Table of Proposed Catalog Parameters

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APM/SuperCOSMOS/INT WFC/CIRSI analysis produces 32 4-byte parameters per detected object. This has been enhanced to include extra parameters for flux estimation and error estimates. The following is the agreed list for the WFCAM standard and further processing pipelines:

No.	Name	Description
1	Seq. no.	running number for ease of reference, in strict order of image detections
2	Isophotal flux	standard definition of summed flux within detection isophote, apart from detection filter is used to define pixel connectivity and hence which pixels to include. This helps to reduce edge effects for all isophotally derived parameters.
3	X coord	intensity–weighted isophotal centre–of–gravity in X
4	Error in X	estimate of centroid error
5	Y coord	intensity–weighted isophotal centre–of–gravity in Y
6	Error in Y	estimate of centroid error
7	Gaussian sigma	these are derived from the three general intensity–weighted second moments.
8	Ellipticity	the equivalence between them and a generalised elliptical Gaussian distribution
9	Position angle	is used to derive Gaussian sigma $= (\sigma_a^2 + \sigma_b^2)^{1/2}$ Ellipticity $= 1.0 - \sigma_a/\sigma_b$ position angle = angle of ellipse major axis wrt x axis
10	Areal profile 1	number of pixels above a series of threshold levels relative to local sky.
11	Areal profile 2	levels are set at T, 2T, 4T, 8T . . . 128T where T is the threshold. These
12	Areal profile 3	can be thought of as a sort of poor man's radial profile. Note that for now
13	Areal profile 4	deblended, *i.e.* overlapping images, only the first areal profile is computed
14	Areal profile 5	and the rest are set to –1 flagging the difficulty of computing accurate
15	Areal profile 6	profiles.
16	Areal profile 7	
17	Areal profile 8	
18	Peak height	in counts relative to local value of sky - also zeroth order aperture flux
19	Error in pkht	
20	Aperture flux 1	To be used if a single number is required to represent the flux for ALL objects. Basically aperture integration with radius rcore (in the FITS header) but modified to simultaneously fit 'cores' in case of overlapping images. Best selected using ≈<FWHM> for site+instrument. Combined with later-derived aperture corrections for general photometry.
21	Error in flux	
22	Aperture flux 2	a series of different radii core/aperture measures similar to parameter 20
23	Error in flux	
24	Aperture flux 3	together with parameter 18 these give a simple curve–of–growth analysis from

25	Error in flux	
26	Aperture flux 4	peak pixel, $1/2\times$ rcore, $1/\sqrt{2}\times$ rcore, rcore, $\sqrt{2}\times$ rcore, $2\times$ rcore,
27	Error in flux	$2\sqrt{2}\times$ rcore, $4\times$ rcore, $4\sqrt{2}\times$ rcore, $8\times$ rcore, $8\sqrt{2}\times$ rcore,
28	Aperture flux 5	$16\times$ rcore, $16\sqrt{2}\times$ rcore, $32\times$ rcore
29	Error in flux	
30	Aperture flux 6	$4\times$ basic core, ensures $\sim 99\%$ of PSF flux
31	Error in flux	
32	Aperture flux 7	extras for generalised galaxy photometry further spaced
33	Error in flux	
34	Aperture flux 8	by $\sqrt{2}$ in radius to ensure correct sampling out to
35	Error in flux	
36	Aperture flux 9	reasonable range of aperture sizes
37	Error in flux	
38	Aperture flux 10	note these are all corrected for pixels from overlapping neighbouring images
39	Error in flux	
40	Aperture flux 11	
41	Error in flux	
42	Aperture flux 12	
43	Error in flux	
44	Aperture flux 13	biggest would be $32\times$ rcore ie. $\approx$30 arcsec diameter
45	Error in flux	
46	Petrosian radius	r_p as defined in Yasuda et al. 2001 AJ 112 1104
47	Kron radius	r_k as defined in Bertin and Arnouts A&A Supp 117 393
48	FWHM radius	r_{fhwm} average image radius at half PeakHeight
49	Petrosian flux	flux within circular aperture to $k \times r_p$
50	Error in flux	
51	Kron flux	flux within circular aperture to $k \times r_k$
52	Error in flux	
53	FWHM flux	flux within circular aperture to $k \times r_{fwhm}$ – simple alternative
54	Error in flux	
55	Error bit flag	bit pattern listing various processing error flags
56	Sky level	local interpolated sky level from background tracker
57	Sky rms	local estimate of variation in sky level around image
58	Child/parent	flag for parent or part of deblended deconstruct

The following are accreted directly after standard catalog generation

59	RA	RA and Dec explicitly put in columns for overlay programs that cannot, in
60	Dec	general, understand astrometric solution coefficients. Derived exactly from

WCS in header and XY in parameters 5 & 6

61	Classification	Flag indicating probable classification: eg. –1 stellar, +1 non–stellar, 0 noise
62	Statistic	An equivalent N(0,1) measure of how stellar–like an image is, used in deriving parameter 61 in a 'necessary but not sufficient' sense

From the further processing pipeline after deriving a suitable PSF

63	PSF flux	fitted flux from PSF
64	Error in flux	
65	X coord	updated PSF-fitted X centroid
66	Error in coord	
67	Y coord	updated PSF-fitted Y centroid
68	Error in coord	
69	PSF fit χ^2	standard normalised variance of fit
70	ν_{PSF}	no. of degrees of freedom for PSF fit
71	1D Sersic flux	fitted flux for Sersic profile
72	Scale length	scale factor of fit
73	Power index	power law index of fit
74	Error in fit	standard normalised variance of fit
75	ν_{S1}	no. of degrees of freedom for 1D Sersic fit
76	2D Sersic flux	fitted flux for PSF-deconvolved 2D Sersic fit
77	Scale length	scale factor of fit
78	Power index	power law index of fit
79	Error in fit	standard normalised variance of fit
80	ν_{S2}	no. of degrees of freedom for 1D Sersic fit

[For numerical stability the Sersic fits will use the previously derived x-y coordinates]