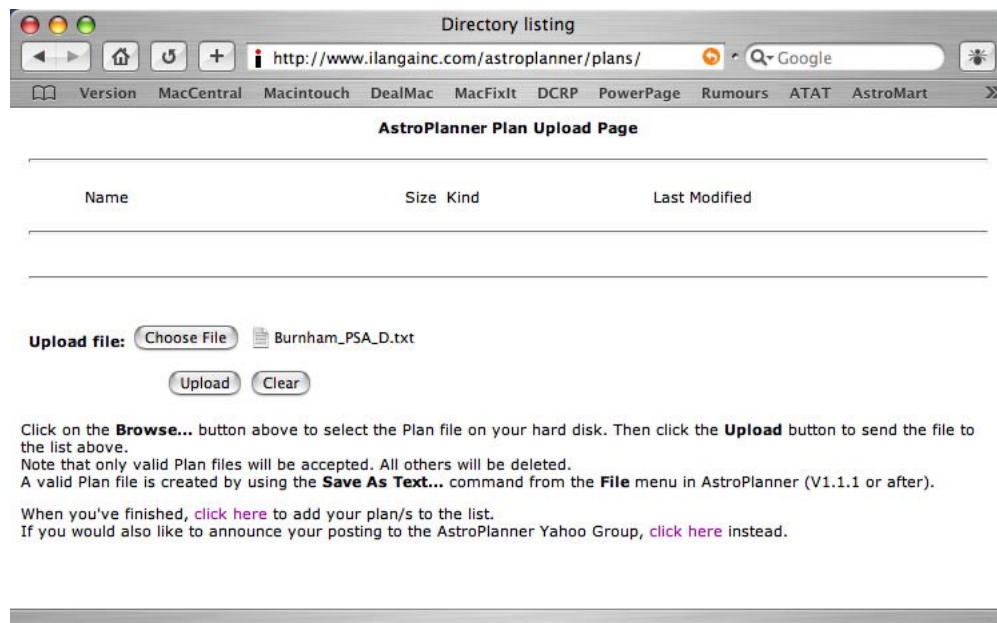
for double/multiple stars, “V” for variable stars and “C” for Clusters, etc. In this case, the name must be “Burnham_PsA_D.txt”. Case is not important, spelling is.



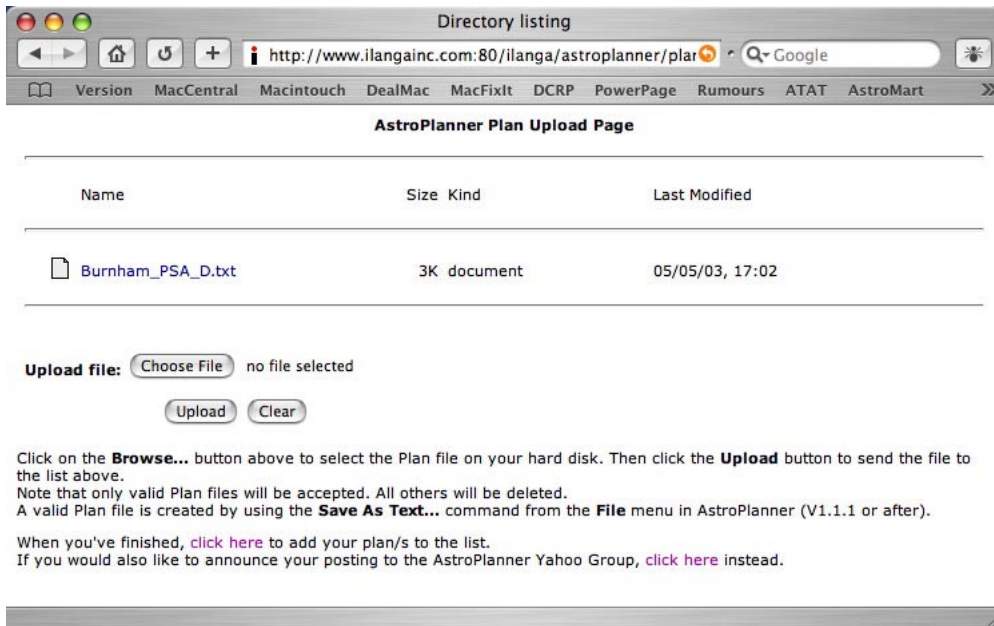
In the plan information dialog, add some descriptive text and your name.



Now the text file is saved, go to the plan upload page in your browser. Click the **Choose File** button and select the file you just created.



Click the **Upload** button to upload the file to the “staging area”.

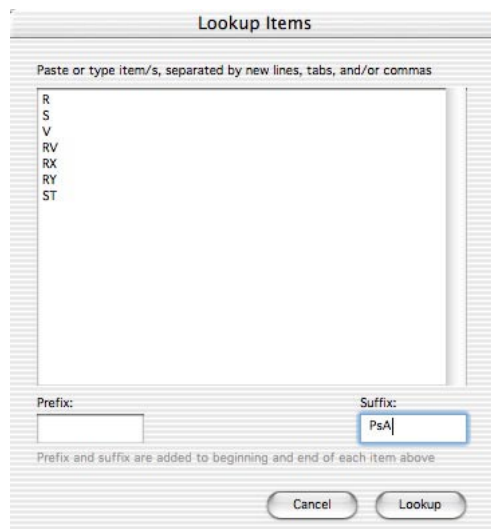


Repeat this for any other files you may have created, and then click the “when you’ve finished, click here” link. Voila. You’re done.

Variable Stars

Variable stars are typically in the GCVS Catalogue, unless they have a Bayer or Flamsteed designation in which case use the Bright Star Catalogue.

The Variable Star list for Pisces Austrinus is shown on the next page. Use the same techniques as above to find them. Here’s the Lookup dialog for the stars:



PISCES AUSTRINUS

LIST OF VARIABLE STARS

NAME	MagVar	PER	NOTES	RA & DEC
π	4.7--5.0	7.975	Cepheid, spect F0	23007s3501
R	8.5--12..	293	LPV. Spect M3e	22152s2951
S	8.3--13..	272	LPV. Spect M3e--M5e	22009s2818
V	8.0--9..	148	Semi-reg; spect M5	22526s2953
RV	9.0--12..	361	LPV.	21358s2726
RX	9.0--10..	366	Semi-reg	22103s2731
RY	8.8--13..	223	LPV.	21445s3626
ST	8.5--12..		LPV.	22515s3440

LIST OF STAR CLUSTERS, NEBULAE AND GALAXIES

NGC	OTH	TYPE	SUMMARY DESCRIPTION	RA & DEC
----	I.5135	ϕ	S0?/Pec; 13.1; 0.9' x 0.8'	21453s3511
7135		ϕ	F,pL,R	
		ϕ	S0; 13.0; 0.9' x 0.7'	21468s3507
7154		ϕ	pB,pL,lE, vgbM	
		ϕ	I; 13.5; 0.8' x 0.5'	21524s3503
7172		ϕ	B,pL,lE, glbm; central bar	
		ϕ	Sa; 12.9; 1.6' x 0.6'	21591s3207
			pB,pL,lE,gbM; nearly edge-on with dark equatorial band; Compact trio of E galaxies 7173, 7174, 7176 lies 7' to south.	
----	I.5156	ϕ	SB; 13.2; 1.0' x 0.5'	22004s3402
			pF,pS,mE	
7314		ϕ	Sb/Sc; 11.9; 3.5' x 1.5'	22330s2618
			cF,L,mE,vlbM, elong N-S	
7361		ϕ	Sb; 12.8; 3.0' x 1.0'	22395s3019
			F,pL,mE,vglbm. Nearly edge-on spiral, elong N-S	
----	I.5269	ϕ	S0; 13.1; 1.3' x 0.5'	22550s3618
			vF,pS,mE, spindle-shape	
----	I.5271	ϕ	S0?; 12.6; 2.0' x 0.8'	22553s3401
			pF,pS,mE,cbM	

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The resulting list, including π PsA from the Bright Star Catalogue is shown here:

New File [8 Objects]

Observing Field of View Sky **Planning**

ID	Name	Type	R.A.	Dec	Obs	Mag	Mag2	Separation	Size	Const	Catalogue	Spect
HR8767	Pi PsA	Star	23h 03m 30s	-34°44'58"		5.1				PsA	Bright	
	R PsA	Var Star	22h 18m 00s	-29°36'15"		8.3	14.7			PsA	GCVS	M3(l)e-M5(l)e
	S PsA	Var Star	22h 03m 46s	-28°03'09"		8.0	14.5			PsA	GCVS	M3e-M5(l)e
	V PsA	Var Star	22h 55m 20s	-29°36'42"		9.3	10.5			PsA	GCVS	MB
	RV PsA	Var Star	21h 38m 41s	-27°12'08"		10.5	13.0			PsA	GCVS	
	RX PsA	Var Star	22h 13m 10s	-27°16'14"		10.5	11.5			PsA	GCVS	Me
	RY PsA	Var Star	21h 47m 31s	-36°11'46"		8.8	14.0			PsA	GCVS	Me
	ST PsA	Var Star	22h 54m 19s	-34°23'31"		9.5	13.0			PsA	GCVS	Me

New Object Delete Object Add Special... Show catalogue... Select from catalogue... Delete...

ID: Right Ascension: Type: Magnitude: Notes:

Lookup ID... ☒ All Spectral: Magnitude:

Name: Declination: Size: Separation:

Lookup Name... ☒ All Show Field of View

This would be saved and uploaded as “Burnham_PsA_V.txt”.

Star Clusters, Nebulae and Galaxies

These are quite straightforward. In most cases the NGC number is given in the NGC column. Note the Prefix shortcut below.

Lookup Items

Paste or type item/s, separated by new lines, tabs, and/or commas

7135
7154
7172
7314
7361

Prefix: NGC Suffix:

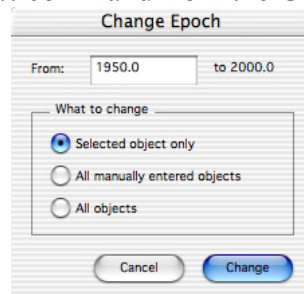
Prefix and suffix are added to beginning and end of each item above

Cancel Lookup

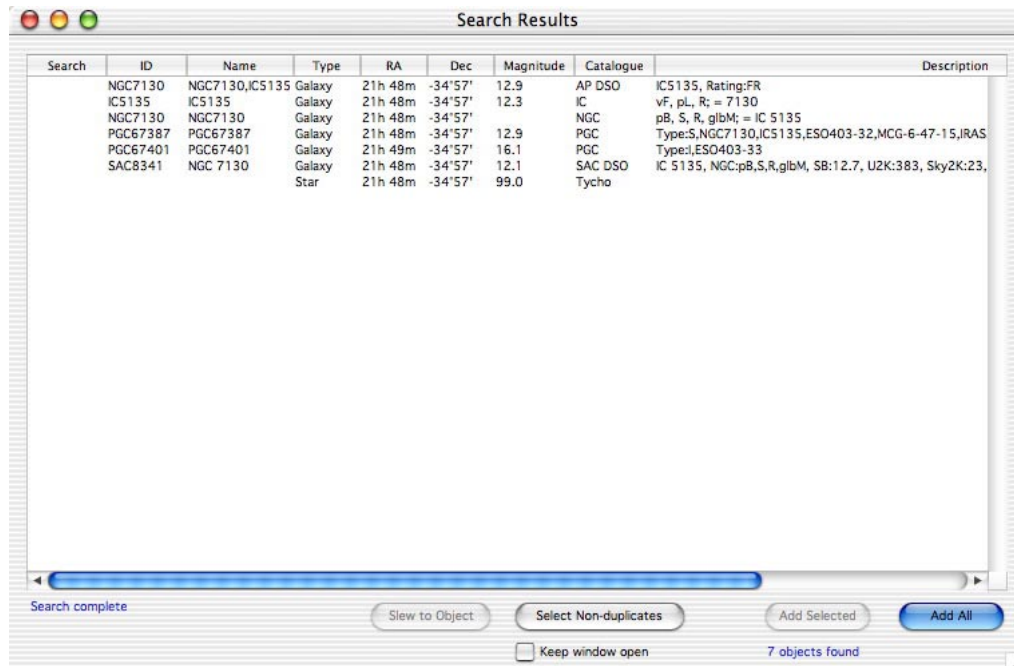
Select the NGC catalogue only to avoid multiple duplicates.

The IDs in the OTH column (Other) can be challenging. Usually they are from the IC Catalogue (Burnham uses “I.nnnn”) or the Harvard Catalogue (H). However, let’s try another method of finding an object with an unknown ID. The first entry for Pisces Austrinus is I.5135. Lets pretend we don’t recognize that it’s IC5135. Here’s the procedure for tracking it down:

1. Create a new object using the **New Object** button.
2. Enter the RA and Dec as given by Burnham. Burnham uses the format “hhmmmHDDMM”, where hh is hours of RA, mmm is minutes of RA times 10 (e.g. 345 is 34.5 minutes), H is “n” for Northern hemisphere and “s” for Southern, DD is degrees of Dec and MM is minutes of Dec. In the above case Burnham has 21453s3511, which is 21h45.3m RA and $-35^{\circ}11'$ Dec.
3. Since Burnham uses Epoch 1950 coords, we need to convert them to Epoch 2000. Use the **Change Epoch...** command from the **Object** menu.



4. To find the object in the catalogues, use the **Lookup Synonyms...** command from the **Object** menu. This finds all objects close to the given coordinates.



5. Choose the applicable object and add it to the list.