MAMA astrometry and photometry of 1221 UV-excess objects in 40 square degrees at the North Galactic Pole

Jacques Berger, J. P. Cordoni, A. M. Fringant, Jean Guibert, Olivier Moreau, Henri Reboul, C. Vanderriest

ASTRONOMY & ASTROPHYSICS
SUPPLEMENT SERIES

Astron. Astrophys. Suppl. Ser. **87**, 389-418 (1991)

MAMA astrometry and photometry of 1221 UV-excess objects in 40 square degrees at the North Galactic Pole*

J. Berger[1], J.P. Cordoni[2], A.M. Fringant[1], J. Guibert[3], O. Moreau[3], H. Reboul[2] and C. Vanderriest[4]

[1] Observatoire de Paris, DASGAL (et URA 335 du C.N.R.S.), 61, Avenue de l'Observatoire F-75014 Paris, France
[2] Laboratoire d'Astronomie de l'Université de Montpellier II (et URA 1368 du C.N.R.S.), F-34095 Montpellier Cedex 5, France
[3] Observatoire de Paris, DEMIRM (et URA 336 du C.N.R.S.) et C.A.I., 61, Avenue de l'Observatoire F-75014 Paris, France
[4] Observatoire de Meudon, DAEC (et URA 176 du C.N.R.S.), place Jules Janssen F-92195 Meudon, France

Received May 29; accepted August 31, 1990

Abstract. — We present method and results of a MAMA photometric and astrometric reduction of 1221 known faint UV-excess objects lying in the whole Palomar-Sky-Survey field PS + 30° 13^h00^m. This field is located at the North Galactic Pole (NGP) and covers a 40 square degrees $\left(40^{\square}\right)$ zone, almost centred on SA 57.

The data are summarized in a catalogue with astrometric absolute accuracy better than 1 arcsec and a photometric one of 0.1 mag on a dynamical range of 10 mag in U, B and V.

Key words: UV-excess objects — Schmidt plate analysis — Photographic photometry — Photographic astrometry — MAMA.

1. Introduction.

For the search for extragalactic or halo objects, the North Galactic Pole region surrounding SA 57 has been widely investigated, especially for the detection of UV-excess objects (see below the list of surveys). However, the astrometric and photometric accuracy of the published data is essentially sparse.

MAMA (*Machine Automatique à Mesurer pour l'Astronomie*) is a high speed multichannel microdensitometer developed by I.N.S.U. for C.A.I. (*Centre d'Analyse des Images*) which is located at Observatoire de Paris (Acker *et al.*, 1991). MAMA appeared as the adequate instrument for an accurate and homogeneous revisiting of the compilation of existing surveys. For that purpose, we analysed 4 plates taken by one of us (J.B.) with the 48" Schmidt telescope of the Palomar Observatory in the frame of a general program of systematic survey for faint UV-excess objects which led to the PB catalogue (Berger and Fringant, 1977, 1980, 1984).

We present here the method of analysis of such plates, as well as the results of its application to the Palomar-Sky-Survey field PS + 30° 13^h00^m, which is almost centred on SA 57.

In this region, the compilation of existing surveys provided a total number of UV-excess objects (1235) that is still compatible with a visual recognition (necessited by the inaccuracy of published positions) and this operation was an excellent test for the implementation of an automatic procedure (P.A.P.A.: *Porgramme Automatique de Photométrie et d'Astrométrie*) of total and automatic reduction (cataloguing) of Schmidt fields for multi-colour surveys, which is close to be operational. Furthermore, the availability of results of Steppe (1978) and Usher (1981), who pass for getting the finest accuracy in photometry and astrometry in the deepest surveys, gave us a simple way to confirm the reliability of our reduction.

2. The observational material.

The observational material consists of 4 plates (1 U, 1 B and 2 V).

The present field (centre: α_{1950} = 13 h 04 min 33 s, $\delta_{1950} = +29° 29' 25''$) belongs to a set of 8 ones observed by J.B. with the 48" Palomar Schmidt telescope in 1962. The $14'' \times 14''$ (35 cm×35 cm) plates were centred on PSS fields and cover 300 square degrees around the North Galactic Pole in 3 (U, B, V) or 4 (U, B, V, R) colours.

Send offprint requests to: H. Reboul.

* Based on photographic plates obtained with the Palomar 48'' Schmidt telescope and digitizations made with the MAMA measuring machine of C.A.I. (I.N.S.U., Paris).

These 32 plates were the first ones taken in the frame of the general program mentioned above which was completed using the Haro's method — 3 slightly shifted exposures with different filters on the same plate — (Haro and Luyten, 1962), less expensive in plates and avoiding the use of a blink comparator. 35 fields were observed in this manner and led to the PB catalogue. Therefore the 32 plates of the 8 first fields remained unexplored and returned to the California Institute of Technology until MAMA allowed an automatic reduction.

These plates were kindly sent to Paris in 1988. Table 1 summarizes observational characteristics of the 4 original plates presently studied. B plate was sent to us with a little missing broken corner $\left(\sim 5\ \mathrm{cm}^2\right)$ that caused the miss, in this colour, of 7 listed objects.

3. Compilation of surveys.

We collected all the surveys of faint UV-excess objects in the field PS $+30°\ 13^h 00^m$ which provided both coordinates and finding charts. We give hereafter the list of these surveys in their chronological order of publication:

- HZ Humason and Zwicky (1947)
- TN Iriarte and Chavira (1957)
- F Feige (1958)
- A2- Barbieri and Rosino (1972)
- W Weistrop (1973)
- PB Berger and Fringant (1977) – finding charts were available but not published –
- ST Steppe (1978)
- KUV Noguchi *et al.* (1980)
- US Usher (1981)
- KUV Kondo *et al.* (1984)
- PG Green *et al.* (1986)

Compilation yielded 1235 objects more or less rich in UV; A2-129, not far from the southwestern corner of the plate, has been forgotten and does not figure in these 1235 objects. It is to note that the redundancy of the quoted overlapping surveys is quite strong for the UV-richest objects.

Moreover, we propose some identifications of these collected objects with:

1) those of other UV-excess surveys that provide neither finding charts nor accurate coordinates:
   - LB Luyten (1952, 1966), Luyten *et al.* (1968)
   - L Luyten (1970)
   - LP Luyten (1977)
   - ZL Zwicky and Luyten (1967)
2) the brightest objects from the very deep survey:
   - KKC Koo *et al.* (1986)
3) those from bright stars catalogues:
   - H4- Haro (1951)
   - SSII Slettebak and Stock (1959)
   - SBS Slettebak *et al.* (1961)
4) quasars or active galactic nuclei from Véron-Cetty and Véron catalogue (1989) which figure with their names from this catalogue:
   - EXO, 5C4-, B, BG, WEE, B2-, WAS, CSO
   - HTV for the objects of reference 435 which have no name.
5) Markarian galaxies:
   - Mark Markarian (1967)
6) photometrically measured but non-catalogued objects from the two above-mentioned surveys:
   - A2 (without number) indicates some TN objects primarily non-catalogued by Barbieri and Rosino but that have been measured and added to their catalogue in a second table.
   - ST (without number) : we thus signalize the 31 very UV-rich PB objects which have been missed by Steppe (1978) but that were photometrically measured later (Steppe *et al.*, 1979).
7) a few objects from RGU Basle catalogue around SA 57, that figure with the prefix:
   - 57- Becker and Fenkart (1976)
8) 1 Coma object:
   - BR Börngen and Richter (1978)

4. Acquisition procedure.

4.1. Preparation.

The accuracy of previously published coordinates of the 1235 UV-excess objects was proving too poor in some cases and photometric standards (those used for calibration and those we added for photometric tests) had finding charts but no coordinates. Visual recognition on the plates was then a necessity for 143 objects including all the photometric standards. α and δ thus were visually measured using a comparator in order to supply accurate enough positions to give adequate instructions to the MAMA table. On the whole, we obtained a file of 1639 objects by compilation of UV-excess objects and photometric or astrometric standards, with previously known or newly measured coordinates.

MAMA was used in its *pavé*-mode of digitization. We chose 128×128 pixels *pavés* and a sampling pixel size of 10 μm (corresponding to *pavés* of 86 arcsec $\times$ 86 arcsec on the sky and a sampling pixel of 0.67 arcsec). The size of the *pavés* was in fact chosen as a compromise between a minimum imposed to get both the aimed object (in spite of inaccurate position) and a good determination of the local sky background, and a maximum convenient for the handiness of stored data.

The acquisition was divided into two runs. The first one was piloted by the original catalogued positions (plus the comparator ones for the 143 above-mentioned objects). The *pavés* of each plate were reorganized into 8×206 *pavés* mosaics (i.e. 1024×26368 pixels pictures) well suited to a visualization with an image processor by sets of $8\times8=64$ *pavés* on the screen.

Objects were pointed on the image processor monitor (save for some 11 objects with erroneous coordinates that we measured on the comparator) and the set of new correct coordinates was used to command the second acquisition run. However, 2 objects given with incorrect coordinates in their survey (ST 46 and ST 365) were missed (see Sect. 5).

This second acquisition run was automatically reduced by a classical thresholding method described thereafter.

4.2. Scanning sequence.

The transformation of α, δ coordinates into x, y table positioning and scanning orders was obtained by an adjusting program using acquisition, visualization and pointing of some bright stars.

The calibration of the MAMA detector itself is described elsewhere (Acker *et al.*, 1991).

The original Palomar plates presented an extremely warped relief (270 μm peak-to-peak with slopes reaching 20 $\mu\text{m} \cdot \text{cm}^{-1}$ for the PS 6557 plate). We chose then to command the automatic focusing MAMA program for each of the 1639 objects. The automatic pre-focusing task available at the epoch of the digitization required then a 4-hour run for each plate.

The scanning itself of the 1639 *pavés* was only 2.5 hours long.

Note: A thin margin of the plate was obscured by a mylar frame placed between the plate and the MAMA table-glass. This simple anti-Newton device obscured some border objects (free-field was limited to 34 cm x 34 cm).

5. Missing objects.

– A2-129 did not belong to the list of the 1235 compiled objects (see Sect. 3).

– Ten of the 1235 aimed objects were lost because of the mylar frame. These missing objects are: PB 3072, US 250, US 371 (identified as B2-1308+32), US 427, US 461, US 610, US 612, US 614, US 617 and US 618 (identified as HTV 1318+270).

– ST 46 and ST 365 have been missed because Steppe's coordinates were incorrect: the error was greater than the half-size of the *pavé*, then the digitized field did not permit us to remark the wrong positioning. These objects were then not digitized; at Steppe's coordinates, we found two red objects !

– US 346, too faint and close to a rather bright star, could not be measured (see Sect. 6.3).

– US 253, too faint, could not be measured: it was not detected on any plate.

Only 1221 objects remained then in the catalogue. Please note that ST 46, ST 365 and A2-129 will be found with correct astrometry and photometry using P.A.P.A. procedure.

6. Object detection.

The automatic detection of objects in the *pavés* was performed by thresholding the images at a fixed level above the sky background.

Preliminary studies showed that smoothing the images altered the photometric accuracy mainly by embodying tiny flaws of the emulsion in the thresholded contour. All the reduction was then operated on unsmoothed images and this led to the choice of low threshold values in order to detect the fainstest objects.

6.1. Sky background determination.

One value for the local sky beackground was computed in each 128 x 128 *pavé* using the density histogram of its pixels.

The determination of the sky background density range on histograms was made, for each plate, using the histogram of a wide $\left(10^6 \text{ pixels}\right)$ image in order to increase the S/N ratio. The maximum is then very clean and we defined the range of the sky as two times the width of the left wing of the peak that is less contaminated by pixels of the stars than is the right one (see Fig. 1).

Inside this sky-range, the sky background was estimated as an approximation of the maximum of a function obtained by convolution of a Gaussian law by a Laplacian one and which models this part of the histogram (Bijaoui, 1980). The sky background estimate was assigned – without any interpolation – to the whole *pavé* for the following reduction. A standard deviation (σ) was also estimated for each *pavé*.

That maximum (128 x 128) mesh-size used for the estimation of the sky background is intended to minimize the effects of possible close bright stars on the local histograms: we assumed that, in most cases, the background contamination from a bright star could not overflow onto the major portion of a *pavé* area without embodying the centred object in the further detection.

In order to examine the variation in sky background values on the plates, we arbitrarily split each one into 16 connected regions in which a mean value of the sky background of the *pavés* was computed. Table 2 shows the results plus the mean sky background value for the available plates. Sky background values are given in MAMA photographic density which is not a diffuse density; north is to the top and east to the left. The sky background is proving little varying on the plates; maximum deviation from the mean value is observed on the B plate: 9% .

6.2. Thresholding.

The threshold value was set to 2.3 times σ_{SB} above the sky background of each *pavé*, σ_{SB} being the fixed standard deviation of the sky background, defined for each plate as the mean of the σ of all the 1639 scanned *pavés*. This adopted value for the threshold was determined in preliminary studies as a compromise between misses of aimed objects present above the limiting magnitude of each plate and detection of false (due to noise) or very faint non-aimed objects.

This part of the procedure supplied a file of objects detected (with ≥ 9 connected pixels above threshold) inside the 1639 *pavés*. File entries are x, y machine coordinates of the objects, area (number of pixels inside the thresholded contour), density flux (sum of the density values of the thresholded pixels) and morphological parameters.

Program objects were selected (mainly by an automatic process) and separated into subsets of photometric standards, astrometric standards and aimed UV-excess objects.

6.3. Close pairs.

Some close associations were not directly resolved by the deep thresholding that we made. For these few objects, we performed then several runs of our process with increasing values of the threshold (up to $7\sigma_{SB}$) to recover nearly all of them. These objects figure with a note in the catalogue. Very few objects were not recovered in every colour and only one object, US 346, because too faint, could not be separated on any plate from a close and rather bright star.

7. Photometric reduction.

We initially intended to reach a photometric accuracy of 0.1 mag with a dynamical range of 10 magnitudes in U, B and V.

The photometric calibration was performed on photographic density since the plates presented no calibration steps and the available photometric standards in SA 57 are numerous and well distributed in magnitude. Consequently, systematic effects due to the non-linearity of photographic emulsion response combined with variations of the sky background may appear. We tried to quantify these effects in section 7.3.

7.1. Photometric standards.

We selected 2 purely photoelectric sequences:

– Purgathofer (1969)

– Baum (1960), fainter than Purgathofer's sequence

We eliminated from these sequences:

1) the reddest objects because UV-excess objects have a quite different spectral energy distribution
2) the brightest objects of Purgathofer's sequence that are saturated and out of the magnitude range of the 1235 studied objects.

Originally, the set of photometric standards included 41 stars (only 38 in U) whose magnitude range were 10.02 – 19.30 in U, 10.09–20.86 in B and 9.62–20.25 in V. However, on U, B and V-10 min plates, some of these standards – too faint – were not detected and finally the number of available standards was slightly lower (37 for U plate, 39 for B and V-10 min plates). Photometric standards are displayed in Table 3, where P stands for Purgathofer stars, B and F for Baum ones.

7.2. Photometric calibration.

Polynomial fits of the relation between used standard magnitudes and the decimal logarithms of MAMA density fluxes are shown in Figure 2. For the choice of the degree of the fitting polynomial, we took account of a visual estimate of the limiting magnitude (0.1 mag consistency was required), for every plate except V-10 min one. This second V plate is not so deep and this led to the loss of 2 standards; the photometric calibration was then impossible for faint magnitudes ($V > 18.86$) and the plate limit could not be described by the polynomial.

Polynomial degrees were 5 for V-15 min and B plates, 4 for V-10 min plate and 3 for U plate. Residuals on standards are displayed in Table 4, they lie between 0.05 and 0.09 mag.

We restricted the range of validity of the fitted relation: the lowest admitted magnitude is that of the brightest used standard and the highest one is that of the plate limit. Nevertheless, we consider as tentative the magnitudes approaching by less than one unit the plate limit.

For V-10 min plate, the lower limit of the range was not the plate limit but the magnitude 18.86.

The magnitude ranges of our photometric calibrations are shown in Table 4. Since V-10 min plate is not deep enough, V magnitudes of objects were measured on V-15 min plate. Magnitudes from V-10 min plate were only used in order to prepare an automatic selection of diffuse objects (see Sect. 9).

7.3. Magnitude testing.

The intrinsic variations in the sensitivity of the 1024 elements of the MAMA detector are lower than 2% (Acker *et al.*, 1991) and then faint with regard to the initial target accuracy (0.1 mag).

Our photoelectric standards were concentrated at the centre of the plate. We tested the transportability of our photometric calibration on two available sequences (unhappily photographic ones): a sequence from Basle at the centre of the plate but much wider than the calibrating one (Fenkart, 1985) and another sequence in Coma lying at more than 2° from the centre (Börngen and Richter, 1978). Distribution of calibration and test stars is shown in Figure 3.

The same rejection criterion (redness and brightness) was applied to the testing standards and to the photoelectric ones that we used for the calibration (see Sect. 7.1).

Tables 5 and 6 show the results of the comparisons. Systematic difference is MAMA magnitude minus published magnitude. We propose the following interpretations of the discrepancies that appear in U with Basle and in B with Coma. Among the 1819 objects listed in the Basle catalogue, several tens are listed with $U - B$ between -0.2 and -0.4 (for B magnitudes in the range 13 to 17). But none of these objects appears in any of the blue surveys of this field: it is then plausible that the listed U Basle values are more or less systematically too faint by $\sim$ 0.1 mag to explain the systematic difference (0.13) between our U magnitudes and those of Basle. We note that dispersions with Basle sequence are nominal for intercomparison of photographic measurements.

The Coma stars that cause the higher systematic difference in B (-0.17 mag) are the brighest ones: those lying in the range 16 to 20 have a shift of only -0.10 magnitude. Dispersion are higher, mainly in U, due presumably to the effects of the two photographics records combined with those of the angular separation of the two sequences on the plates.

In order to quantify the level of effects due to sky background variations, we examined, for each colour, the magnitude difference (MAMA magnitude minus published one) as a function of local sky background. We found no evidence of any correlation between these two quantities.

Of course, all these tests would have been more reliable if other photometric sequences in various regions of the field were available.

8. Astrometric reduction.

Our initial aim was to get an absolute positional accuracy of 1 arcsec, compatible with MOS (Multi-Object-Spectroscopy) pointing.

8.1. Astrometric standards.

The standards were selected among the 224 AGK3 stars present in the field. Some of these stars were lost due to the mylar frame (see Sect. 4.2), some were rejected, being double or too bright; 177 reference stars then remained. For these stars, α, δ and proper motions were taken from the AGK3 catalogue (Heckmann and Dickvoss, 1975).

8.2. Reduction procedure.

The astrometric reduction was performed using a 3^{rd} order 2D geometrical fitting for each Schmidt plate, according to proper-motion-corrected positions of reference stars.

Residuals of the transformation (x, $y \leftrightarrow \alpha_{1950}$, δ_{1950}) on astrometric standards are summarized in Table 7. Their mean value is $\sim$ 0.5 arcsec. However, it is presumable that the obtained positional accuracy is lower at the extreme limits of the plates.

8.3. Plate-to-plate consistency of positions.

The reproductibility of MAMA positioning is better than 0.2 μm on the plate (i.e. $\sim$ 0.01 arcsec on Palomar Schmidt plates). We compared the object-positions obtained on each of the 4 plates (which were taken in the same night) in order to test the reliability of our astrometric reduction. Dispersions (standard-deviations of the difference between measured positions of objects from one plate to another) are displayed in Table 8.

When restricting ourselves to the stellar-like objects, the plate-to-plate dispersion of positions falls slightly: dispersions, percentage of discrepancies greater than 1 arcsec (*column 3*), percentage of those greater than 1.5 arcsec (*column 4*) and highest discrepancies (*column 5*) for these stellar-like objects are shown in Table 9. There is no significant systematic difference on α or δ coordinates between the four plates; the largest one is observed on α coordinate between PS 6557 and PS 6559 plates and corresponds to 0.12 arcsec in the sky. The highest discrepancies are due to border objects (the extreme discrepancy of 3.15", observed between PS 6557 and PS 6559 plates is due to an object located at a very corner of the field). The percentages shown in Table 9 indicate that such high discrepancies affect very few objects.

Since there is no important discordance between the 4 plates and V-15 min is the deepest one, we choose to use positions from this plate for the catalogue. Nevertheless, a few objects could not be measured on V-15 min plate (due to the mylar frame); for these objects, positions from B plate were listed. For one object, TN 145, B position could not be measured and position from U plate was taken.

9. Diffuse objects separation.

It was necessary, in order to validate the quality of photometric results, to separate reliable stellar-like objects from diffuse (i.e. non-stellar-like) ones: here described reduction techniques are aimed at stellar-like objects.

The classical method of visual inspection of all the digitized *pavés* on the image processor monitor was applicable here. Although it may be subjective, especially for faint objects, we decided to use this visual separation method.

Nevertheless we are preparing a process of automatic separation in the perspective of our general program P.A.P.A.. The visual inspection of all the *pavés* that we made will allow us to optimize the efficiency of the automatic selection. We plan to perform such a discrimination comparing, on the one hand, flux and area of the detected objects and using, on the other hand, morphology of objects.

In addition, we remarked that difference between V-15 min plate and V-10 min plate magnitudes is systematically negative for diffuse objects. Figure 4 shows histograms of magnitude difference between the two V plates for: a) stellar-like objects, b) diffuse objects. For each histogram, one bin represents about 0.13 mag. It appears that diffuse objects preferentially show negative difference; average difference is -0.06 for stellar-like objects (probably due to V-10 min plate calibration) and -0.24 for diffuse ones. Therefore, this magnitude difference seems to be a good criterion for the recognition of diffuse objects.

In the present work, the separation of diffuse objects from stellar-like ones was visually performed on the *pavé* images from V-15 min plate, which is the deepest one.

10. The catalogue.

The catalogue is displayed in annex 1.

Column1: index number. An * after this number refers to a note in annex 2.

Column2: names (with the denominations described in Sect. 3). These names stand in chronogical order of publication, except for the 57- and BR objects which come from photometric sequences and not from any UV survey.

Column3: right ascension (α), equinox 1950.0. A colon indicates uncertain values for particular objects.

Column 4: declination (δ), equinox 1950.0. Idem for a colon.

Column 5: U-magnitude (rounded by 0.05 steps). A colon indicates uncertain values for diffuse, too faint (nearer than one unit from the limiting magnitude of the plate) or particular objects.

Column 6: B-magnitude (rounded by 0.05 mag). Idem for a colon.

Column 7: V-magnitude (rounded by 0.05 mag). Idem for a colon.

Column 8: morphological discrimination (D = diffuse (non-stellar-like) object).

Column 9: literature spectral classification. Following symbols are used to define published astrophysical nature of objects: QSO for a quasar, Sy for a Seyfert galaxy and AG for an active galaxy in the Véron-Cetty and Véron catalogue 4^{th} edition, 1989 (AG has been assigned to objects listed in Table 4 of this edition without any classification), X for a X-ray source, WD for a white dwarf, sd for a subdwarf (sdO for a subdwarf O,...), HB for an horizontal branch star (HBB for a B type HB), NHB for a star which may be a HB or a normal one, PNN for a planetary nebula nucleus and em. for an emission line object.

11. Discussion.

11.1. About photometric accuracy.

We have compiled Steppe's and Usher's photometric measurements in order to compare them to MAMA results. Between all the compiled surveys, only Steppe's and Usher's give iris photometer measurements; the best consistency with MAMA measurements is obtained with these two surveys.

Figures 5 and 6 show the comparison of MAMA magnitudes with respectively those of Steppe and Usher, when restricting ourselves to stellar-like objects. Steppe's values (1978) show the best agreement. In V, for example, the systematic difference with our own measurements is only 0.08 magnitudes and the dispersion of the differences 0.17. But the dispersion is there enhanced by the variability of a notable proportion of these faint UV-excess objects (Steppe's plates were exposed in 1961). Usher's measurements show a higher dispersion, but it is to note that his magnitudes were rounded by 0.1 mag instead of 0.01 for Steppe's ones.

According to these comparisons and to the tests on Basle and Coma sequences (Sect. 7.3), our initial objectives seem to be reached for both the accuracy (save, perhaps, for U) and the dynamical range of the photometry. The higher dispersion on U magnitudes may be explained by the higher errors of used standards and by the abnormality of the U response curve of the Palomar Schmidt telescope.

It is to note that the announced accuracy is relative to the present UBV system (i.e. the one defined by the response curve of the chain atmosphere – telescope – filter – emulsion and the spectral properties of the used photometric standards). So our UBV measurements may slightly differ from pure photoelectric values for objects whose spectra are very far from that of calibration standards. We choose to give our raw "U", "B", "V" values without any colour correction since such corrections are only valid for regular stellar spectra which is not the case at least for one third of the faint UV-excess objects.

11.2. About astrometric accuracy.

We tested the reliability of our measured positions by comparing them with that measured by Steppe for his objects (stellar-like or not). Figure 7 presents the histogram of angular differences between MAMA and Steppe's positions for 280 objects. This histogram shows a very good agreement between these positions. Dispersion (σ of differences between MAMA and Steppe's positions) is 0.93 arcsec. On the other hand, Usher's measurements accuracy is sufficient to find the objects on the plates but proved really too poor to give any additional indication of the reliabilty of our measures: dispersion is about 6 arcsec !

After comparison with Steppe and tests of position consistencies that we made (Sect. 8.3), we note that the accuracy of our position measurements is better than the one we initially aimed at, save for very few objects located at the extreme edges of the plates.

11.3. General remarks.

– For ST 46, ST 365 as well as some other ST, some US and KUV objects quoted in annex 2, the authors did not measure the same object for astrometry and photometry, a confusion that is just impossible with our automatic detection method.

– Figure 8 displays the locations of all stellar-like objects on a $U-B/B-V$ diagram. This diagram clearly shows a separation into two clusters approximately separated by a line given by $U-V=0$. The upper cloud is expected to contain a high proportion of quasars (see, e.g., Cristiani *et al.*, 1989). We shall add, in a following paper, the variability of objects as a new criterion for the selection of quasar candidates among the listed objects. We plan to observe our candidates (and other preclassified objects) by multi-object spectroscopy.

12. Conclusion.

The presented homogeneous set of astrometric and photometric measurements of the compilation of 10 catalogues of UV-excess objects in the PSS field +30° 13^h00^m at NGP reached the levels of accuracy that were planned: < 1 arcsec and 0.1 mag (slightly poorer in U). The production of photometric measurements at a new epoch (1962.32) is a way to improve the detection of variable objects and a following paper will be devoted to a study of variability of the listed objects.

Moreover, quality of both astrometry and photometry encourages us to generalize the procedure towards a total automatic reduction of Schmidt fields (PAPA program). We plan to produce complete multi-colour surveys of objects detected on the plates for the 8 Berger fields; our aim is to preclassify the maximum of objects and select primarily the quasar candidates in these fields using colour and variability (if available) criterions.

Acknowledgements.

It is a pleasure to thank J.L. Greenstein for his effective intervention towards the offices of Palomar Observatory to allow a new loan of Palomar plates and for his scientific interest about our planned measurements and research. Our gratitude is owed to A. Maury for search and mailing of original Palomar plates taken by J.B. in 1962.

We would like to thank W.A. Baum for communicating his photoelectric sequence and R. Fenkart for his unpublished *UBV* measurements of SA 57 Basle sequence.

We acknowledge the contribution of the CDCA/STII team at Observatoire de Nice with usefull image processing programs. At Observatoire de Bordeaux, J.P. Périé kindly made available to us the base for efficiently guiding MAMA to AGK3 stars and C. Ducourant provided a performant software for astrometric reduction. Finally, we thank C. Soubiran for her high contribution to the development of MAMA pre-acquisition and reduction procedures and the whole technical MAMA team for a continuous implementation of MAMA procedures throughout the carrying out of this program.

References

Acker Y., Belmas M., Danguy T., Guilbert J., Leroy A., Moreau O., Paillous M., Soubiran C., Stoclet P. and Tajahmady F.: 1991, in preparation.
Barbieri C. and Rosino L.: 1972, *Astrophys. Space Sci.* **16**, 324.
Baum A.: 1960, private communication.
Becker W. and Fenkart R.: 1976, Photometric Catalogue for stars in Selected Areas and other fields in the RGU-System, I. Publ. of the Astron. Inst. of Univ. of Basle.
Berger J. and Fringant A.-M.: 1977, *Astron. Astrophys. Suppl. Ser.* **28**, 123.
Berger J. and Fringant A.-M.: 1980, *Astron. Astrophys. Suppl. Ser.* **39**, 39.
Berger J. and Fringant A.-M.: 1984, *Astron. Astrophys. Suppl. Ser.* **58**, 565.
Bijaoui A.: 1980, *Astron. Astrophys.* **84**, 81.
Börngen F. and Richter N.: 1978, *Astron. Nachr.* **299**, 117.
Cristiani S., Barbieri C., Iovino A., La Franca F. and Nota A.: 1989, *Astron. Astrophys. Suppl. Ser.* **77**, 161.
Feige J.: 1958, *Astrophys. J.* **128**, 267.
Fenkart R.: 1985, private communication.
Gaston B.: 1983, *Astrophys. J.* **272**, 411.
Graham J.A.: 1970, *Publ. Astron. Soc. Pac.* **82**, 1305.
Green R.F.: 1976, *Publ. Astron. Soc. Pac.* **88**, 665.
Green R.F., Schmidt M. and Liebert J.: 1986, *Astrophys. J. Suppl. Ser.* **61**, 305.
Greenstein J.L.: 1966, *Astrophys. J.* **144**, 496.
Greenstein J.L. and Sargent A.: 1974, *Astrophys. J. Suppl. Ser.* **28**, 157.
Haro G.: 1951, *Publ. Astron. Soc. Pac.* **63**, 144.
Haro G. and Luyten W.J.: 1962, *Bol. Obs. Tonantzintla y Tacubaya* **22**, 37.
Heckmann O. and Dickvoss W.: 1975, "AGK3 star catalogue", Hamburger Sternwarte.

Humason H.L. and Zwicky F.: 1947, *Astrophys. J.* **105**, 85.
Iriarte B. and Chavira E.: 1957, *Bol. Obs. Tonantzintla y Tacubaya* **16**, 3.
Kondo M., Noguchi T. and Maehara H.: 1984, *Ann. Tokyo Astron. Obs., 2nd Series* **20**, 130.
Koo D.C., Kron R.G. and Cudworth K.M.: 1986, *Publ. Astron. Soc. Pac.* **98**, 285.
Luyten W.J.: 1952, A Search for Faint Blue Stars, I. Publ. of the Univ. of Minnessota, Minneapolis.
Luyten W.J.: 1966, A Search for Faint Blue Stars, XXXVIII, Publ. of the Univ. of Minnesota, Minneapolis.
Luyten W.J.: 1968, A Search for Faint Blue Stars, XLIX, Publ. of the Univ. of Minnesota, Minneapolis.
Luyten W.J.: 1970, White dwarfs, I, Publ. of the Univ. of Minnesota, Minneapolis.
Luyten W.J.: 1977, White dwarfs, II, Publ. of the Univ. of Minnesota, Minneapolis.
Markarian B.E.: 1967, *Astrofizica* **3**, 55.
Noguchi T., Maehara H. and Kondo M.: 1980, *Ann. Tokyo Astron. Obs., 2nd Series* **18**, 55.
Purgathofer A.Th.: 1969, *Lowell Obs. Bull.* **147**, 98.
Reboul H., Fringant A.-M. and Vanderriest C.: 1986, *Proc. of the IAU Symp. 119 "Quasars"*, *Bangalore*, G. Swarup and V.K. Kapahi (eds), Reidel Publ., p. 553.
Reboul H., Vanderriest C., Fringant A.-M. and Cayrel R.: 1987, *Astron. Astrophys.* **177**, 337.
Slettebak A. and Stock J.: 1959, *Astron. Abh. Hamburg* N° 5.
Slettebak A., Bahner K. and Stock J.: 1961, *Astrophys. J.* **134**, 195.
Slettebak A. and Brundage R.K.: 1971, *Astron. J.* **76**, 338.
Steppe H.: 1978, *Astron. Astrophys. Suppl. Ser.* **31**, 209.
Steppe H., Véron P. and Véron M-P.: 1979, *Astron. Astrophys.* **78**, 125.
Usher P.D.: 1981, *Astrophys. J. Suppl. Ser.* **46**, 117.
Véron-Cetty M.-P. and Véron P.: 1989, A Catalogue of Quasars and Active Galactic Nuclei (4th edition), E.SO. Sci. Rep. N° 7.
Weistrop D.: 1973, *Astron. Astrophys.* **23**, 215.
Wegner G. and McMahan R.K.: 1985, *Astron. J.* **90**, 1511.
Wegner G. and McMahan R.K.: 1986, *Astron. J.* **91**, 139.
Zwicky F. and Luyten W.J.: 1967, A Search for Faint Blue Stars, XLV, Publ. of the Univ. of Minnesota, Minneapolis.

ANNEX 1: THE CATALOGUE

1	LB11392, PB3073	12 49 56.02	+31 36 19.2	17.90	18.55:	18.70		
2	LB11394, A2-112, PB3074, KUV494-24, CSO176	12 49 59.67	+29 29 38.4	16.75	17.60	17.35		QSO
3	A2-114	12 50 3.38	+29 37 0.1	17.85	17.95	17.45		
4	LB7291, PB3075, CSO177	12 50 3.64	+31 59 2.2	17.55:	18.25:	18.05:	D	Sy2
5	PB3076	12 50 9.44	+31 56 35.6	18.10	18.30	18.05		
6	A2-117, PB3077	12 50 13.11	+30 18 31.3	17.60	18.45:	18.25		
7	A2-120, PB3078, KUV493-38	12 50 16.90	+28 29 4.3	18.40	18.60:	18.60		
8	A2-121, PB3079	12 50 20.89	+28 22 51.4	17.65	17.70	17.40		
9	PB3080	12 50 21.85	+28 50 36.0	18.20	18.80:	18.55		
10	PB3081	12 50 22.04	+28 0 30.3	17.75	17.90	17.55		
11	PB3082	12 50 24.90	+29 39 7.7	18.95:	18.65:	18.30		
12	PB3083	12 50 28.09	+28 20 2.2	19.15:	18.80:	18.40		
13*	A2-123, PB3084	12 50 29.03	+26 49 27.9	17.25		17.05		
14	A2-124	12 50 31.78	+27 47 1.0	17.15:	17.50:	16.35:	D	
15	KUV494-26	12 50 31.84	+29 13 51.7	16.65	17.00	16.60		
16*	A2-126	12 50 34.41	+26 43 31.5	17.85		17.55		
17	PB3085	12 50 35.28	+29 21 13.0	17.95	18.45	18.25		
18	A2-127, KUV494-27	12 50 36.64	+28 12 10.9	16.25	16.65	16.30		
19	PB3087, KUV493-58	12 50 40.66	+28 38 47.3	18.40	18.80:	18.80		
20	PB3086, KUV493-59	12 50 41.14	+29 21 30.3	17.90	18.20	18.20		
21*	A2-128	12 50 43.54	+28 11 22.7	18.40	18.45:	18.35		
22*	LB7315, PB3088	12 50 46.50	+28 11 40.4	18.50	18.90:	18.85		
23	A2-130	12 50 47.30	+29 50 33.2	17.95	18.40	17.75		
24	PB3089	12 50 48.57	+29 22 2.9	18.25	18.50:	18.20		
25	LB11408, PB3090, KUV493-34, CSO179	12 50 53.16	+31 22 6.6	16.20	17.15	16.95		QSO
26*	HZ35, LB11409, PB3091, KUV494-11, PG1250+303	12 50 53.68	+30 22 46.7	14.45	15.75	16.10		sdB
27	LB7321, PB3092	12 50 54.60	+27 37 32.1	18.90:	19.00:	19.25		
28*	TN668, A2	12 50 55.92	+26 46 9.9	16.05		16.30		
29*	A2-135	12 50 56.97	+26 37 35.1	17.35		17.20		
30	PB3093	12 50 58.01	+29 26 17.7	18.05	18.25	17.80		
31	A2-136	12 50 58.98	+28 37 37.7	17.55	17.65	17.30		
32	PB3094	12 51 1.65	+29 33 39.7	18.15	17.95	18.00		
33*	LB21, PB3095	12 51 3.24	+26 18 27.3	17.75		17.75		
34	A2-137	12 51 5.10	+28 38 46.7	17.75	18.00	17.45		
35	PB3096	12 51 6.39	+27 38 40.6	18.85:	19.05:	19.00		
36*	PB3097	12 51 9.97	+26 38 31.2	18.45		18.20		
37	A2-138	12 51 12.33	+28 21 11.9	16.80	17.05	16.65		
38*	TN136, PB3098	12 51 14.82	+26 40 49.6	15.20		15.55		
39	PB3099	12 51 16.96	+32 21 5.9	18.50	18.20	18.10		
40	A2-139	12 51 18.91	+26 54 11.3	16.45	16.65	16.40		
41	A2-140	12 51 24.35	+27 45 56.3	18.30	18.25	18.05		
42	A2-142	12 51 28.07	+29 56 27.9	18.25	18.10	17.70		
43	A2-144	12 51 28.90	+28 52 21.6	16.60	16.85	16.25		
44	A2-145	12 51 32.74	+28 14 2.9	17.50	17.70	17.10		
45	PB3101	12 51 34.03	+26 41 43.9	18.00	18.35	18.10		
46	PB3100	12 51 34.48	+30 3 35.4	15.75:	15.90:	14.65:	D	
47	PB3102	12 51 34.99	+30 14 28.4	18.65:	18.40	17.85		
48	PB3103	12 51 36.52	+28 1 54.4	18.90:	18.80:	18.50		
49	PB3105	12 51 38.28	+27 15 0.8	18.35	18.20	18.05		
50*	SSII229, LB11422, PB3104	12 51 38.42	+29 8 2.0	12.10	12.20	12.35		Ap
51	A2-148	12 51 41.52	+27 13 51.8	17.35	17.50	16.90		
52	A2-150	12 51 44.42	+27 56 1.9	17.75	17.90	17.45		
53	PB3106	12 51 46.76	+30 24 44.9	18.25	18.35	18.00		
54	PB3107	12 51 49.13	+28 1 49.4	18.10:	18.60:	18.20:	D	
55	PB3108	12 51 52.30	+29 7 21.8	18.60:	18.40:	18.00:	D	
56	TN669	12 51 52.70	+28 59 57.1	16.30	16.50	16.15		
57	LB11425, PB3109, KUV493-36	12 51 52.92	+31 49 20.6	15.25	15.10	15.50		
58	LB11426, PB3110, KUV493-37	12 51 53.80	+31 41 51.5	17.40	17.95	18.15		
59	A2-152, PB3111	12 51 56.55	+27 54 49.8	16.95	18.05	18.25		
60	A2-153, PB3112	12 51 56.97	+26 36 21.8	16.45	17.80	17.90		
61	A2-154	12 51 57.92	+29 22 43.4	17.55	17.60	17.30		
62	LB7366, PB3113, KUV493-64	12 51 58.78	+31 6 33.6	17.90	19.10:	19.15		
63	A2-156, PB3114	12 52 2.82	+26 36 57.3	17.65	17.75	17.50		
64	PB3115	12 52 7.71	+28 56 22.7	19.05:	19.05:	18.70		
65	TN670	12 52 8.32	+28 36 17.7	15.15	15.65	15.20		
66	PB3116	12 52 9.63	+26 24 14.1	17.75	17.85	17.60		
67	A2-160	12 52 12.07	+27 59 7.0	17.85	18.05	17.45		
68	A2-161	12 52 14.14	+26 15 15.0	17.15	17.40	16.95		
69	US1	12 52 16.00	+28 22 28.5	16.40	16.75	16.35		
70	A2-164	12 52 18.95	+27 56 29.8	17.05	17.25	17.00		
71	LB11435, PB3117	12 52 33.35	+29 52 17.8	12.35	12.70	12.30		
72	PB3118	12 52 34.85	+27 35 33.8	18.40	18.50:	18.10		
73	PB3119	12 52 36.21	+27 36 30.0	18.55	18.40	18.25		
74	A2-170	12 52 37.33	+26 47 5.1	16.50	16.75	16.45		
75	PB3120	12 52 38.67	+27 41 43.8	18.60	18.50:	18.35		
76	US2	12 52 38.93	+31 46 54.4	19.10:	19.15:	19.00		
77	A2-173	12 52 41.05	+26 54 37.1	16.95	17.00	16.75		
78	US4	12 52 42.76	+31 46 17.5	19.35:	19.30:	19.70:		
79	US3	12 52 42.89	+32 13 18.3	18.70:	19.45:	19.40		
80	A2-177	12 52 47.02	+26 23 18.2	16.35	16.65	16.35		
81	LB7396, A2-178	12 52 49.11	+27 40 38.5	17.30	17.60	17.00		
82	A2-180	12 52 51.36	+27 28 41.0	18.10	18.10	17.60		
83	A2-182	12 52 52.58	+28 58 49.2	17.40	17.80	17.15		
84	A2-183, PB3121, US5	12 52 54.54	+27 41 38.6	17.70	18.25	18.25		
85*	LB7400, PB3122	12 52 55.41	+31 11 16.3	18.85:	18.90:	18.50		
86	US6	12 52 56.97	+29 36 55.9	15.60	16.10	15.65		
87	A2-186	12 52 59.73	+27 54 52.2	18.05	18.15	17.80		
88*	A2-187	12 53 1.42	+27 24 46.5	17.30	17.50	17.10		
89	US7	12 53 3.79	+29 4 14.9	18.25	18.25	18.00		
90	US8	12 53 4.15	+29 15 59.8	18.65:	19.20:	19.10		
91	KUV494-29	12 53 4.31	+27 56 14.4	16.60	16.85	16.55		
92	A2-188	12 53 4.37	+26 16 35.0	18.40	18.35	18.05		
93	PB3123	12 53 5.47	+28 44 19.1	18.20	18.00	17.65		
94	US9	12 53 5.91	+29 13 40.6	18.50	18.15	18.20		
95	A2-189, US10	12 53 6.31	+30 17 57.0	18.40:	18.60:	18.60:	D	
96	A2-190	12 53 13.53	+28 6 24.1	17.00	17.40	16.90		
97	US11	12 53 14.07	+29 39 46.8	19.10:	19.25:	19.00		
98	TN671, A2, KUV494-28	12 53 14.29	+28 19 16.9	16.35	16.70	16.35		
99	PB3124	12 53 16.17	+30 18 20.0	18.55	18.45	18.30		
100	US12	12 53 16.75	+28 23 9.1	17.95	17.90	17.50		
101	US13	12 53 18.54	+31 27 1.2	18.30	19.20:	19.30		
102	US14	12 53 18.76	+30 54 31.9	17.65	17.70	17.35		
103	LB7408, PB3125, US15	12 53 20.50	+32 7 34.6	18.45	18.90:	18.85		
104	LB7411, US16	12 53 21.80	+31 56 49.4	18.70:	18.45:	18.45		
105	A2-191	12 53 22.94	+27 19 29.5	18.15	18.20	17.80		
106	US17	12 53 23.46	+30 51 33.0	17.70	17.80	17.35		
107	A2-192	12 53 23.60	+28 11 10.5	17.95	17.95	17.45		
108	A2-195	12 53 25.79	+29 26 9.0	16.70	17.00	16.55		
109	A2-194	12 53 26.20	+27 32 55.3	17.80	18.00	17.50		
110	A2-196	12 53 26.73	+30 21 43.8	18.05	18.25	17.65		
111	A2-197, PB3126	12 53 27.63	+27 40 19.0	17.50	18.30	17.95		
112	A2-198	12 53 31.05	+28 11 17.8	17.80	18.05	17.45		
113	A2-199	12 53 31.77	+30 8 1.0	18.10	18.05	17.85		

ANNEX 1 (continued)

114	PB3127	12 53 31.84	+27 19 7.0	18.60	19.00:	18.45		
115	A2-201	12 53 32.86	+29 51 29.0	18.25	18.20	17.80		
116	A2-202	12 53 38.62	+29 0 12.1	17.20	17.35	16.80		
117	US18	12 53 39.04	+30 6 22.7	19.15:	19.40:	19.45:		
118*	TN673, TN139, SSII232, SBS73, A2, PB3128, KUV494-09, PG1253+283	12 53 39.72	+28 23 33.1	12.20	12.90	12.90		sdO
119	US19	12 53 40.71	+29 5 55.5	18.75:	19.10:	19.60:		QSO
120	PB3129, KUV494-30	12 53 40.74	+27 56 54.0	14.45:	14.70:	13.65:	D	
121	US20	12 53 41.60	+30 10 3.5	19.00:	19.30:	19.45:	D	
122	A2-203	12 53 41.67	+26 55 36.4	17.05	17.10	16.55		
123	US21	12 53 41.81	+29 33 25.1	18.40:	18.25:	17.90:	D	
124	TN672	12 53 43.70	+26 31 43.0	17.00	17.30	17.00		
125	TN674, A2-204	12 53 43.90	+29 43 9.6	16.95	17.35	16.90		
126	A2-205	12 53 43.97	+29 52 28.5	17.10	17.40	16.70		
127	US23	12 53 44.92	+29 18 40.6	18.50	19.10:	18.80		
128	US22	12 53 45.30	+31 50 15.9	17.50	17.65	17.05		
129	A2-206	12 53 45.93	+28 48 50.1	18.40:	17.80:	16.85:	D	
130	A2-207	12 53 51.11	+27 51 2.1	16.90	17.00	16.45		
131	PB3130	12 53 51.90	+30 26 60.0	19.30:	19.10:	18.90		
132	A2-209	12 53 55.53	+29 53 19.4	18.35	18.35	18.25		
133	PB3131	12 53 55.55	+26 30 0.6	17.40	17.60	17.15		
134	A2-210, US24	12 53 57.24	+28 52 30.8	17.90	18.00	17.45		
135	PB3133	12 53 57.53	+30 39 22.9	19.20:	18.70:	18.40:	D	
136	PB3132, US25	12 53 58.33	+31 47 39.6	17.85	17.65	17.45		
137*	SSII234, US26	12 53 58.38	+27 44 52.0	13.60	13.35	13.45		A0
138*	TN140, A2-211, PB3134, KUV494-07, US27, PG1254+279	12 54 2.19	+27 58 45.4	14.65	15.65	15.90		sdB
139	US28	12 54 3.56	+32 13 58.2	16.95	17.00	16.65		
140	PB3135	12 54 4.36	+27 31 20.0	18.80:	18.85:	19.10		
141	A2-213	12 54 5.66	+29 32 33.1	17.10	17.30	16.80		
142	US29	12 54 7.35	+30 29 9.9	19.10:	19.05:	18.80:	D	
143	PB3136	12 54 7.94	+32 27 3.2	17.50	17.40	17.00		
144	US30	12 54 8.28	+30 59 20.3	19.50:	18.85:	19.10		
145	A2-216	12 54 11.04	+27 17 47.2	17.25	17.50	16.95		
146*	ZL108, A2-217, PB3137, US31	12 54 11.45	+26 52 57.6	16.05	17.30	17.45		
147	PB3138, US32	12 54 12.00	+30 48 16.6	18.15	18.80:	18.90		
148	PB3139	12 54 12.37	+29 40 28.7	18.95:	19.00:	18.60		
149	PB3141	12 54 18.16	+26 16 19.8	17.80	17.05	17.65		
150	A2-218, PB3140	12 54 18.60	+30 0 39.2	18.20	18.30	18.00		
151	A2-219	12 54 20.59	+28 8 4.4	17.50	17.60	17.35		
152	A2-220	12 54 20.85	+29 26 55.7	16.65	16.80	16.15		
153	PB3142	12 54 20.89	+27 21 24.4	19.20:	19.30:	19.00		
154	US33	12 54 22.28	+29 31 10.3	19.50:	19.25:	19.15		
155	US35	12 54 23.04	+28 15 30.5	17.75	18.00	17.55		
156	PB3143, US34	12 54 23.10	+32 16 40.3	18.00	17.95	17.60		
157	US37	12 54 24.30	+31 30 24.0	18.40	18.40	18.15		
158	PB3144, US38	12 54 24.70	+30 25 48.6	18.30	18.85:	18.70		
159	US36	12 54 24.82	+26 46 13.1	17.20	17.80	17.30		
160	A2-221, PB3145, US39	12 54 28.95	+30 29 33.4	18.40	18.70:	18.50		QSO
161	TN676, PB3146, US40	12 54 29.77	+31 36 22.0	16.80	17.25	17.30		
162	US41	12 54 30.08	+31 5 0.2	18.90:	18.95:	19.25		
163	TN675, PB3147, US42	12 54 31.88	+27 7 27.7	16.90	16.70	16.75		
164	US43	12 54 32.15	+31 15 55.9	18.50	18.30	18.35		
165	A2-222	12 54 36.28	+28 42 29.8	17.05	17.20	16.65		
166	A2-223	12 54 37.10	+29 32 42.6	18.20	18.30	17.80		
167	US44	12 54 38.82	+32 9 25.9	18.05	18.05	17.65		
168	A2-224	12 54 39.03	+28 55 18.2	18.05	18.05	17.55		
169	PB3148	12 54 39.27	+27 56 15.7	18.85:	18.75:	18.35		

170*	A2-225, PB3149, US46	12 54 43.04	+29 12 9.9	16.80	17.75			
171	PB3150, US45	12 54 43.09	+27 29 43.1	18.40	19.00:	18.55		
172	PB3151, US47	12 54 46.21	+29 9 5.1	18.55	18.50:	18.35		
173	PB3152	12 54 46.78	+27 58 28.9	18.75:	18.90:	18.60		
174	US48	12 54 47.07	+31 46 44.6	17.60	17.55	17.30		
175	A2-226	12 54 48.34	+27 10 37.3	17.10	17.40	16.85		
176	A2-227	12 54 49.57	+28 46 33.5	18.60:	18.10:	16.45:	D	
177	PB3153	12 54 51.88	+27 7 30.0	18.50	19.20:	18.80		
178	PB3154, US49	12 54 52.07	+31 27 39.1	17.95	18.90:	19.60:		
179	US50	12 54 53.34	+30 56 27.0	17.70	17.95	17.65		
180	US51	12 54 54.01	+32 25 13.8	19.15:	19.30:	18.55		
181	A2-228	12 54 57.34	+27 17 52.7	18.45	18.30	18.00		
182	US52	12 54 58.96	+28 26 10.3	19.00:	18.80:	18.50		
183	US53	12 55 3.23	+27 1 28.1	17.55	17.20	17.30		
184	PB3155	12 55 4.98	+31 6 33.4	18.75:	18.55:	18.50		
185	TN677, A2, US54	12 55 7.15	+28 42 37.3	16.00	16.30	15.95		
186	A2-232	12 55 8.20	+27 49 7.2	18.25	18.30	17.65		
187	PB3156, US55	12 55 11.11	+32 4 54.6	16.75	16.45	16.80		
188	PB3157	12 55 14.03	+29 42 27.8	18.60	18.35	18.10		
189	PB3158, US56	12 55 14.67	+29 26 55.5	19.25:	19.15:	19.85:		
190	PB3159, US57	12 55 15.18	+29 27 49.0	18.25	18.20	18.10		
191	A2-233	12 55 15.42	+27 16 16.0	16.35	16.55	16.15		
192	US58	12 55 16.78	+29 24 19.0	18.85:	19.05:	19.30:	D	
193	A2-234	12 55 16.93	+27 59 55.2	16.80	17.05	16.70		
194	TN678, A2	12 55 25.23	+26 59 1.3	15.50	15.85	15.40		
195	A2-235, US59	12 55 26.40	+26 52 33.3	18.20	19.00:	19.40:		
196	A2-236	12 55 31.13	+27 51 4.8	17.30:	16.90:	15.80:	D	
197	A2-239	12 55 34.02	+28 59 4.1	16.95	17.35	16.85		
198*	US60	12 55 34.64	+28 59 55.8	19.00:		19.35		
199	A2-238	12 55 35.00	+30 1 51.9	17.35	17.10	16.35		
200	A2-240, PB3160	12 55 35.37	+30 14 44.7	18.05	18.45:	18.25		
201	A2-241	12 55 36.62	+28 38 42.8	16.00	16.25	15.85		
202	A2-242	12 55 37.22	+28 6 9.6	17.90	18.00	17.50		
203	PB3161	12 55 39.87	+31 32 49.0	18.80:	19.25:	19.10		
204	PB3162, US61	12 55 41.44	+31 1 35.8	18.65:	19.05:	19.35:	D	
205	A2-246, US62	12 55 46.43	+29 8 43.5	18.50	18.50:	17.95		
206*	US63	12 55 47.29	+29 21 36.0		19.20:	18.85		
207	PB3163	12 55 47.78	+30 9 40.2	18.40	18.35	18.05		
208	PB3164, US64	12 55 48.56	+29 51 12.9	19.20:	19.45:	19.75:		
209	A2-249	12 55 48.99	+26 31 25.6	17.65	17.80	17.25		
210	US66	12 55 53.51	+28 15 47.2	18.50	18.90:	19.15		
211	PB3166, US65	12 55 54.20	+26 44 19.5	18.45	18.45:	18.10		
212	US67	12 55 54.30	+31 59 54.7	17.90	17.95	17.55		
213	A2-251, PB3165, US68	12 55 54.58	+30 21 23.6	17.90	18.35	18.25		
214	US69	12 55 55.04	+30 5 47.0	18.50	18.45	18.25		
215	PB3167, US70	12 55 55.75	+28 30 8.8	18.70:	19.00:	19.10		
216	US71	12 56 0.70	+31 3 55.1	18.70:	19.15:	19.00		
217	PB3168	12 56 1.83	+27 17 36.3	18.25:	18.10:	17.40:	D	
218	KUV494-32	12 56 2.31	+30 45 14.1	18.00	18.10	17.65		
219	PB3169, US72	12 56 4.16	+29 28 31.7	18.35	19.10:	19.05		QS
220	PB3170	12 56 4.22	+26 46 48.8	18.25:	18.05:	17.95:	D	
221*	KUV494-31	12 56 9.68	+28 38 57.8	17.25	17.20	16.80		
222	A2-255, PB3172, ST2, US74	12 56 10.35	+31 23 38.2	17.35	18.25	18.05		
223	PB3171, US73	12 56 10.46	+31 34 3.7	18.40	18.80:	18.65		
224*	LB23, A2-256, PB3173, ST, US75	12 56 10.54	+30 35 25.3	16.55	17.45	17.75		
225	US76	12 56 11.17	+28 32 29.7	17.05:	17.15:	15.65:	D	
226	US77	12 56 12.53	+31 47 21.5	18.40:	18.50:	18.00:	D	
227	US78	12 56 15.35	+28 44 22.6	19.45:	19.30:	19.00		
228*	US80	12 56 15.60	+28 50 36.0	19.40:	19.40:	19.85:		
229*	US79	12 56 15.71	+29 2 17.3	18.85:	18.75:	18.55		

ANNEX 1 (*continued*)

230	A2-257	12 56 15.92	+26 51 37.6	17.25	17.50	17.30	
231	A2-258	12 56 18.34	+29 51 42.8	17.70	17.75	17.25	
232	A2-259, PB3174	12 56 21.14	+28 48 46.1	18.20:	18.65:	17.90:	D
233	PB3175, US81	12 56 22.90	+31 48 2.7	18.60	19.40:	19.30	
234	A2-260	12 56 23.46	+26 46 36.5	18.50	18.45	17.70	
235	US82	12 56 25.37	+32 5 59.3	18.00	17.90	17.65	
236	ST141	12 56 27.51	+29 58 1.8	18.45	18.95:	18.90	
237	A2-262	12 56 28.15	+30 48 33.0	17.95	17.90	17.25	
238	A2-263	12 56 28.88	+26 15 14.0	17.50:	17.20:	16.80	
239	A2-266, PB3176, US83	12 56 29.75	+26 45 23.1	18.40	18.60:	18.70	
240*	TN679	12 56 30.23	+28 4 0.6	16.35	16.50	16.25	
241	A2-268	12 56 31.00	+26 51 2.8	17.70	17.60	17.00	
242*	PB3177	12 56 32.20	+28 9 40.6	19.40:		19.85:	
243	A2-270	12 56 33.16	+28 31 38.3	16.20	16.50	16.30	
244	PB3178, US84	12 56 33.87	+31 27 20.9	17.35	17.45	17.10	
245	PB3179, ST, US86	12 56 34.37	+28 9 18.3	18.25	18.95:	18.55	
246	US85	12 56 34.84	+32 22 38.6	18.45	19.05:	19.10	
247	PB3180	12 56 35.30	+26 42 10.3	19.35:	19.20:	19.40:	D
248	US87	12 56 35.59	+32 24 3.5	19.15:	18.25	18.55	
249	TN680	12 56 35.78	+26 51 38.4	16.40	16.55	16.05	
250	PB3181, ST, US88	12 56 36.13	+31 34 54.7	18.30	19.00:	19.00	
251	PB3182, ST136, US89	12 56 37.34	+30 43 5.3	18.50	18.30	18.05	
252	A2-273	12 56 37.39	+28 3 57.0	16.75	16.80	16.35	
253	A2-275, PB3183,	12 56 37.83	+30 48 48.6	17.85	18.55:	18.60	
	ST135, US90						
254	US91	12 56 39.60	+31 2 41.4	18.75:	18.60:	18.35	
255	ST276	12 56 40.66	+28 7 6.8	18.75:	18.80:	18.00:	D
256	A2-276	12 56 40.67	+30 6 43.4	16.45	16.50	16.00	
257	TN681	12 56 42.18	+26 52 1.3	16.15	16.15	15.75	
258	US92	12 56 44.58	+27 45 27.5	18.10	17.70	18.10	
259	ST138	12 56 44.67	+30 28 28.1	18.00	18.10	17.80	
260	A2-277	12 56 45.87	+29 11 4.8	18.10	18.20	17.95	
261	TN682	12 56 45.91	+26 53 56.5	15.55	15.35	15.45	
262	KUV494-33	12 56 48.34	+30 42 39.1	17.15	16.80	16.90	
263	PB3184, ST152, US93	12 56 49.22	+29 33 5.5	18.30	18.50:	18.40	
264	TN685, A2	12 56 49.43	+29 8 17.7	15.05	15.35	15.00	
265	TN683, A2-278	12 56 49.56	+28 9 12.9	16.80	16.90	16.65	
266	TN684, A2-279, US94	12 56 51.08	+28 13 21.2	16.30	16.50	16.15	
267	ZL119, PB3185, ST275,	12 56 51.87	+28 9 55.9	18.30	18.55:	18.65	AG X
	EXO1256+28						
268	A2-280	12 56 53.68	+28 49 3.0	17.15	17.40	17.00	
269*	HZ38, PB3186, ST362,	12 56 56.38	+27 50 15.9	12.80	13.80	14.35	sdO
	KUV494-06, US95,						
	PG1256+278						
270	A2-282	12 56 57.02	+29 51 23.3	17.85	17.95	17.50	
271	PB3187	12 56 57.82	+26 32 31.0	18.10	17.95	17.85	
272	A2-284	12 56 58.40	+30 2 51.6	17.90	17.95	17.75	
273	ST285, HTV1256+277	12 56 58.40	+27 43 30.7	18.40	19.45:	19.65:	QSO
274*	HZ47, PB3188, ST286,	12 57 1.07	+27 37 33.1	14.45	15.10	15.50	sdOA
	KUV494-05, US96,						
	PG1257+276						
275	A2-285	12 57 1.71	+30 46 0.1	17.90	18.05	17.65	
276	ST154	12 57 1.85	+29 24 55.5	17.20:	16.90:	15.35:	D
277	US97	12 57 2.15	+32 27 20.2	18.70:	18.75:	18.10	
278*	H4-1, PB3189, ST,	12 57 2.90	+27 54 20.5	14.85	16.20	15.80	PNN
	US99, PG1257+279						
279*	US98	12 57 3.13	+27 14 33.9	19.35:		19.35	
280	A2-286	12 57 3.88	+29 2 0.8	18.30	18.30	17.50	
281	US100	12 57 5.87	+32 18 17.8	16.50	16.60	16.15	
282	PB3190, ST266	12 57 6.35	+28 43 14.9	18.05	18.60:	18.70	
283	US101	12 57 8.11	+27 16 9.1	19.40:	19.05:	19.20	
284	TN686, Mark60,	12 57 9.91	+28 11 4.1	16.75:	17.65:	17.60:	D
	A2-287, PB3191, ST,						
	KUV494-72, US102						
285	A2-289	12 57 12.01	+26 45 1.1	17.05	17.20	16.60	
286	ST271	12 57 12.19	+29 13 37.1	18.25	18.35	17.95	
287	ST5, US103	12 57 13.85	+31 18 13.8	18.50	18.35	18.00	
288	A2-290	12 57 14.21	+30 6 5.7	18.35	18.15	17.55	
289	US104	12 57 14.81	+30 54 1.2	19.05:	18.70:	16.65:	D
290	PB3193	12 57 15.70	+26 21 3.4	18.20	18.10	17.80	
291	A2-293, PB3192	12 57 16.66	+27 34 37.0	18.85:	18.60:	18.80	
292	A2-294, PB3194,	12 57 18.12	+29 58 13.4	18.20	18.75:	18.55	
	ST142, US105						
293	A2-295	12 57 18.90	+29 7 6.8	16.45	16.80	16.25	
294	ST147	12 57 19.45	+29 39 10.1	19.25:	18.95:	18.50	
295	TN687	12 57 19.79	+26 41 42.6	15.95	15.70	15.80	
296	ST155	12 57 20.61	+29 24 36.5	19.30:	18.90:	18.40	
297	ST146	12 57 21.51	+29 41 26.0	18.80:	18.85:	18.50:	D
298	PB3195	12 57 22.35	+27 40 57.9	18.75:	18.55:	18.35	
299*	L1408-19, KUV494-19,	12 57 22.69	+27 50 10.7	14.75	15.45	15.50	WD
	US106, PG1257+278						
300	ST1	12 57 22.93	+31 37 15.2	18.50:	18.50:	17.90:	D
301	A2-296, PB3196, US107	12 57 23.49	+26 55 27.9	18.30	18.80:	18.90	
302	US108	12 57 24.96	+30 4 42.9	18.35	18.25	17.95	
303*	PB3197	12 57 25.03	+30 3 23.4	18.15	18.45	18.20	
304	US109	12 57 25.28	+31 9 6.4	19.00:	18.85:	18.50:	D
305	PB3198	12 57 26.77	+26 42 43.7	17.30	17.45	17.15	
306	US110	12 57 28.57	+28 22 36.9	17.60	17.70	17.25	
307	PB3199, ST269, US111	12 57 29.88	+29 7 8.5	18.10	18.20	17.90	
308	ST270	12 57 33.21	+29 14 53.6	19.40:	18.95:	18.55	
309	ST134	12 57 33.28	+30 58 36.0	16.65	16.80	16.15	
310*	US112	12 57 35.41	+26 47 25.6	16.50	16.65	16.15	
311	A2-297	12 57 36.25	+29 35 48.7	16.30	16.30	16.20	
312	US114	12 57 36.40	+31 32 47.8	17.40	17.55	17.00	
313	US113	12 57 36.56	+32 18 13.5	18.90:	19.30:	19.25	
314	ST151	12 57 37.28	+29 34 30.1	18.70:	18.75:	18.55	
315	US115	12 57 38.14	+28 33 50.0	19.45:	18.65:	18.45	
316	A2-299	12 57 39.10	+29 36 44.8	17.60	17.70	17.20	
317	ST139	12 57 39.13	+30 33 6.0	18.85:	18.85:	18.25:	D
318	A2-300, PB3200	12 57 40.07	+30 2 33.6	18.05:	18.10:	17.05:	D
319	US116	12 57 42.42	+32 9 32.5	16.35	16.35	16.20	
320	ST150	12 57 43.35	+29 36 59.6	19.30:	19.25:	18.95:	D
321	A2-302, PB3201	12 57 44.09	+26 54 23.0	18.30	18.25	17.80	
322	US117	12 57 45.31	+28 45 33.3	19.25:	18.90:	18.50	
323	A2-305	12 57 45.31	+28 42 0.6	16.65	16.75	16.30	
324	US118	12 57 46.06	+28 45 7.3	19.00:	18.95:	18.70	
325	TN689, PB3202	12 57 46.52	+29 18 57.4	15.05	14.90	14.95	
326	PB3203, ST144, US119	12 57 50.20	+29 49 22.0	18.05:	18.40:	18.50:	D?
327	PB3204	12 57 50.94	+29 28 34.3	18.75:	18.65:	18.25	
328	TN688, A2	12 57 54.27	+27 35 54.6	16.20	16.35	16.15	
329	A2-311	12 57 54.28	+29 34 51.9	17.20	17.10	16.65	
330	A2-313, US120	12 57 57.84	+30 22 57.2	17.00	17.10	16.60	
331	PB3205, ST140, US121	12 58 1.64	+30 24 31.1	17.90	17.55	17.35	
332	PB3206	12 58 3.19	+26 21 57.0	18.15	18.55:	18.80	
333	ST284	12 58 3.48	+27 58 14.6	18.75:	18.95:	18.40	
334	TN690, A2-315	12 58 3.97	+27 35 22.5	17.10	17.15	16.85	
335	A2-316, 5C4-105,	12 58 4.12	+28 46 19.1	17.10	17.55	17.25	QSO
	PB3207, ST265,						
	KUV494-59, US122						
336	ST133	12 58 4.33	+31 0 28.8	19.25:	19.45:	18.05:	D
337	ST149	12 58 6.69	+29 36 37.3	18.90:	18.55:	17.65:	D
338	US123	12 58 7.08	+28 40 53.7	19.25:	19.00:	18.70	
339	ST132	12 58 8.12	+31 0 49.8	18.50	18.50:	17.85	
340	US124	12 58 8.89	+31 15 14.3	18.05	18.30	17.65	

ANNEX 1 (*continued*)

341	A2-320	12 58 9.50	+28 22 39.7	16.70	16.70	16.10		
342	A2-322	12 58 10.81	+31 7 33.6	17.95	17.85	17.45		
343	A2-323	12 58 11.93	+29 25 28.7	16.10	16.25	15.90		
344	US125	12 58 12.76	+30 57 20.8	18.55	18.60:	18.05		
345	US126	12 58 14.54	+27 33 29.0	18.70:	18.65:	18.30		
346	PB3208, US127	12 58 14.76	+29 16 37.9	19.15:	19.10:	18.60		
347	PB3209, US128	12 58 15.97	+31 47 55.5	17.70	18.55:	18.35		
348	PB3212	12 58 16.00	+28 9 7.1	19.00:	19.35:	19.05		
349	PB3211	12 58 16.23	+28 47 17.7	15.15:	15.45:	14.15:	D	
350	TN691, PB3210, KUV494-41	12 58 16.92	+29 8 45.3	16.55	16.25	16.30		
351	PB3213	12 58 18.28	+28 10 0.4	18.35	18.20	17.70		
352	US129	12 58 20.53	+27 58 37.8	16.70	16.80	16.60		
353	ST123	12 58 20.53	+30 17 13.3	18.40	18.60:	18.20		
354	ST127	12 58 23.08	+30 41 15.3	18.25	18.20	17.95		
355	TN692, A2	12 58 23.26	+27 21 30.9	15.90	16.20	16.00		
356	A2-327, W61972, PB3214, ST264, KUV494-71, US130	12 58 23.68	+28 39 28.8	16.75	17.75	17.75		QSO
357	A2-326	12 58 23.69	+29 35 23.0	16.15	16.35	16.00		
358*	US131	12 58 24.27	+30 10 59.8	17.15	17.40	17.00		
359*	A2-328, US132	12 58 24.75	+30 11 4.2	17.55	17.55	17.20		
360	PB3215	12 58 25.78	+27 7 56.0	17.70	17.80	17.50		
361	A2-329	12 58 29.38	+30 57 36.8	17.10	17.15	16.55		
362	US133	12 58 29.77	+28 29 21.2	18.10	18.05	17.85		
363	ST124, US134	12 58 30.94	+30 19 13.0	18.05	18.00	17.50		
364	ST125	12 58 31.38	+30 26 8.2	17.90	17.85	17.35		
365	ST292	12 58 32.04	+27 36 11.7	18.60	18.40	18.05		
366	US135	12 58 33.83	+27 5 29.0	19.40:	19.10:	18.80		
367	A2-330, W62385, PB3216, ST, KUV494-44, US136	12 58 36.44	+28 35 52.6	16.65	17.60	17.40		QSO
368	ST126	12 58 36.72	+30 29 10.1	18.70:	18.90:	18.35		
369	ST277	12 58 37.74	+28 9 8.0	18.35	18.25	18.10		
370	ST291	12 58 38.81	+27 35 58.0	18.50	18.60:	18.45		
371	ST129	12 58 43.06	+30 56 2.1	18.25:	18.35:	17.85:	D	
372	PB3217, ST6, US137	12 58 43.34	+31 31 55.8	17.15	18.10	18.45		
373	US138	12 58 44.18	+31 15 11.7	16.30	16.50	15.95		
374*	A2-333, PB3218, LP322-329, ST148, KUV494-60, US139	12 58 44.23	+29 42 15.9	17.15	17.75	17.95		WD
375	ST130	12 58 46.20	+30 58 56.7	18.30	18.30	17.85		
376	ST290	12 58 46.63	+27 48 18.5	17.85:	18.00:	17.50:	D	
377	PB3219, US140	12 58 48.28	+31 45 30.2	18.35	18.80:	18.65		
378	US141	12 58 48.47	+28 3 54.8	17.90	18.25	17.90		
379	PB3220	12 58 51.41	+27 4 29.2	18.60	18.60:	18.25		
380	5C4-127, US142	12 58 55.78	+28 37 44.6	18.55	19.45:	19.40:		QSO
381	A2-338	12 58 57.30	+28 11 6.7	16.60	16.85	16.40		
382	PB3221	12 58 58.07	+32 24 46.1	18.05	17.50	17.40		
383	A2-339	12 58 59.72	+28 23 26.4	17.65	17.60	17.10		
384	PB3222	12 59 1.43	+26 42 39.1	17.90	18.25	17.70		
385	A2-340	12 59 2.65	+28 2 54.3	17.75	17.75	17.40		
386	PB3223, ST361, US143, EXO1259+282	12 59 3.64	+28 7 13.6	17.55	18.25	17.50		AG X
387	A2-342	12 59 4.49	+26 34 7.7	17.40	17.40	17.20		
388	A2-343	12 59 4.61	+26 36 31.1	17.55	17.50	17.15		
389	PB3224	12 59 6.60	+31 13 35.8	18.55	19.00:	19.05		
390	A2-344, US145	12 59 10.58	+28 32 37.6	17.95	17.95	17.40		
391	US144	12 59 11.26	+26 43 0.7	19.10:	19.20:	18.95		
392	ST278	12 59 11.33	+28 18 20.4	19.00:	19.00:	18.65:	D	
393	ST263	12 59 11.44	+28 54 50.7	18.35	18.65:	18.35		
394*	ST8	12 59 12.42	+31 12 10.9	18.40	18.45	17.95		
395	US146	12 59 13.46	+32 20 36.9	17.20	17.25	16.80		
396*	PB3225, ST143, US147	12 59 15.07	+29 55 43.9	18.00	18.35	18.35		
397	PB3226	12 59 16.36	+30 37 42.2	19.00:	18.80:	18.20:	D	
398	TN693, A2, KUV494-48, US148	12 59 16.73	+27 43 6.4	16.40	16.65	16.45		
399	PB3227, US149	12 59 18.41	+30 11 2.2	18.45	18.35	18.05		
400*	A2-347, PB3228, ST, US150, EXO1259+285	12 59 20.47	+28 27 39.1		19.30:	19.60:		QSO X
401*	US151	12 59 21.14	+32 0 32.8	19.10:		20.00:		
402	ST9	12 59 21.19	+31 9 46.1	18.65	18.70:	18.05		
403	A2-348	12 59 25.95	+29 10 1.5	17.65	17.70	17.45		
404	PB3229	12 59 26.06	+32 26 18.3	17.95	18.35	18.45		
405	A2-349	12 59 26.41	+29 18 5.2	16.70	16.70	16.15		
406	US152	12 59 28.03	+31 46 59.0	17.80	17.80	17.20		
407	US153	12 59 28.23	+31 26 54.5	18.20	18.20	18.05		
408	PB3230	12 59 28.80	+31 51 13.3	19.35:	19.10:	19.05		
409*	F71, PB3231	12 59 29.19	+29 51 4.5	10.50	10.55	10.70		B8III
410	PB3232, B264, US154	12 59 32.09	+32 21 54.7	16.50	17.25	16.65		AG
411	ST159	12 59 32.59	+29 39 10.6	18.40:	18.25:	17.85:	D	
412	US155	12 59 36.26	+27 57 3.1	18.00	18.20	17.70		
413	US156	12 59 36.45	+29 14 54.0	19.50:	19.30:	20.00:		
414	A2-352	12 59 36.63	+27 33 7.5	18.15	18.05	17.60		
415	US157	12 59 37.37	+32 10 53.4	16.80	16.85	16.35		
416	A2-353, PB3233, US158	12 59 38.32	+27 14 16.2	16.10	17.15	17.05		
417	ST7	12 59 40.70	+31 16 48.3	18.25	18.30	17.85		
418	PB3234, ST	12 59 41.10	+29 8 21.3	18.60	19.45:	19.30		
419	ST156	12 59 41.64	+29 22 51.7	18.10:	17.80:	17.00:	D	
420*	US159	12 59 45.42	+28 17 40.1		19.40:	19.10		
421	PB3235, US160	12 59 46.72	+31 33 54.1	17.95	18.70:	18.60		
422	A2-354, PB3236, ST128, US161	12 59 49.04	+30 57 27.9	18.10:	18.75:	18.35:	D?	
423	US162	12 59 52.01	+26 55 20.1	19.35:	19.45:	19.65:		
424	ST281, US163	12 59 52.63	+27 58 53.0	18.20	18.20	18.00		
425	A2-356	12 59 54.68	+28 18 5.9	17.95	18.15	17.80		
426	ST119	12 59 55.92	+30 26 14.4	18.05	17.95	17.55		
427*	PB3238, ST367, US164	12 59 56.88	+31 12 27.4	18.95:		19.50:		
428	PB3239, US165	12 59 57.60	+29 41 57.8	18.40	18.20	17.95		
429	PB3237	12 59 57.62	+31 43 23.4	18.60	18.75:	18.35		
430	ST157	12 59 58.92	+29 25 4.5	19.25:	18.60:	18.05:	D	
431	PB3240, US166	13 0 0.09	+32 14 3.7	15.55:	15.70:	14.90:	D	
432	ST160	13 0 0.71	+29 47 25.5	18.10	18.10	17.65		
433	PB3241, ST, KUV494-42	13 0 1.55	+29 7 36.4	16.90:	17.30:	16.15:	D	
434	US167	13 0 4.56	+32 4 33.5	18.85:	19.15:	18.15:	D	
435	US168	13 0 5.37	+31 21 26.6	18.60	18.50:	18.00		
436	A2-359, PB3242, US169	13 0 5.74	+27 10 33.9	18.05	18.95:	19.00		
437	PB3243	13 0 7.16	+26 22 23.5	18.35	18.35	18.25		
438	A2-361	13 0 7.24	+28 53 43.9	16.55	16.90	16.50		
439	PB3244	13 0 7.62	+32 29 39.3	18.35	18.25	17.90		
440	ST293	13 0 7.99	+27 39 42.6	18.20:	17.80:	17.05:	D	
441	PB3245, US170	13 0 8.41	+31 59 6.3	18.85:	19.20:	19.80:		
442	US171	13 0 9.47	+31 5 2.0	18.75:	18.75:	18.10		
443	A2-363	13 0 12.65	+30 27 40.1	18.00:	17.80:	16.95:	D	
444	PB3246, US172	13 0 12.67	+31 41 40.8	18.85:	19.25:	19.50:		
445	PB3248, US173	13 0 12.82	+29 38 33.0	18.40	18.70:	18.75		
446*	PB3247, ST, US174	13 0 13.23	+31 7 53.2	17.25:	17.70:	17.45:	D?	
447	PB3249, ST280, US175	13 0 13.49	+28 7 33.5	17.80	18.50:	18.60		
448	US176	13 0 15.23	+26 47 8.1	18.40:	18.75:	18.45:	D?	
449	A2-366, PB3250	13 0 16.02	+27 20 8.1	17.65	18.55:	18.65		
450*	LB27, W64217, PB3251, ST282, KUV494-04, US177, PG1300+279	13 0 17.37	+27 56 48.3	13.00	13.90	14.40		sdB
451	PB3252, ST118, US178	13 0 18.49	+30 38 18.7	18.30:	19.05:	18.85:	D	

ANNEX 1 (*continued*)

452	US179	13 0 19.33	+30 11 8.4	19.05:	18.85:	18.45		
453	ST121	13 0 20.08	+30 29 17.5	18.15:	18.20:	17.70:	D	
454	ST260	13 0 21.23	+29 8 23.4	18.05	18.10	17.75		
455	US180	13 0 22.54	+29 40 50.7	19.40:	19.10:	19.40:		
456	A2-368	13 0 23.93	+30 39 33.5	16.90	17.10	16.50		
457	A2-369, PB3253, US181	13 0 24.83	+27 15 13.5	17.70	18.35	18.25		
458	KUV494-49	13 0 27.94	+27 45 53.9	16.45	16.45	16.15		
459	PB3254	13 0 29.85	+27 57 53.6	19.25:	19.30:	19.30		
460	A2-370, PB3255, ST162, US182	13 0 30.86	+30 5 21.0	17.50:	18.10:	17.85:	D	
461	PB3256	13 0 33.53	+29 2 41.6	18.30	18.55:	17.90		
462	PB3257, US183	13 0 34.69	+32 11 54.0	18.25	18.65:	18.90		
463	A2-371	13 0 35.03	+27 39 15.1	17.80	18.05	17.65		
464	US184	13 0 36.01	+30 50 8.7	18.65:	18.65:	18.15:	D	
465	US185	13 0 36.59	+31 57 52.9	17.45	17.55	17.05		
466	US186	13 0 37.94	+31 59 58.7	18.35	18.25	17.90		
467	PB3258	13 0 40.95	+29 34 9.8	19.10:	19.05:	19.35		
468	ST117	13 0 40.95	+30 35 27.5	18.90:	18.85:	18.55:	D	
469	A2-374	13 0 43.88	+27 10 42.2	17.45	17.60	17.25		
470	US188	13 0 44.62	+31 16 12.2	18.65	18.45	17.95		
471	ST298	13 0 47.70	+27 50 6.9	18.35	18.40	18.25		
472	TN694, A2-375, W62579, PB3259, ST, KUV494-47, US189	13 0 48.88	+28 27 13.4	16.45	17.45	17.10		QSO
473	TN141, US190	13 0 49.65	+28 56 15.6	15.40	15.20	15.15		
474	PB3260	13 0 50.19	+29 59 27.4	18.00	17.85	17.05		
475*	US191	13 0 50.55	+32 35 16.1	18.90:	19.05:			
476	KUV494-37	13 0 52.86	+30 42 30.0	16.30	16.60	16.15		
477	PB3261	13 0 53.74	+28 0 39.1	19.00:	18.60:	18.70		
478*	US187	13 0 54.42	+26 44 27.2	17.75	17.65	17.20		
479	PB3262, US192	13 0 56.39	+30 15 41.5	18.75:	19.25:	19.70:		
480	A2-378	13 0 58.33	+27 23 34.7	17.40:	17.90:	17.30:	D	
481	US193	13 0 58.36	+28 47 15.9	18.65	18.75:	18.10		
482	US194	13 0 59.83	+31 28 58.4	17.25	17.45	17.20		
483	PB3263	13 1 0.61	+26 23 27.8	18.45	18.55:	18.35		
484	ST122	13 1 1.29	+30 12 5.7	19.40:	18.80:	18.45		
485*	PB3264, KUV494-34, US195	13 1 3.47	+31 43 27.3	17.45:	17.80:	17.45:	D	
486	ST115	13 1 4.66	+30 46 55.8	18.70:	18.55:	18.20:	D	
487	A2-380	13 1 6.27	+27 31 14.4	17.95	17.90	17.50		
488	ST164	13 1 6.55	+29 52 12.2	19.10:	19.05:	18.45		
489	ST13	13 1 9.03	+31 9 38.7	18.50	18.45:	17.85		
490	A2-381	13 1 9.31	+28 46 48.6	17.70	17.60	17.30		
491	PB3265, ST256, US196	13 1 9.97	+28 36 27.5	18.25:	19.05:	18.95:	D	
492	US197	13 1 11.08	+27 38 0.4	17.95	17.90	17.50		
493	ST255	13 1 11.71	+28 32 27.5	18.70:	18.70:	18.05		
494	US198	13 1 12.46	+29 13 56.2	18.20	17.90	17.80		
495	ST113	13 1 12.51	+30 50 11.3	18.65	18.50:	17.85		
496	A2-384	13 1 12.62	+29 34 10.9	16.50	16.70	16.35		
497	ST112	13 1 13.90	+30 56 20.5	18.60	18.40	18.15		
498	ST165	13 1 14.86	+29 53 8.9	19.45:	19.40:	18.05:	D	
499	ST163	13 1 15.15	+29 58 40.4	19.55:	19.35:	18.95		
500	A2-387	13 1 18.94	+27 46 35.0	18.25	18.25	17.70		
501	A2-389	13 1 19.35	+29 53 35.7	17.70	17.70	17.20		
502	A2-390, PB3266, US199	13 1 21.29	+26 49 19.2	17.50	18.05	17.80		
503*	TN143, A2-391, PB3267, KUV494-08, US200, PG1301+270	13 1 22.06	+27 2 35.5	14.05	15.45	15.75		sdO
504	PB3268, US201	13 1 24.98	+28 49 29.2	18.50	19.00:	18.80		
505*	ST295, US202	13 1 27.21	+27 32 26.1	18.00	18.05	17.70		
506	US203	13 1 27.99	+30 57 2.6	18.50	18.50:	18.00		
507	ST12	13 1 28.85	+31 21 6.7	18.45	18.45:	18.00		
508	W34497, ST, US204	13 1 29.40	+29 53 13.8	18.05	18.10	17.80		
509	W33211, ST114, KUV494-61, US205	13 1 30.53	+30 42 38.1	17.10	17.55	17.30		QSO
510*	US206	13 1 35.78	+27 53 23.3	18.40	18.20	18.05		
511	KUV494-43	13 1 37.21	+29 32 15.5	15.85	15.80	15.80		
512	KUV494-50	13 1 37.23	+27 33 16.4	17.15	17.25	16.85		
513	A2-399	13 1 38.04	+28 49 14.4	16.10	16.35	15.90		
514	PB3269, US207	13 1 38.06	+29 22 52.2	18.50	18.75:	18.90		
515	A2-400, KUV494-45	13 1 38.12	+28 47 44.5	17.05	17.10	16.50		
516	PB3270	13 1 40.33	+28 35 5.6	19.10:	18.80:	18.60		
517	US208	13 1 42.25	+29 42 22.9	18.85:	18.90:	18.45		
518	US209	13 1 43.24	+32 18 59.5	18.40	18.10	17.90		
519	US210	13 1 44.40	+29 25 35.5	18.95:	18.95:	18.35:	D	
520	US211	13 1 46.05	+29 35 47.3	18.60	18.80:	18.90		QSO
521	PB3271	13 1 46.23	+29 23 1.2	18.45	18.50:	18.20		
522	PB3272	13 1 48.33	+27 40 23.7	18.65	18.80:	18.15		
523	US212	13 1 48.36	+26 34 47.6	18.45	18.60:	19.10		
524	PB3273, US213, 57-1599	13 1 48.69	+30 9 53.4	18.05:	18.10:	17.85:	D	
525	ST302	13 1 48.86	+28 19 14.7	18.85:	18.85:	18.15		
526	A2-404, PB3274, US214	13 1 50.51	+27 14 48.7	18.10	18.35	18.40		
527	A2-405	13 1 51.89	+27 18 56.5	17.30	17.50	17.10		
528	PB3275, ST297	13 1 51.99	+27 48 22.9	18.65:	18.95:	18.80:	D	
529*	ST10	13 1 52.50	+31 33 17.5	18.65:	18.25:	17.65:	D	
530	US215, 57-1778	13 1 53.08	+29 7 7.1	19.00:	18.70:	18.50:	D	
531	PB3276, US216	13 1 53.74	+31 40 12.6	18.50	18.95:	18.75		QSO
532	PB3277, ST299	13 1 58.01	+27 54 24.9	18.90:	18.25	18.25		
533	KUV494-35	13 2 0.16	+31 46 28.9	15.80	15.50	15.45		
534	ST111	13 2 0.34	+30 44 38.1	19.50:	19.05:	18.75		
535	US217	13 2 1.21	+30 15 45.0	17.45	17.55	17.00		
536	A2-407, 57-1819	13 2 3.49	+28 58 25.5	16.90	17.00	16.55		
537	ST110	13 2 5.76	+30 44 44.0	18.05	17.95	17.60		
538	ST301	13 2 5.96	+27 58 32.1	18.60	18.40	18.05		
539	ST11, US218	13 2 6.38	+31 29 12.4	18.25	18.75:	18.40		
540	US219	13 2 6.40	+29 29 13.9	19.20:	19.40:	19.45:		
541	PB3278, ST253, KUV494-62, US220	13 2 7.41	+28 34 11.2	18.10:	18.25:	17.55:	D	
542	A2-409	13 2 9.26	+28 25 23.8	17.25	17.35	16.75		
543	TN695	13 2 9.32	+27 17 21.5	16.45	16.60	16.15		
544	PB3279, US221	13 2 11.17	+32 22 38.8	18.05	18.65:	18.45		
545*	A2-410, KUV494-46, 57-1815	13 2 11.94	+28 53 43.4	16.10:	15.90:	14.40:	D	
546	A2-411	13 2 12.11	+28 19 4.6	17.20	17.30	16.60		
547	ST300	13 2 14.05	+27 53 27.8	18.25:	17.75:	17.70:	D	
548	PB3280	13 2 15.00	+31 13 58.2	18.45	18.55:	18.25		
549	LB28, PB3282, KUV494-02, US222	13 2 17.05	+31 45 9.2	15.60	16.85	17.40		
550	ST107, US223	13 2 17.47	+30 23 26.3	17.25	17.50	17.00		
551	PB3281	13 2 17.59	+32 9 25.0	18.75:	18.90:	18.55		
552	PB3283, US224	13 2 20.07	+30 35 22.0	18.75:	19.30:	19.65:		
553	A2-414	13 2 20.52	+28 18 48.2	18.00	18.05	17.50		
554*	US225	13 2 22.05	+31 15 2.3	18.85:	19.10:	19.25		
555*	US226	13 2 22.11	+27 35 55.2	19.10:	19.40:	19.60:		
556	US227	13 2 23.98	+32 4 29.2	18.55	18.50:	18.15		
557	US228	13 2 24.65	+31 5 57.3	16.20	16.30	15.80		
558*	HZ39, PB3284, ST303, KUV494-03, US229, PG1302+283	13 2 24.74	+28 23 33.2	14.10	15.25	15.50		WD
559	PB3285	13 2 27.01	+31 46 34.4	18.85:	18.60:	18.30		
560	US230	13 2 27.46	+31 30 31.2	18.65	18.50:	18.30		
561	US231, 57-1537	13 2 28.11	+30 5 32.1	18.10	18.30	17.85		
562	A2-417	13 2 29.20	+27 53 52.9	17.20	17.20	16.55		

ANNEX 1 (*continued*)

563	PB3286, US232	13 2 30.09	+31 40 34.5	18.50	19.00:	18.95	
564	ST14, US233	13 2 33.14	+31 16 5.3	18.60	18.50:	18.35	
565	A2-418	13 2 35.71	+27 24 41.1	17.40	17.70	17.25	
566	A2-419, 57-1722	13 2 37.90	+29 27 20.1	18.55	18.40	17.85	
567	ST245, 57-1741	13 2 37.91	+29 18 49.3	18.50	18.60:	18.10	
568	PB3287, ST304, US234	13 2 38.41	+28 22 3.9	18.45	18.85:	18.45	
569	KUV494-38, US235	13 2 41.59	+30 43 21.0	16.90	17.00	16.60	
570	PB3288, 57-1629	13 2 42.34	+29 46 19.2	17.60	17.75	17.45	
571	A2-421	13 2 43.58	+26 57 12.3	17.75	17.90	17.35	
572	A2-422, 57-1676	13 2 44.34	+29 27 59.5	16.80	17.00	16.75	
573	US236	13 2 44.40	+32 6 49.6	18.50:	17.85:	17.40:	D
574	ST249, US237, 57-1802	13 2 45.25	+28 53 19.3	18.80:	19.05:	19.25:	D
575	PB3289	13 2 45.55	+30 33 18.5	19.35:	18.85:	18.05:	D
576	ST168, 57-1577	13 2 45.59	+29 56 55.0	17.95	18.30	17.85	
577	US238	13 2 46.67	+30 53 7.7	18.75:	18.55:	18.20	
578	PB3290	13 2 47.67	+31 47 18.9	19.00:	18.70:	18.35	
579	US239, 57-1787	13 2 48.18	+29 3 47.9	17.10	16.95	16.50	
580	PB3291	13 2 52.15	+26 29 6.9	17.65:	18.00:	17.05:	D
581	ST170, 57-1671	13 2 53.33	+29 23 45.4	19.00:	19.20:	19.05:	D
582	US240	13 2 53.95	+28 35 12.4	17.45	17.70	17.15	
583	US241, 57-1799	13 2 54.47	+28 54 19.9	18.10	18.15	17.50	
584	Mark62, PB3292, ST108, KUV494-39	13 2 55.96	+30 32 42.0	16.40:	16.35:	15.25:	D
585	ST305	13 2 56.15	+28 13 40.4	18.40	18.15	17.65	
586	TN696	13 2 56.42	+26 55 47.7	15.95	16.30	15.90	
587	PB3293	13 2 56.60	+31 35 36.5	19.05:	19.30:	19.10	
588*	US242	13 2 56.69	+27 33 45.6		19.30:	19.65:	D
589	US243	13 3 0.87	+27 6 16.5	19.00:	19.00:	19.30	
590	KUV494-51	13 3 2.27	+27 34 17.0	15.75	15.95	15.55	
591	ST106	13 3 2.70	+30 29 2.5	18.30	18.45	17.80	
592*	PB3294	13 3 3.32	+30 13 38.0		18.90:	19.10	
593	A2-425, 57-1796	13 3 6.33	+28 59 10.4	18.50	18.40	17.65	
594	US244	13 3 6.60	+32 8 47.0	18.40	18.25	17.40	
595	ST250, US245, 57-1797	13 3 7.96	+28 55 3.2	18.05:	18.80:	17.95:	D
596	A2-426	13 3 9.19	+27 32 6.4	17.75	17.80	17.15	
597	A2-427	13 3 11.04	+27 51 28.9	16.45	16.90	16.35	
598	US246	13 3 12.20	+28 46 17.6	18.80:	19.35:	19.90:	
599	A2-428, 57-1254	13 3 13.61	+29 16 9.3	18.05	17.90	17.55	
600	US247	13 3 13.70	+28 46 9.1	18.90:	19.20:	18.65	
601	US248	13 3 14.11	+31 40 36.4	18.05	18.15	17.90	
602	US249	13 3 17.51	+32 12 7.3	17.40	17.60	16.75	
603	US251	13 3 21.82	+31 10 40.2	17.85	17.80	17.30	
604	PB3295, 57-1248	13 3 21.96	+29 8 18.2	16.20:	16.45:	15.45:	D
605	US252	13 3 22.90	+30 50 29.4	17.00	16.85	16.70	
606	US254	13 3 25.55	+29 18 30.4	19.25:	19.45:	19.50:	
607	ST97	13 3 29.44	+30 44 41.8	18.20	18.15	17.70	
608	US255, 57-1337	13 3 30.83	+29 39 3.7	18.65	18.70:	18.10	
609	W22722, PB3296, ST96, KUV494-63, US256	13 3 32.02	+30 48 54.7	17.10	17.85	17.45	
610*	PB3297, KUV494-13	13 3 35.43	+27 6 38.9	12.75	12.75	12.85	
611	ST95	13 3 35.90	+30 52 56.9	18.35	18.60:	18.25	
612	A2-432	13 3 38.16	+27 28 5.5	17.75	17.85	17.10	
613	TN697, KUV494-52	13 3 38.91	+27 22 47.4	16.55	16.60	16.55	
614	ST15	13 3 40.32	+31 18 38.3	18.25	18.10	17.80	
615	TN144, PB3298, KUV494-53	13 3 41.85	+27 51 30.8	16.70	16.55	16.55	
616	PB3299, ST, US257	13 3 43.17	+27 48 33.6	18.50	18.85:	18.95	
617	ST105	13 3 44.50	+30 29 11.2	18.55:	18.45:	17.85:	D
618	US258, 57-1314	13 3 45.40	+29 25 25.2	18.70:	18.30	17.60	
619	PB3300	13 3 46.91	+30 21 39.6	18.35	19.00:	19.25	
620	US259	13 3 47.38	+32 0 4.1	19.45:	19.45:	19.65:	
621*	ST242, 57-1266	13 3 47.70	+29 18 26.9	13.90:	14.15:	13.90:	
622	PB3301	13 3 47.94	+31 30 4.3	19.05:	19.30:	19.75:	
623	PB3302	13 3 49.47	+27 55 53.6	19.05:	19.10:	18.65	
624	PB3303, ST314, US260	13 3 51.37	+27 52 36.0	18.20:	18.75:	19.15:	D
625	A2-433, US261, 57-1283	13 3 52.10	+29 10 36.1	18.25	18.35	17.95	
626	LB30, W21541, PB3304, ST16, KUV494-64, US262	13 3 54.25	+31 21 31.3	16.75	17.90	17.70	QSO
627	PB3305, US263	13 3 55.25	+26 40 40.2	18.25	18.85:	18.80	
628	US264	13 3 55.86	+28 44 11.2	19.45:	19.25:	18.55:	D
629	US265, 57-1450	13 3 56.49	+29 53 40.4	18.75:	18.90:	18.35	
630	US266	13 3 57.77	+30 23 40.2	18.30	18.30	18.05	
631	A2-434, ST315	13 3 57.79	+27 36 58.1	18.05	17.90	17.75	
632	ST252	13 3 58.37	+28 38 27.3	19.40:	19.10:	18.45:	D
633	A2-435, PB3306, ST, 57-1311	13 3 58.76	+29 24 8.5	17.95	18.00	17.60	
634	US267, 57-1282	13 3 59.34	+29 9 34.6	19.00:	18.70:	18.40	
635	PB3307, US268	13 3 59.62	+31 50 1.6	19.05:	19.20:	19.00:	D
636	US269, 57-1226	13 3 59.65	+29 1 5.5	16.70	16.95	16.45	
637	PB3308	13 4 0.14	+28 29 27.6	18.00	18.10	17.45	
638*	PB3309	13 4 0.17	+26 39 25.1	11.85	12.00	11.60	sd ?
639	ST98	13 4 2.75	+30 35 3.9	18.40	18.35	18.05	
640	PB3310, ST180, US270, BG57-3, 57-1467	13 4 3.31	+30 8 19.9	18.35	19.05:	18.90	QSO
641	PB3311, ST	13 4 6.05	+28 28 20.4	18.55	19.20:	19.35	
642	US271, 57-1305	13 4 11.24	+29 26 54.6	16.65	16.90	16.20	
643	US272	13 4 11.78	+31 5 34.8	18.95:	19.00:	18.90	QSO
644	PB3312, US273	13 4 14.08	+32 27 35.8	17.95	18.55:	18.30	
645*	PB3313, 57-1291	13 4 14.52:	+29 7 2.2:	14.10:	13.40:	11.85:	D
646	US274	13 4 18.22	+29 42 30.0	19.25:	19.20:	18.95	
647	A2-438	13 4 18.57	+27 59 11.7	17.75	18.15	17.55	
648	PB3314, ST103	13 4 18.59	+30 30 18.8	18.50	18.40	17.95	
649	ST104	13 4 18.77	+30 28 0.9	18.40	18.45	18.10	
650	US275	13 4 21.28	+32 2 51.5	17.65	17.85	17.45	
651*	US276	13 4 22.06	+30 43 18.9		19.30:	19.15	
652	PB3315, ST, US277	13 4 23.16	+28 39 55.0	18.60	18.85:	18.90	
653	A2-440, 57-1297	13 4 23.63	+29 15 49.0	17.30	17.40	16.45	
654	US278, 57-1298	13 4 24.12	+29 14 52.9	18.70:	19.00:	18.85	
655*	US280	13 4 25.57	+26 57 29.5	18.65:	18.75:	18.35	
656*	PB3316, US279	13 4 25.61	+26 47 33.1	18.05	18.30	18.15	
657	PB3318, ST172, US281, 57-1368	13 4 27.11	+29 25 29.9	17.90	18.75:	18.50	
658	PB3317	13 4 27.57	+30 24 41.3	19.05:	19.45:	19.35	
659	A2-441, PB3319, ST241, 57-1296	13 4 27.70	+29 15 51.0	18.30	18.95:	18.25	
660	A2-442	13 4 28.13	+27 59 21.7	17.70	17.90	17.30	
661	US282	13 4 28.24	+32 25 35.6	18.60	19.00:	18.45	
QSO 662	PB3320, ST173, 57-1369	13 4 28.43	+29 30 11.9	18.60	19.00:	19.05	
NHB 663	US283, BG57-8	13 4 32.30	+29 20 34.8	18.65	19.20:	19.30	QSO
664	US284, 57-1472	13 4 33.25	+30 7 37.0	18.40:	18.95:	18.05:	D
665	PB3321, US285	13 4 33.97	+32 14 39.6	16.30	16.30	16.25	
666	US286	13 4 34.54	+30 47 35.5	16.25	16.40	15.85	
667	A2-443	13 4 35.69	+27 45 37.9	18.25:	18.45:	18.05:	D
668*	PB3322, ST17, KUV494-65, US287	13 4 37.81	+31 18 25.9	17.70	18.10	18.05	
669	PB3323, ST, US288	13 4 39.59	+28 38 13.4	18.25:	19.05:	18.70:	D?
670*	A2-445	13 4 39.80	+27 52 46.6	17.00	17.05:	16.65:	
671	PB3324, BG57-10, 57-1105	13 4 41.45	+29 17 32.9	18.70:	18.90:	19.15	AG
672	KUV494-66	13 4 42.35	+28 21 35.1	18.05	18.15	17.65	
673	A2-446	13 4 43.21	+27 25 30.7	16.60	16.70	16.25	

ANNEX 1 (*continued*)

674	A2-447	13 4 44.30	+28 47 39.2	16.60	16.90	16.30		
675	ST306, US289	13 4 44.61	+28 20 49.4	17.35:	17.90:	17.15:	D	
676	ST313	13 4 45.05	+28 7 30.6	18.55:	18.45:	17.85:	D	
677	PB3325, US290, 57-1047	13 4 47.32	+29 27 38.7	19.05:	18.95:	18.90		
678	ST100	13 4 47.57	+30 36 17.4	19.20:	19.05:	18.55:	D	
679	US291	13 4 50.54	+31 44 31.3	18.05	18.00	17.50		
680	US292	13 4 55.38	+30 48 35.9	18.00	17.80	17.70		
681	PB3326	13 4 56.43	+26 20 16.2	18.35	18.30	17.80		
682	US293	13 4 56.82	+30 41 56.6	16.50	16.25	16.06		
683*	US294	13 4 57.62	+31 47 49.7	18.90:	18.80:	18.55		
684	PB3327	13 4 57.73	+27 33 25.3	18.10	18.15	17.85		
685	A2-449, PB3328, US295, 57-1035	13 5 0.05	+29 40 4.9	17.40:	17.35:	16.50:	D	
686	A2-450	13 5 1.05	+28 7 53.6	16.70	16.85	16.25		
687	PB3329, ST174, 57-1059	13 5 3.51	+29 30 8.6	18.70:	18.50:	18.30		
688	ST307	13 5 5.47	+28 12 0.7	19.20:	18.95:	18.40		
689	PB3330, ST312, US296	13 5 5.56	+28 2 59.3	17.80	18.50:	18.10		
690	A2-453, 57-1132	13 5 6.25	+29 10 57.8	17.15	17.25	16.60		
691	A2-454, 57-1186	13 5 7.24	+28 55 38.2	16.85	17.05	16.60		
692	PB3331, 57-909	13 5 11.61	+30 17 41.1	18.85:	18.95:	18.40:	D	
693	A2-456	13 5 12.37	+28 24 7.7	17.95	18.00	17.40		
694	US297	13 5 12.98	+32 19 30.6	16.70	16.80	16.40		
695	US298	13 5 12.98	+27 30 46.5	18.10	18.05	17.65		
696	A2-458	13 5 13.04	+28 0 31.1	16.40	16.65	15.85		
697	US299, 57-982	13 5 13.16	+29 57 26.2	17.85	17.90	17.40		
698	ST101	13 5 13.89	+30 38 7.6	19.10:	18.75:	18.60		
699	ST102	13 5 14.90	+30 35 22.5	18.80:	18.65:	18.45		
700	PB3332	13 5 21.09	+32 31 56.7	17.90	18.00	17.40		
701	ST237	13 5 21.50	+28 48 43.3	18.00	18.25	17.70		
702	A2-461	13 5 21.76	+27 53 13.2	17.20	17.00	16.55		
703	US300	13 5 22.80	+31 33 4.3	16.80	16.90	16.70		
704	A2-464, 57-1098	13 5 23.49	+29 19 36.2	17.35	17.70	17.00		
705	US301, 57-1009	13 5 24.95	+29 46 30.4	18.65	18.70:	18.10		
706	US302	13 5 25.54	+28 11 56.1	19.20:	19.20:	19.80:		
707	PB3333	13 5 25.66	+31 23 51.2	18.60	18.40	18.20		
708	US303, KKC10	13 5 26.50	+29 49 3.6	19.00:	19.45:	19.50:		QSO
709	ST238, 57-1115	13 5 30.10	+29 12 20.1	18.60	18.45	18.15		
710	PB3335, ST, US305	13 5 31.28	+30 51 52.0	18.20	18.30	18.60		
711	US304	13 5 31.29	+31 47 6.5	19.05:	18.85:	18.80		
712	PB3334, ST, US306	13 5 32.14	+31 0 29.6	18.65	18.85:	18.80		
713	US307	13 5 36.91	+30 36 20.7	16.30	16.55	15.90		
714	ST311	13 5 37.51	+28 3 9.7	17.60	18.05	17.35		
715	PB3336, ST179, US308, BG57-22, 57-928	13 5 41.35	+30 6 27.5	18.10	18.80:	18.55		QSO
716	US309	13 5 43.86	+27 55 7.3	18.40	18.40	18.05		
717	US310, KKC19	13 5 45.72	+29 50 48.7	19.35:	19.45:	19.25		QSO
718	PB3337, 57-927	13 5 47.58	+30 6 36.6	18.65	18.50:	18.10		
719	US311	13 5 48.03	+31 43 30.7	18.45	18.10	18.00		
720	ST308, US312	13 5 48.99	+28 13 56.0	18.85:	18.60:	17.95:	D	
721	ST236	13 5 49.36	+28 37 19.1	18.80:	18.90:	18.40		
722*	PB3338	13 5 51.50	+30 28 34.0		19.10:	18.75:	D	
723	US313	13 5 52.14	+29 17 22.2	19.45:	18.90:	18.00:	D	
724	PB3340, US314, WEE105, KKC28	13 5 53.22	+29 35 16.9	18.80:	19.15:	19.40:		QSO
725	PB3339	13 5 53.73	+31 44 11.3	18.65:	18.90:	19.05:	D	
726	ST18	13 5 55.94	+31 26 32.2	18.30	18.40	18.00		
727	A2-468, W51148, PB3341, ST235, KUV494-67, US315	13 5 57.12	+28 38 44.8	16.90	17.90	17.45		
728	US316	13 5 58.45	+30 56 29.7	16.85	16.90	16.40		
729	PB3342, 57-647	13 5 58.47	+29 7 22.8	18.65	18.80:	18.55		
730	PB3343	13 6 5.08	+27 5 41.1	18.15	18.25	17.90		
731	W23694, PB3344, ST182, KUV494-16, US317	13 6 7.15	+30 21 38.5	16.45	17.00	16.70		QSO
732	PB3345, ST, US318	13 6 9.94	+31 12 36.0	18.05	18.10	17.75		
733	ST19	13 6 10.97	+31 22 8.1	18.60	18.50:	18.20		
734*	US319, 57-781	13 6 17.32	+29 39 7.9	16.95:	17.00:	16.30:		
735	ST230, 57-682	13 6 19.62	+29 9 2.5	19.10:	18.90:	18.30		
736	US320, 57-761	13 6 21.45	+29 36 3.4	18.45	18.45:	18.05		
737	ST92	13 6 22.64	+31 0 25.0	19.15:	18.70:	17.55:	D	
738	PB3346, 57-710	13 6 22.87	+29 20 40.3	18.60	18.60:	18.20		
739	US321	13 6 23.23	+26 57 42.1	18.25	18.95:	19.00		
740*	US323	13 6 23.96	+27 39 51.6		19.45:	20.20:		QSO
741	US322	13 6 24.03	+32 27 34.3	18.45	18.40	17.95		
742	US324	13 6 24.33	+29 31 36.2	19.30:	19.30:	18.75		
743	ST232, US325, 57-629	13 6 24.41	+28 53 25.8	17.80:	18.20:	17.35:	D	
744	PB3347, US326	13 6 24.93	+27 36 28.2	18.20	18.45	18.35		
745	ST233	13 6 26.19	+28 50 23.6	18.40:	18.25:	17.70:	D	
746	ST90	13 6 30.83	+30 39 30.6	18.60	18.60:	18.00		
747	US327	13 6 32.24	+32 22 29.7	18.75:	18.95:	18.95		
748	KUV494-55	13 6 32.96	+27 39 8.8	17.00	17.25	16.75		
749	PB3348, US328, B2-1306+27A	13 6 33.09	+27 24 10.1	18.00	18.45	18.50		QSO
750	US329	13 6 35.01	+32 16 57.6	18.50	18.85:	18.60		
751*	PB3349, US330, BG57-37, KKC54, 57-706	13 6 36.27	+29 21 57.0	18.40	18.65:	18.50		sd ?
752	KUV494-54	13 6 36.37	+28 0 18.8	17.00	17.45	17.05		
753	US331, 57-856	13 6 39.98	+30 8 6.2	17.55	17.60	17.05		
754*	US332	13 6 40.21	+30 27 38.9	19.55:		19.50:		
755	US333	13 6 40.57	+27 10 32.9	18.15	18.15	17.70		
756	ST89	13 6 40.93	+30 36 10.5	18.55	18.50:	18.35		
757*	US334	13 6 42.05	+27 23 21.0	19.40:		20.00:		
758	PB3350, ST178, 57-820	13 6 43.25	+29 54 18.1	18.15	18.15	17.85		
759	US335	13 6 43.73	+31 50 11.3	18.95:	19.10:	19.25		
760	US336	13 6 47.10	+31 25 49.1	17.75	17.80	17.35		
761	ST88, US337	13 6 47.63	+30 32 47.5	18.25:	18.40:	17.85:	D	
762	PB3351, ST20, US338	13 6 48.98	+31 12 31.8	18.25	19.05:	18.75		
763	PB3352	13 6 50.06	+27 48 38.7	15.65	15.65	15.50		
764	ST177, 57-806	13 6 51.02	+29 47 49.3	18.75:	18.55:	18.30		
765*	US339	13 6 52.48	+31 56 23.9	17.90	18.10	17.70		
766	ST310	13 6 54.46	+28 4 38.0	18.45:	18.45:	18.20:	D	
767	US340	13 6 54.66	+27 20 13.3	18.60	19.40:	19.15		
768	US341	13 6 57.75	+31 35 10.1	17.25	17.55	16.90		
769	US342	13 6 58.91	+28 31 13.2	18.25	18.10	17.70		
770	US343	13 7 1.95	+32 18 34.2	18.80:	18.80:	18.55		
771	A2-479, 57-609	13 7 4.39	+29 2 32.9	17.45	17.55	17.30		
772	PB3353	13 7 4.45	+32 8 2.8	18.50	19.00:	18.80		
773	PB3355	13 7 4.88	+26 23 47.7	17.60	18.15	18.15		
774	ST228, 57-663	13 7 5.26	+29 11 29.2	18.85:	18.50:	17.95:	D	
775	US344	13 7 6.16	+31 32 36.4	17.50	17.65	17.35		
776	PB3354, US345, 57-669	13 7 6.34	+29 15 16.1	18.60	18.40	18.00		
777	US347	13 7 9.65	+31 0 46.0	18.80:	19.10:	19.35		
778	A2-480, 57-599	13 7 10.45	+28 52 43.4	17.60	17.30	16.80		
779	US348	13 7 11.66	+27 50 47.4	16.90	17.05	16.70		
780	PB3356, 57-884	13 7 13.66	+30 14 26.0	18.15:	18.15:	17.75:	D	
781	US349	13 7 21.28	+31 56 39.4	18.05	17.55	17.60		
782	A2-482, PB3357, ST234, US350	13 7 21.86	+28 43 32.5	17.10	17.90	17.75		
783	PB3358	13 7 22.87	+30 46 58.4	18.75:	19.15:	19.25		
784*	KUV494-57	13 7 23.67	+27 5 56.0	16.80	17.00	16.75		NHB

ANNEX 1 (*continued*)

	785	ST21	13 7 28.58	+31 10 53.6	19.35:	19.15:	17.95:	D
	786*	A2-487, PB3359, ST317, US351	13 7 29.07	+27 58 37.5	18.10	18.50:	18.30	
	787	PB3360, US352	13 7 30.19	+30 43 23.7	18.80:	18.30	18.20	
	788	A2-484	13 7 30.48	+28 45 25.7	17.80	17.95	17.45	
	789	ST175, 57-466	13 7 31.83	+29 32 56.7	19.50:	18.75:	18.20:	D
	790*	PB3361, ST176, KUV494-68, US353, KKC76, 57-461	13 7 33.75	+29 44 2.0	17.15	18.00	18.00	
	791	PB3362, ST91, US354	13 7 35.08	+30 56 26.4	17.80	18.60:	18.30	
	792	US355	13 7 38.59	+30 23 28.6	17.85	17.60	17.50	
	793*	US357, 57-481	13 7 38.63	+29 26 56.0	17.70	17.75	17.30	
	794*	PB3363, ST27, US356	13 7 38.65	+31 31 54.9	18.10	19.00:	18.70	
	795	KUV494-36, US358	13 7 39.44	+32 7 37.8	16.85	17.00	16.80	
	796	ST318	13 7 42.49	+27 58 47.9	19.05:	18.65:	18.15	
	797	US359	13 7 47.78	+30 50 57.6	17.15	17.20	16.70	
	798	US360	13 7 49.57	+27 11 43.3	18.30	18.70:	18.75	
	799*	TN145, PB3364, KUV494-12, US361	13 7 52.29	+32 13 19.4	15.30			
	800	PB3365, US362	13 7 53.25	+31 41 13.4	18.55	18.85:	18.80	
	801	PB3366, US363	13 7 53.75	+30 20 13.5	17.75:	18.85:	18.40:	D
	802	US364	13 7 55.94	+32 21 50.7	18.20	18.20	17.70	
	803	PB3367, ST23	13 7 56.53	+31 9 15.2	18.20	18.20	17.95	
	804	US365	13 7 57.83	+31 17 24.5	18.45	18.30	17.90	
	805	US366	13 8 0.31	+30 48 32.8	19.30:	19.45:	19.60:	
	806	US367, BG57-52, 57-342	13 8 0.99	+30 11 30.8	18.20	18.30	17.80	
	807	US368	13 8 1.22	+32 25 4.5	18.90:	18.55:	18.20	
	808*	US369	13 8 2.54	+30 35 24.3	19.35:		19.70:	
	809*	LB32, ST320, US370, WEE114	13 8 5.10	+28 24 32.5	17.45	17.90	18.00	
	810	ST363	13 8 5.90	+28 16 32.8	18.25	18.20	17.75	
	811	US372	13 8 10.99	+27 49 56.7	19.00:	19.45:	19.50:	D
	812	PB3368, US373	13 8 11.89	+27 59 51.6	18.50	18.55:	18.20	
	813	PB3369	13 8 12.31	+26 53 32.2	17.75	18.80:	18.80	
	814	US374	13 8 13.13	+31 53 10.6	17.90	17.95	17.50	
	815	KUV494-40, US375	13 8 13.58	+30 27 12.7	17.15	17.30	16.95	
	816	PB3370, ST319	13 8 15.00	+27 56 54.2	18.45	18.10	18.15	
	817	ST183	13 8 16.70	+30 23 14.9	18.90:	18.60:	18.30	
	818	US376	13 8 21.12	+31 54 39.4	19.50:	19.05:	19.30	
	819	US377	13 8 27.89	+30 39 57.7	18.20	18.20	17.65	
	820	PB3371	13 8 29.05	+26 31 14.9	18.25	18.30	17.95	
	821	US378	13 8 34.00	+30 35 32.5	17.45	17.75	17.45	
	822*	ST184, 57-295	13 8 34.17	+30 19 20.9	18.80:	18.60:	18.10	
	823	ST227, 57-536	13 8 34.23	+29 5 46.8	18.70:	18.65:	18.35	
	824	US379	13 8 35.50	+32 22 40.0	18.55	18.50:	18.30	
	825*	PB3372	13 8 35.77	+26 40 48.1	17.30	17.40	17.15	
	826	US380	13 8 35.94	+27 25 33.5	19.05:	19.45:	19.75:	
	827	PB3373, ST185, US381, 57-300	13 8 36.89	+30 17 2.2	17.20	18.05	17.80	
	828	US382	13 8 37.52	+26 52 3.6	17.80	17.75	17.45	
	829	US383	13 8 38.63	+29 25 20.4	19.25:	19.30:	19.25	
	830	ST226	13 8 40.11	+28 42 12.4	18.80:	18.65:	18.20	
	831	US384	13 8 40.48	+26 34 25.9	18.10	18.55:	18.55	
	832*	US385	13 8 40.58	+29 27 2.5	18.90:		19.65:	
	833	US386	13 8 42.91	+27 2 44.2	19.20:	18.95:	18.65	
	834*	US387	13 8 45.92	+32 34 35.9	18.65	18.65:	18.10:	
	835	ST322	13 8 46.22	+28 18 30.5	18.90:	18.65:	18.20:	D
	836	PB3374, ST28, KUV494-17, US388	13 8 47.58	+31 38 50.1	16.35	17.10	16.90	
	837*	TN146, KUV494-56	13 8 48.56	+28 50 53.2	16.40	16.55	15.95	
	838	ST25	13 8 50.24	+31 14 31.1	18.70:	18.65:	18.05	
	839	US389	13 8 50.56	+31 47 48.3	19.15:	18.85:	18.45	
	840	ST24	13 8 50.87	+31 14 24.7	19.35:	18.80:	18.55:	D
	841	ST82	13 8 54.27	+30 35 31.6	19.20:	18.85:	18.75	
	842	ST29	13 8 54.63	+31 30 60.0	19.15:	18.75:	18.35	
	843	ST225, US390	13 8 55.86	+28 49 30.9	17.40	17.25	17.20	
	844	PB3375, US391	13 8 56.83	+28 14 9.0	18.50:	18.85:	19.35:	D
WD	845	ST30, US392	13 8 57.86	+31 29 59.1	18.00:	18.10:	17.60:	D
	846	PB3376, US393	13 8 58.11	+31 55 14.8	17.90	18.35	18.45	
	847*	TN698, PB3377, KUV494-58, US394	13 9 1.04	+27 16 44.7	16.35:	16.90:	16.20:	D em.
	848	PB3378	13 9 2.58	+26 39 25.2	17.75	17.90	17.10	
	849	ST81, US395	13 9 3.27	+30 54 47.6	18.60:	18.50:	18.20:	D
	850	ST31	13 9 5.67	+31 32 59.4	18.80:	19.05:	18.70	
	851	PB3379	13 9 6.85	+27 16 19.9	18.10	18.90:	18.75	
	852	PB3380, ST26, KUV494-18, US396	13 9 6.91	+31 21 47.1	17.15	17.95	17.95	
	853	PB3381, ST32, US397	13 9 8.75	+31 32 1.8	18.45	19.05:	19.20	
	854*	US398	13 9 10.31	+32 35 28.7	18.10	17.50		
	855	ST360	13 9 11.06	+28 43 24.8	18.55	18.40	17.80	
	856	PB3382	13 9 13.66	+30 42 41.8	17.50	17.90	17.05	
	857	PB3383, ST324	13 9 13.67	+28 16 44.2	19.00:	18.55:	18.30	
	858	ST83	13 9 14.45	+30 36 50.3	19.30:	19.10:	18.70:	D
	859	US399	13 9 15.52	+32 8 13.6	19.15:	18.45:	18.35	
	860	PB3384, ST222, US400	13 9 18.16	+28 33 38.8	18.35	18.55:	18.40	
	861	ST224	13 9 23.20	+28 45 42.3	18.45	18.50:	17.80	
QSO	862	US401	13 9 24.83	+30 41 35.8	18.80:	18.40:	18.05:	D
	863*	US402	13 9 27.06	+31 27 24.0	16.75	17.05	16.30	
	864	ST223	13 9 28.04	+28 43 29.8	18.05	18.25	17.80	
	865	ST85	13 9 29.36	+30 32 56.6	18.35	18.30	18.00	
QSO	866	TN699, US403, 57-88	13 9 32.21	+29 25 37.9	16.85	17.10	16.65	
	867	ST351, 57-62	13 9 32.22	+29 16 48.1	19.10:	18.85:	18.55	
	868	ST80	13 9 34.33	+31 2 20.0	18.20:	18.10:	17.85:	D
	869	ST84	13 9 34.90	+30 34 21.3	18.60	18.50:	18.05	
	870	ST326	13 9 35.28	+27 58 24.9	17.55	17.45	17.10	
	871	US404	13 9 35.59	+32 24 38.9	18.35	18.45	18.05	
	872	ST86, US405	13 9 36.47	+30 29 49.1	18.75:	18.65:	17.90	
	873	PB3385, ST357, KUV494-69, US406, 57-232	13 9 37.93	+30 7 54.4	17.40	18.05	17.45	
	874	ST327	13 9 39.31	+27 57 16.1	18.80:	18.85:	18.45:	D
	875	US407	13 9 40.22	+29 1 57.2	19.40:	19.45:	19.25	
	876*	US408	13 9 42.07	+31 18 34.3	17.60	17.65	16.80	
	877*	US409	13 9 42.15	+32 20 3.6	18.00:	18.10:	17.65:	
	878	US410	13 9 43.37	+30 54 43.3	18.95:	19.10:	18.70:	D
	879	US411	13 9 43.83	+30 55 8.6	19.35:	19.20:	19.30:	D
	880	PB3386, ST, 57-267	13 9 48.59	+30 12 22.9	17.50:	17.65:	17.20:	D
	881	US412, 57-174	13 9 51.46	+29 49 49.6	19.15:	19.25:	19.25:	D
	882	ST87, US413	13 9 52.94	+30 24 48.0	18.75:	18.55:	18.25	
	883	ST325	13 9 58.36	+28 11 39.2	18.60:	18.55:	17.95:	D
	884	US414	13 9 59.21	+31 19 34.1	18.20	18.55:	17.95	
	885	PB3387, ST33, US416	13 9 59.96	+31 33 44.4	18.00	18.50:	18.40	
QSO	886*	PB3388, ST355, US415, 57-203	13 10 0.04	+29 53 41.9	18.05	18.50:	18.25	AG
	887	PB3389, US417	13 10 0.28	+30 32 0.9	17.90	18.40	17.85	
	888	ST79	13 10 0.49	+31 4 52.9	18.55:	18.35:	18.15:	D
	889	PB3390, ST328, US418	13 10 1.05	+27 55 10.1	17.05	18.20	18.70	
	890	US419	13 10 3.23	+28 48 29.4	16.15	16.20	15.45	
	891*	ST356, 57-205	13 10 3.79	+29 55 19.3	18.90:	18.75:	18.40	
	892	US420	13 10 6.68	+30 43 12.4	17.80	17.75	17.15	
	893	TN147, US421	13 10 6.80	+30 23 7.1	16.00	16.25	15.70	
NHB	894	PB3391, ST34	13 10 7.26	+31 32 21.1	18.05	18.15	17.70	
	895	US422	13 10 7.31	+26 56 43.7	18.45	19.15:	18.90	

ANNEX 1 (*continued*)

896	PB3392, US423	13 10 10.74	+28 47 54.5	18.50:	18.95:	18.55:	D
897	PB3393, ST, US424	13 10 10.91	+28 37 40.2	18.45	19.20:	18.90	
898	PB3394	13 10 12.25	+27 6 52.2	18.90:	18.35	18.30	
899	ST329	13 10 13.46	+27 50 0.5	18.25	18.75:	17.95	
900	US425	13 10 13.50	+28 45 19.6	19.20:	19.00:	18.55	
901	PB3395	13 10 16.19	+28 37 24.5	18.20	18.15	17.95	
902	US426	13 10 19.73	+30 37 20.9	19.20:	18.90:	18.75	
903	US428	13 10 21.08	+29 40 30.6	18.45	19.05:	19.55:	
904	PB3396	13 10 22.47	+28 37 16.9	19.10:	18.80:	18.25:	D
905	US429	13 10 26.93	+29 19 20.4	18.05	18.40	17.65	
906	PB3397, ST36, US430	13 10 27.59	+31 28 53.5	17.80	18.30	18.15	
907	TN700, PB3399	13 10 27.69	+26 39 42.5	16.80	17.05	16.70	
908	PB3398	13 10 28.64	+29 31 4.8	18.05	18.00	17.65	
909	US431	13 10 29.15	+27 3 1.7	18.80:	19.40:	19.35	
910	ST35	13 10 29.36	+31 31 50.4	19.10:	18.75:	18.70	
911	PB3400, ST, US432	13 10 29.60	+30 11 29.8	17.95:	18.45:	18.35:	D
912	US433	13 10 33.04	+28 43 4.8	17.95	17.90	17.60	
913	PB3401, ST78, US434	13 10 33.24	+31 2 11.2	17.60	18.15	17.95	
914	PB3402	13 10 34.53	+26 24 20.8	18.25	18.10	17.75	
915	ST77	13 10 34.59	+31 4 9.8	19.20:	19.35:	18.45:	D
916*	TN148, PB3403,	13 10 35.28	+31 56 55.2	15.55	15.65	15.80	em.
	KUV494-14						
917	US435	13 10 36.56	+28 51 53.9	18.15:	19.15:	19.00:	D
918	US436	13 10 37.39	+31 47 49.2	18.65	18.85:	18.70	
919	PB3405	13 10 37.51	+29 7 1.6	18.85:	18.55:	18.30:	D
920	PB3404	13 10 37.51	+30 19 52.7	18.75:	18.55:	18.00	
921	PB3406	13 10 37.55	+26 33 13.0	18.75:	18.85:	18.95	
922	PB3407	13 10 38.60	+26 39 49.1	17.15	17.50	16.95	
923*	US437	13 10 38.95	+32 35 27.9	19.15:	18.60:		
924	ST359	13 10 39.02	+30 15 35.1	18.85:	18.70:	17.95:	D
925	ST38	13 10 39.47	+31 20 1.0	18.85:	19.00:	18.55	
926	ST221	13 10 40.29	+28 35 17.5	18.30	18.35	17.65	
927	ST69	13 10 42.21	+30 45 55.7	18.85:	18.75:	18.55:	D
928	PB3409, ST71	13 10 52.03	+30 49 8.5	18.30:	18.50:	18.00:	D
929*	HZ42, PB3408, ST37,	13 10 52.24	+31 37 51.3	14.10	14.55	14.75	HBE
	KUV494-10, PG1310+316						
930	ST352, US438	13 10 53.52	+29 24 13.2	19.00:	18.75:	18.45	
931	ST70	13 10 54.92	+30 48 34.6	19.00:	18.90:	18.35	
932	ST350, US439	13 10 58.94	+29 17 26.6	18.85:	18.65:	17.85:	D
933	ST354	13 11 0.55	+29 42 17.9	18.60	19.00:	18.65	
934	PB3410	13 11 7.40	+31 23 2.6	19.10:	19.10:	18.60	
935	US440	13 11 9.83	+32 13 51.0	18.30	17.10	15.90	
936	US441	13 11 9.93	+32 29 49.7	18.10	18.10	17.60	
937	PB3411, ST, US442	13 11 11.12	+31 3 35.6	18.30	19.10:	18.85	
938	ST39	13 11 13.74	+31 12 17.3	18.15	18.35	17.95	
939	W13323, PB3412,	13 11 14.52	+30 14 7.4	17.25:	17.95:	17.75:	D
	ST186, KUV494-70,						
	US443						
940*	ST341	13 11 15.99	+27 37 5.4		18.20	18.25	
941	ST330	13 11 16.22	+28 0 38.4	18.25	18.30	18.05	
942	PB3413	13 11 16.62	+29 29 52.7	18.55	18.70:	18.15	
943	ST207	13 11 16.87	+30 0 24.5	18.45	18.40	18.10	
944	US444	13 11 17.33	+27 34 45.6	19.40:	19.45:	19.65:	D
945	US445	13 11 20.15	+30 7 38.1	19.60:	19.10:	18.30:	D
946	ST339	13 11 20.75	+27 50 21.5	17.90	17.90	17.55	
947	PB3414	13 11 22.51	+32 1 32.5	18.60	18.50:	18.25	
948	PB3415	13 11 22.51	+26 49 17.9	18.50	18.35	18.35	
949	US446	13 11 22.87	+31 28 37.2	18.55	19.00:	18.70	
950	PB3416, ST208, US447	13 11 25.85	+29 57 53.7	17.25	18.45	18.10	
951*	PB3417	13 11 27.44	+32 6 36.3	18.85:		19.80:	
952	US448	13 11 30.15	+31 46 32.0	18.95:	19.40:	18.95	
953	ST338	13 11 30.58	+27 48 10.0	18.55	18.60:	17.95	
954	PB3418	13 11 31.60	+26 56 6.9	18.20	18.30	17.80	
955	LB35, PB3419	13 11 34.01	+28 3 23.6	17.30	17.40	17.10	
956	PB3420, ST188, US449	13 11 36.63	+30 20 29.9	17.95	18.15	18.40	
957	PB3421	13 11 37.56	+26 55 15.5	17.85	18.00	17.50	
958	ST220	13 11 38.55	+28 41 0.6	18.90:	18.90:	18.40	
959	PB3422	13 11 40.13	+30 39 59.8	17.45	17.70	17.15	
960	ST206, US450	13 11 40.84	+29 56 21.1	18.70:	18.55:	18.10:	D
961	ST40	13 11 43.94	+31 19 29.4	18.85:	19.15:	18.90	
962	US451	13 11 45.43	+27 18 11.7	18.75:	18.25	18.40	
963	PB3423	13 11 46.99	+32 23 38.0	18.35	18.25	17.75	
964	US452	13 11 47.66	+30 59 23.4	18.95:	19.15:	19.70:	
965	ST66	13 11 48.58	+30 32 25.1	18.75:	18.60:	18.05:	D
966	ST67	13 11 50.40	+30 44 33.5	18.90:	18.80:	18.30	
967	ST75	13 11 53.77	+31 8 49.8	18.90:	18.60:	18.30	
968	US453	13 11 57.82	+30 40 13.1	17.45	17.65	17.15	
969	ST340	13 11 58.61	+27 45 2.8	18.00	17.95	17.70	
970*	PB3424 + PB3425, ST,	13 12 0.61	+31 6 40.8	16.85:	17.35:	17.00:	D WD+WD
	US454						
971	PB3428, ST, US455	13 12 0.65	+27 35 11.8	18.25:	18.55:	17.45:	D
972	PB3426, ST41, US456	13 12 1.03	+31 27 40.4	17.65:	18.25:	17.60:	D
973	PB3427, ST353	13 12 1.16	+29 25 53.3	17.65	18.45	18.10	
974	ST364	13 12 2.85	+28 13 1.2	18.30:	18.50:	17.85:	D
975	US457	13 12 9.22	+30 21 14.2	19.10:	18.90:	18.45	
976	ST344	13 12 10.27	+27 35 34.8	18.20	18.25	17.80	
977	ST42	13 12 10.70	+31 27 46.2	18.85:	18.55:	17.40:	D
978	PB3429	13 12 12.98	+29 25 49.4	18.50	18.40	18.15	
979	PB3430, ST64, US458	13 12 13.75	+30 33 54.4	18.40	18.40	17.80	
980	US459	13 12 14.36	+32 29 37.4	18.35	18.40	17.95	
981	PB3431, US460	13 12 15.20	+29 8 27.8	18.50	18.80:	18.00	
982	US462	13 12 21.11	+28 54 58.2	17.85	17.90	17.35	
983	ST205	13 12 26.80	+29 59 57.6	18.40	18.55:	18.05	
984	US463	13 12 27.58	+29 22 18.7	19.15:	19.00:	18.15:	D
985	US464	13 12 27.66	+27 49 17.9	18.95:	18.75:	18.30:	D
986	TN149	13 12 29.16	+26 32 6.6	15.80	16.25	15.90	
987	TN150, PB3432,	13 12 34.50	+32 28 45.4	16.20	16.50	16.80	
	KUV494-01, US465						
988	US466	13 12 36.85	+31 56 2.0	16.90	17.20	16.75	
989	US467	13 12 39.43	+29 48 11.6	17.25	17.15	16.95	
990	ST189	13 12 41.47	+30 17 10.4	17.80	17.55	17.30	
991	PB3433	13 12 41.58	+29 24 3.6	17.85	17.60	17.30	
992	ST204	13 12 44.91	+30 5 21.4	18.60	18.80:	18.10	
993	PB3434	13 12 45.10	+28 4 53.1	18.20	18.40	18.20	
994	US468	13 12 49.07	+28 19 1.6	19.30:	19.15:	18.85:	D
995	PB3435, US469	13 12 51.41	+27 20 31.9	19.10:	19.40:	19.40	
996	US470	13 12 53.60	+29 13 53.7	17.90	18.05	17.65	
997	US471	13 12 53.66	+30 35 12.2	18.40	18.35	17.90	
998	US472	13 12 53.75	+31 56 37.2	19.25:	18.95:	18.45	
999	PB3436, ST345, US473	13 12 58.45	+27 33 39.3	18.05	18.95:	18.90	
1000	US474	13 12 59.18	+30 31 57.4	17.70	18.10	17.45	
1001	PB3437, US475	13 13 0.51	+32 15 9.6	17.45	18.10	17.95	
1002	ST218	13 13 1.42	+28 29 3.9	18.50	18.45	17.90	
1003	ST191	13 13 3.36	+30 17 15.6	19.50:	19.20:	18.95:	D
1004	PB3438	13 13 5.04	+27 19 39.5	18.65:	18.90:	18.40	
1005	ST63	13 13 7.65	+30 39 29.7	18.60	19.10:	19.60:	
1006	PB3439, ST44	13 13 7.81	+31 33 32.7	18.40	18.70:	18.60	
1007	ST217	13 13 10.85	+28 24 25.8	17.75	17.85	17.50	
1008	ST331	13 13 11.02	+28 22 58.4	18.55	18.50:	17.90	
1009	PB3440	13 13 12.68	+27 7 12.8	18.20	18.45:	18.15	
1010	ST62	13 13 13.33	+30 42 15.5	19.20:	19.05:	18.75	
1011	TN701, PB3441, US476	13 13 16.90	+26 30 43.0	16.40	16.55	16.60	
1012	PB3442, ST216, US477	13 13 18.85	+28 24 45.7	18.40	18.90:	18.90	
1013	ST192, US478	13 13 19.38	+30 11 44.1	18.90:	18.65:	18.60	

ANNEX 1 (*continued*)

1014	PB3444, US479	13 13 20.14	+27 30 18.3	18.35	18.85:	19.00		
1015	PB3443	13 13 20.33	+30 2 2.1	17.80	17.95	17.45		
1016	US480	13 13 21.76	+31 17 17.6	19.00:	19.25:	19.20		
1017	PB3445	13 13 23.50	+27 55 38.9	18.55	18.60:	18.30		
1018	PB3446	13 13 24.84	+29 5 43.3	18.80:	18.70:	18.15		
1019	PB3447	13 13 25.51	+26 49 27.7	18.15	18.40	17.70		
1020	ST337	13 13 26.87	+28 1 17.8	18.05	18.15	17.70		
1021	US481	13 13 29.71	+32 33 51.7	17.85:	17.40	17.15		
1022	ST61	13 13 31.12	+30 46 39.1	19.20:	18.95:	18.55		
1023	US482	13 13 35.28	+30 36 30.9	19.20:	18.90:	19.40:		
1024	ST203	13 13 37.44	+30 4 51.5	18.60	18.75:	18.15		
1025	PB3448	13 13 38.07	+30 31 44.7	18.60	18.80:	18.50		
1026	ST193	13 13 39.07	+30 12 9.6	19.35:	18.85:	18.40		
1027	TN151, PB3449, US483, WAS66	13 13 42.29	+29 38 43.2	16.05:	16.65:	15.85:	D	HII
1028	US484	13 13 45.02	+32 20 2.6	17.30	17.00	16.70		
1029	US485	13 13 45.97	+26 59 17.4	19.15:	19.45:	20.05:		
1030	PB3450, ST58	13 13 47.60	+30 55 14.3	18.15	18.55:	18.75		
1031	ST194	13 13 49.41	+30 20 27.8	18.95:	18.85:	18.40		
1032	US486	13 13 49.74	+27 44 52.3	18.85:	19.15:	19.30		
1033	PB3451	13 13 49.83	+28 22 24.8	18.10	17.95	17.45		
1034*	US487	13 13 50.99	+31 20 48.1	18.65:	19.05:	18.70:	D	
1035	US488	13 13 51.85	+30 11 47.9	17.75	17.85	17.30		
1036*	KUV494-15	13 13 52.99	+32 12 40.8	14.70	14.45	14.75		NHB
1037	PB3452, ST215	13 13 53.03	+28 32 35.1	18.15	18.10	17.65		
1038	ST57	13 13 54.20	+30 57 13.3	18.90:	19.00:	18.55		
1039	PB3453, US489	13 13 55.96	+30 46 13.0	18.20	18.65:	18.55		
1040	ST49	13 13 56.34	+31 26 22.4	18.70:	18.60:	17.90:	D	
1041*	HZ43, PB3454, ST, US490, PG1314+293	13 14 0.53	+29 21 47.6	11.50	12.70	12.55		WD
1042	PB3455	13 14 2.27	+30 35 39.6	18.20	18.15	17.65		
1043*	ST214	13 14 2.34	+29 9 41.5		19.20:	18.45		
1044	US491	13 14 4.66	+32 27 35.5	18.50	18.65:	17.90		
1045	PB3456, US493	13 14 7.55	+32 14 11.9	17.45	18.20	18.10		
1046	US492	13 14 7.82	+30 33 25.7	19.10:	19.45:	19.95:		
1047	US494	13 14 8.01	+31 35 7.6	17.25	17.70	17.30		
1048	PB3457	13 14 8.95	+30 36 3.7	17.90	18.20	17.65		
1049	US495	13 14 10.67	+31 15 13.8	19.10:	19.20:	19.60:		
1050	ST56	13 14 11.05	+30 56 53.1	19.05:	19.20:	18.30:	D	
1051	US496	13 14 12.35	+27 0 32.8	18.90:	18.80:	18.75		
1052	PB3458, ST347	13 14 13.11	+27 46 18.6	18.05	18.25	17.85		
1053	PB3459	13 14 14.90	+29 0 11.0	18.30	18.45:	18.15		
1054	US497	13 14 19.51	+30 4 50.1	15.45	15.70	15.10		
1055	PB3460, ST, US498	13 14 22.53	+29 45 37.1	18.60	19.00:	18.75		
1056	PB3461, ST60, US499	13 14 23.55	+30 41 52.1	18.55	18.70:	18.15		
1057	ST50	13 14 24.04	+31 17 48.1	17.05	17.30	16.85		
1058	PB3462	13 14 28.52	+26 59 18.2	18.50	18.45	18.00		
1059	PB3463, US500	13 14 30.02	+28 55 36.2	18.55	19.45:	19.30		
1060	ST195	13 14 33.04	+30 19 1.7	19.45:	19.30:	18.65:	D	
1061	ST196, US501	13 14 36.09	+30 19 2.4	17.50:	17.85:	16.95:	D	
1062	ST47	13 14 37.32	+31 37 10.7	19.15:	19.20:	18.65		
1063	PB3464, ST, US503	13 14 37.37	+31 7 35.6	18.35	19.00:	19.25		
1064	ST201, US502	13 14 37.46	+30 14 39.6	18.10:	18.05:	17.15:	D	
1065	US504	13 14 39.97	+31 58 12.0	18.75:	18.65:	18.65		
1066	PB3465, ST346, US505	13 14 43.61	+27 30 5.0	18.00	18.20	18.20		
1067	US506	13 14 46.18	+29 57 7.3	19.30:	19.25:	19.10		
1068	US508	13 14 48.47	+32 4 2.8	18.15	18.15	17.65		
1069	PB3466, ST, US507	13 14 48.50	+30 5 22.5	19.10:	19.15:	19.35		
1070	US509	13 14 53.32	+32 2 52.6	18.55	19.00:	19.00		
1071	US510	13 14 53.39	+32 12 37.2	17.55	17.75	17.15		
1072	US511	13 14 54.72	+32 2 35.5	19.30:	19.10:	19.05		
1073	US512	13 14 55.62	+32 7 28.6	18.45	18.45	18.10		
1074	PB3467, ST54, US513	13 14 56.48	+30 56 42.4	18.00	18.75:	18.95		
1075	PB3468	13 14 58.88	+29 48 18.1	18.95:	18.75:	18.55		
1076	ST48, US514	13 14 59.15	+31 29 50.4	18.20	18.55:	18.05		
1077	ST59	13 15 5.54	+30 40 28.9	18.70:	18.85:	18.30		
1078	US515	13 15 12.38	+28 39 7.8	18.35:	18.80:	18.15:	D	
1079	US516	13 15 12.60	+32 19 45.9	17.95	17.85	17.30		
1080	PB3469	13 15 12.97	+26 28 6.6	18.70:	18.80:	18.20		
1081	US517	13 15 13.12	+29 8 27.6	19.35:	19.35:	19.45:		
1082	PB3470	13 15 15.75	+27 4 55.1	18.45	18.55:	18.15		
1083	US518	13 15 16.26	+29 21 57.4	17.35	17.70	17.15		
1084	US520	13 15 16.71	+26 38 19.2	18.50	18.75:	18.30		
1085	PB3471, ST200, US519	13 15 16.75	+30 12 14.4	17.80	18.55:	18.40		QSO
1086	US521	13 15 18.69	+28 44 33.1	17.80	18.05	17.55		
1087	US522	13 15 19.97	+32 26 9.5	17.50	17.80	17.15		
1088	US524	13 15 20.72	+32 9 36.4	17.15	17.40	16.80		
1089	US523	13 15 20.88	+28 57 35.0	18.80:	18.50:	17.65:	D	
1090	PB3472	13 15 21.73	+32 7 12.6	17.80:	18.55:	18.80:	D	
1091	PB3473, ST198, US525	13 15 23.01	+30 29 41.3	17.85	18.35	18.30		
1092	US526	13 15 24.69	+27 46 26.3	19.15:	19.45:	19.90:		
1093*	US527	13 15 25.54	+30 19 1.2	17.30:	17.50:	16.60:	D	
1094*	PB3474, US528	13 15 26.10	+28 48 12.9	18.60	19.45:	19.25		
1095*	US529	13 15 27.09	+31 4 52.3	19.45:	19.45:	19.80:		
1096	PB3475	13 15 28.16	+26 50 48.8	17.85	18.05	17.45		
1097	PB3476, ST, US530	13 15 28.25	+31 35 27.5	17.95	18.75:	18.45		
1098	PB3477	13 15 29.13	+26 30 24.5	18.25	18.45	18.20		
1099	US531	13 15 29.47	+28 20 7.3	18.55	18.60:	18.05		
1100	PB3478	13 15 31.91	+30 13 45.3	19.15:	18.70:	18.50		
1101	ST336	13 15 31.95	+28 2 39.9	17.10	17.45	17.05		
1102	ST202, US532	13 15 33.08	+29 56 55.1	19.00:	19.30:	19.05:	D	
1103	PB3479	13 15 35.16	+29 15 6.0	18.25	18.20	17.85		
1104	PB3480, US533	13 15 35.66	+31 42 5.5	17.95	18.00	17.70		
1105	ST335	13 15 37.40	+28 1 27.0	17.65	17.75	17.30		
1106	PB3481, US534	13 15 38.01	+26 37 22.8	17.95	18.60:	18.15		
1107	US536	13 15 39.87	+31 27 18.7	18.30	18.30	17.85		
1108	US535	13 15 39.98	+30 16 27.8	18.85:	18.75:	18.30		
1109	US537	13 15 41.84	+29 31 42.8	18.85:	18.80:	18.45		
1110	US538	13 15 42.95	+29 36 2.9	18.85:	18.90:	18.50		
1111*	ST53	13 15 43.37:	+30 57 30.7:	19.00:	17.85:	16.75:	D	
1112	ST366	13 15 44.53	+28 8 9.7	18.65:	18.75:	17.95:	D	
1113	ST333	13 15 45.27	+28 10 57.4	17.70	17.65	17.30		
1114	ST334	13 15 46.09	+27 58 49.1	18.35:	18.70:	17.75:	D	
1115	US540	13 15 48.92	+32 15 45.2	18.55	18.40	18.10		
1116*	US539	13 15 49.24	+28 12 38.8	19.55:		20.15:		
1117	US541	13 15 50.21	+30 47 21.2	19.05:	19.00:	18.60:	D	
1118	ST212	13 15 53.13	+29 20 3.5	18.50	18.60:	18.20		
1119	TN702	13 15 55.66	+27 12 14.7	15.30	15.40	15.25		
1120	US542, HTV1315+271	13 15 56.58	+27 11 54.4	18.85:	18.80:	18.90		QSO
1121	ST52	13 15 56.70	+31 6 32.4	18.90:	18.85:	18.40		
1122	US543	13 15 56.71	+27 20 47.9	19.35:	19.45:	19.80:		
1123	US544	13 15 58.25	+30 56 4.8	18.70:	18.60:	18.25		
1124	PB3482, ST210, US545	13 15 58.89	+29 25 51.7	17.35	18.00	18.05		
1125	PB3483	13 16 0.42	+30 45 16.2	18.30	18.35	17.90		
1126	PB3484, ST211, US546	13 16 4.92	+29 25 21.8	17.95	18.70:	19.05		
1127	PB3485	13 16 12.44	+31 24 28.6	18.30	18.40	18.10		
1128	US547	13 16 12.70	+29 32 8.2	18.70:	19.25:	19.30		
1129	US548	13 16 15.26	+32 31 0.9	19.40:	18.80:	18.10		
1130	PB3486, US549	13 16 16.73	+31 25 1.9	17.55	17.90	17.50		
1131*	US551	13 16 18.41	+26 57 5.3	15.75	16.05	15.60		
1132	US550	13 16 18.79	+30 49 40.5	18.80:	18.90:	18.50:	D	
1133	PB3487, US552	13 16 19.70	+31 13 37.5	18.05	18.60:	19.00		
1134	PB3488	13 16 19.83	+26 59 37.2	17.90	17.70	17.75		
1135*	US553	13 16 20.45	+29 44 1.0	18.90:		20.20:		

ANNEX 1 *(continued)*

1136	PB3489	13 16 21.45	+32 16 14.8	17.15	17.30	16.75		
1137	US554	13 16 24.27	+32 31 7.6	18.20	17.75	17.30		
1138	PB3490	13 16 29.60	+30 46 59.6	18.20	18.25	18.00		
1139	PB3492	13 16 30.98	+28 37 22.1	18.15	18.10	17.70		
1140	PB3491	13 16 31.17	+30 34 51.8	18.35	18.45:	17.80		
1141	US555	13 16 32.02	+30 41 26.5	18.50	18.45	18.15		
1142*	US556	13 16 36.37	+30 53 0.1		19.45:	18.00		
1143*	US557	13 16 36.75	+30 53 15.8		19.10:	17.85		
1144	US558	13 16 39.02	+26 55 7.7	17.05	16.90	16.95		
1145	US559	13 16 44.64	+27 44 0.1	18.70:	19.25:	18.90		
1146	PB3493, US560	13 16 45.52	+27 34 13.7	18.20	18.75:	18.45		
1147	PB3494, US561	13 16 46.40	+30 53 24.1	18.55	18.85:	18.40		
1148	US562	13 16 49.70	+32 0 4.5	17.95	18.05	17.65		
1149	PB3495	13 16 52.43	+26 24 5.3	17.00	17.40	16.95		
1150	US563	13 16 54.54	+28 12 53.2	18.30	18.60:	18.00		
1151	PB3496, US564	13 16 55.38	+26 41 45.3	18.50	18.55:	18.20		
1152*	PB3498	13 16 56.44	+28 40 11.9	17.75:	18.65:	18.60:	D	
1153	PB3497	13 16 56.82	+30 37 53.3	17.85	18.35	18.25		
1154	PB3499	13 16 59.70	+27 14 31.1	18.40	18.75:	18.30		
1155	US565	13 17 0.17	+28 29 1.4	18.85:	18.60:	18.45		
1156	TN152, PB3500, US566	13 17 3.09	+28 46 13.5	16.65	17.60	17.60		
1157	US567	13 17 4.20	+30 0 31.8	18.35	19.30:	19.55:		
1158	US568	13 17 14.59	+29 51 38.4	17.75	18.00	17.50		
1159	PB3501, US569	13 17 15.96	+30 41 4.8	18.30	18.80:	18.75		
1160	US570	13 17 17.93	+32 6 45.3	18.60:	18.85:	18.30:	D	
1161	US571	13 17 18.51	+30 50 8.8	18.95:	18.80:	18.70		
1162	PB3502	13 17 20.05	+29 30 36.1	18.20	18.10	17.85		
1163*	F78, PB3503	13 17 21.88	+29 39 24.2	13.85	13.95	13.85		A3
1164*	PB3505, US588	13 17 24.21	+29 22 25.2	17.40	18.10	18.15		
1165	PB3504	13 17 24.49	+30 25 54.8	17.70	17.90	17.70		
1166	PB3506	13 17 27.28	+31 5 16.4	15.45:	15.45:	14.05:	D	
1167	TN153, PB3507, US572	13 17 34.10	+27 43 52.2	15.45	16.45	16.20		QSO
1168*	US573	13 17 35.08	+28 45 26.5	18.30	18.95:	18.55		
1169	PB3508	13 17 36.16	+28 48 54.6	18.15	18.55:	17.85		
1170	US574	13 17 40.35	+31 8 18.5	18.20	18.35	17.95		
1171	PB3509	13 17 42.28	+27 57 45.8	17.40	17.15	17.00		
1172*	US575	13 17 42.51	+27 54 46.6	18.15:	18.90:	18.25:	D	
1173	US577	13 17 48.57	+30 50 14.2	18.55	18.85:	18.60		
1174	US578, HTV1317+275	13 17 49.93	+27 30 31.3	18.30	19.05:	19.45:		QSO
1175*	US576	13 17 50.27	+32 28 38.1	17.25	17.25	16.55		
1176	US580	13 17 56.24	+28 5 59.2	19.20:	19.45:	19.55:		
1177	US579	13 17 56.34	+29 33 57.8	18.85:	18.90:	18.45		
1178	US581	13 17 57.30	+29 6 55.1	19.40:	19.20:	19.10		
1179	US582	13 17 59.03	+32 19 46.6	18.85:	19.05:	18.85		
1180	PB3510, US583	13 18 2.30	+31 12 5.5	17.90	18.30	18.20		
1181	US584	13 18 6.02	+28 49 23.1	19.30:	19.10:	18.80		
1182	PB3511	13 18 8.15	+29 21 3.0	17.80	17.55	17.70		
1183	PB3512, US585	13 18 13.11	+30 51 5.2	17.80	18.50:	18.70		
1184	PB3513	13 18 14.83	+30 37 38.3	18.85:	18.95:	18.50		
1185	US586	13 18 15.58	+29 30 16.6	18.55	19.25:	19.85:		
1186	PB3514, US587	13 18 15.80	+31 9 55.6	17.85	18.30	18.45		
1187*	US590	13 18 16.19	+32 13 22.7	17.25	17.40	16.95		
1188	US589	13 18 16.61	+30 27 56.1	16.85	16.65	16.55		
1189	US591	13 18 18.78	+29 27 43.0	18.60	19.05:	18.65		
1190*	US593	13 18 19.27	+27 30 52.2			20.15:		
1191*	US592	13 18 19.62	+28 54 2.8	17.80:	18.15:	17.25:	D	
1192	US594	13 18 25.77	+28 38 7.3	18.85:	19.05:	18.85:	D	
1193	US596, HTV13184+269	13 18 25.86	+26 55 4.5	19.30:	19.45:	19.45:	D	QSO
1194	US595	13 18 26.02	+30 53 2.3	19.20:	19.20:	18.90:	D	
1195	US597	13 18 33.67	+30 59 56.1	18.25	18.50:	18.00		
1196	US598	13 18 34.21	+31 35 22.7	18.60:	18.60:	18.15:	D	
1197*	US600	13 18 34.87	+32 25 56.1	16.10	16.25	15.95:		
1198	US599	13 18 35.44	+31 31 35.2	18.20:	18.30:	18.05:	D	
1199	US601	13 18 36.87	+26 52 53.3	18.55	19.35:	19.15		
1200	PB3515	13 18 38.78	+30 13 10.6	17.40	17.90	17.40		
1201	US602	13 18 39.36	+29 28 11.2	18.55	18.50:	18.30		
1202	US603	13 18 39.71	+31 41 23.0	18.30	18.65:	18.60		
1203*	US604	13 18 40.18	+31 18 13.4	17.95:	18.20:	18.45:	D	
1204*	US605	13 18 41.41	+30 34 41.3	19.40:	19.10:	18.60:		
1205	PB3516	13 18 42.23	+31 16 39.6	16.85	17.05	16.55		
1206	PB3517	13 18 42.35	+30 5 53.3	18.30	18.35	17.95		
1207	PB3518, US606	13 18 45.75	+29 52 19.4	18.05	18.65:	18.75		
1208*	US607, HTV13187+269	13 18 46.35	+26 55 32.2		18.70:			QSO
1209	PB3519, US608	13 18 49.59	+28 36 45.5	17.20	18.05	18.45		
1210*	US609	13 18 51.09	+31 53 43.8	18.55	18.40	18.35		
1211*	TN155, PB3520, US611	13 18 53.54	+29 3 30.9		17.90	17.70		QSO
1212*	TN156, PB3521, US613	13 18 54.68	+29 3 1.0		17.00	16.85:		QSO
1213	US615	13 18 55.97	+29 43 10.2	18.70:	18.60:	18.15		
1214	US616	13 18 58.47	+30 20 6.0	18.75:	19.10:	18.70		
1215	US619	13 19 2.05	+31 14 20.4	18.95:	19.35:	18.90:	D	
1216	US620	13 19 2.82	+30 53 48.4	17.90	18.10	17.60		
1217*	PB3522	13 19 4.55	+30 7 22.7		18.25:	17.75		
1218	PB3523, US622	13 19 6.08	+32 21 43.9	17.50	18.45:	18.35		
1219	US623	13 19 9.76	+31 41 19.1	18.75:	19.25:	19.40:		
1220	US625	13 19 19.44	+31 51 28.9	17.55	17.80	17.10		
1221*	US628	13 19 26.83	+32 19 2.1		18.15:	17.80		

ANNEX 2: NOTES TO THE CATALOGUE

13 A2-123 is missing in B because of the broken corner of the plate.
16 A2-126 is missing in B because of the broken corner of the plate.
21-22 A2-128 and PB 3088 are two distinct — but very close — objects, given as identical in PB catalogue.
26 HZ 35 : spectral type after Green (1976).
28 TN 668 is missing in B because of the broken corner of the plate.
29 A2-135 is missing in B because of the broken corner of the plate.
33 LB 21 is missing in B because of the broken corner of the plate.
36 PB 3097 is missing in B because of the broken corner of the plate.
38 TN 136 is missing in B because of the broken corner of the plate.
50 PB 3104 : spectral type after Berger and Fringant (unpublished).
85 PB 3122 = LB 7400 if, in LB catalogue, α = 12 h 53.0 min is read instead of 12 h 54.0 min.
88 A2-187 appears as a close binary on PSS prints (mag. ~ 17.5 + 19.5).
118 KUV 494-09 : NHB after Wegner and McMahan (1986) but composite spectra sdO + F according to Berger and Fringant (unpublished).
137 US 26 : spectral type after Sletteback and Brundage (1971).
138 TN 140 : spectral type after Green (1976).
146 ZL 108 is identified with PB 3137 in spite of discrepancies in α (3 sec.) and in magnitude (2 mag.) because, on the one hand, there is no other object in the neighbourhood and, on the other hand, ZL 108 is variable after Zwicky and Luyten (1967).
170 A2-225 could not be separated, on V plate, from a close (7 arcsec) B = 16.8 mag. star southeastward.
198 US 60 was not detected on B plate : B > 19.45.
206 US 63 was not detected on U plate : U > 19.65.
221 KUV 494-31 is misidentified on the finding chart, the right object is to the east of the pointed one, according to coordinates and magnitudes.
224 A2-256 is not LB 198 : misidentification by Barbieri and Rosino (1972).
228-229 US 80 and US 79 are permuted on the Usher's finding chart, but coordinates are right.
240 TN 679 has a V = 16.4 mag. companion, 7 arcsec distant southwestward.
242 PB 3177 was not detected on B plate : B > 19.45.
269 HZ 38 : spectral type from Greenstein (1966).
274 HZ 47 : spectral type from Green (1986).
278 H4-1 : PNN after Haro (1951).
279 US 98 was not detected on B plate : B > 19.45.
299 US 106 : DA6 according to Green (1976).
303 PB 3197 has a V = 17.2 mag. companion, 6 arcsec distant to the northeast.
310 US 112 has a V = 10.8 mag. companion, 13 arcsec distant northwestward.
358-359 US 131 and US 132 form a close binary : distance = 8".
374 LP 322-329 : spectral type from Luyten (1970).
394 ST 8 : the pointed object on the finding chart is probably the right one though it disagrees with the given coordinates (valid for the 16.5 mag. star westward).
396 ST 143 = PB 3225 : this identification is omitted in Steppe et al. (1979) because they give δ = +28° 55' 43" instead of +29° 55' 43" for ST 143.
400 A2-347 was not detected on U plate : U > 19.65.
401 US 151 was not detected on B plate : B > 19.45.
409 F 71 : spectral type from Sargent and Searle (1968).
420 US 159 was not detected on U plate : U > 19.65.
427 PB 3238 was not detected on B plate : B > 19.45.
446 PB 3247 has a V = 18.0 diffuse companion, 6 arcsec distant westward.
450 LB 27 : spectral type after Greenstein and Sargent (1974).
475 US 191 was obscured by the mylar frame on V plate only.
478 US 187. It is the object indicated on Usher's finding chart : Usher's coordinates are wrong and correspond to a red object.
485 KUV 494-34 is misidentified on the finding chart : the right blue object is to the east of the pointed one, after coordinates and magnitudes.
503 KUV 494-08 : spectral type from Wegner and McMahan (1985).
505 US 202. The object corresponds to Usher's coordinates, but the pointed object on the finding chart is red and distant by 25 arcsec from the right one.
510 US 206 has a V = 15.8 companion, 7 arcsec distant northwestward.
529 ST 10 : like for ST 8 previously mentioned, the pointed object disagrees with the given coordinates (valid for the 13.5 mag. star northeastward).
545 KUV 494-46 is misidentified on the finding chart : the right blue object is to the east of the pointed one, after coordinates and magnitudes.
554-555 US 225 and US 226 are permuted on the Usher's finding chart, but the coordinates are right.
558 HZ 39 : sdB or DAp after Greenstein (1966), DA1 after Green (1976).
588 US 242 was not detected on U plate : U > 19.65.
592 PB 3294 was not detected on U plate : U > 19.65.
610 KUV 494-13 : spectral type from Wegner and McMahan (1986).
621 ST 242 is close to a very bright star which pollutes the local sky background, magnitude measurements may then be uncertain. Moreover, ST 242 could not be separated from this bright star on V–15 min plate and we used, for this object, V magnitude and position from V–10 min plate.
638 PB 3309 : sdF or F after Berger and Fringant (unpublished).
645 PB 3313 is extremely diffuse : its measured position is uncertain.
651 US 276 was not detected on U plate : U > 19.65.
655-656 US 280 and US 279 are permuted on the Usher's finding chart, but the coordinates are right.
668 KUV 494-65 was identified as ST 16 instead of ST 17 by Noguchi et al. (1980).
670 A2-445 is just next to the mylar frame and this led to a pollution of the local sky background on B and V plates. Therefore, B and V magnitudes are uncertain.
683 US 294 has a V = 15.0 companion, 7 arcsec westward.
722 PB 3338 was not detected on U plate : U > 19.65.
734 US 319 is close to a bright star which pollutes the local sky background. U, B and V magnitudes are therefore uncertain.

ANNEX 2 (*continued*)

740 US 323 was not detected on U plate : U > 19.65.

751 BG 57-37 : a quasar after Gaston (1983) but definetely classified as a star (subdwarf ?) by Koo et al. (1986).

754 US 332 was not detected on B plate : B > 19.45.

757 US 334 was not detected on B plate : B > 19.45.

765 US 339 has a V = 19.2 companion, 6 arcsec to the west.

784 KUV 494-57 : spectral type from Wegner and McMahan (1986).

786 A2-487 is the object indicated by Barbieri and Rosino (1972) on their finding chart, but their coordinates are wrong.

790 KKC 76 : spectral type after Koo et al. (1986).

793-794 US 357 and US 356 are permuted on Usher's finding chart, but the coordinates are right.

799 TN 145 could not be separated from a close and V = 16.9 star on B and V plates. This star is located at 8 arcsec to the northeast of the object and has the colour type K (Berger and Fringant, 1977).

808 US 369 was not detected on B plate : B > 19.45.

809 LB 32 has a V = 15.2 companion, 9 arcsec distant eastward.

822 ST 184 = 57-295 according to Steppe and ST 184 ≠ 57-295 after the finding charts. The pointed object in Basle photometric catalogue (1976) is very red and the error lies probably in the published chart.

825 PB 3372 has a V = 17.9 companion, 6 arcsec distant southwestward.

832 US 385 was not detected on B plate : B > 19.45.

834 US 387 is just next to the mylar frame and this led to a pollution of the local sky background on V plate. Therefore, V magnitude is uncertain.

837 KUV 494-56 : spectral type from Wegner and McMahan (1986).

847 KUV 494-58 : spectral type from Wegner and McMahan (1986).

854 US 398 was obscured by the mylar frame on V plate only.

863 US 402 has a V = 17.2 companion, 8 arcsec distant to the east.

876 US 408. Usher's finding chart is wrong : the blue object is at 15 arcsec to the east of the pointed object but its coordinates are right.

877 US 409 is close to a very bright star which pollutes the local sky background. U, B and V magnitudes are therefore uncertain.

886-891 ST 355 and ST 356 : disagreements in Steppe (1978) between index numbers, coordinates, identifications with Basle objects and colors. We have adopted finding chart identification, the index numbers, the coordinates, but we consider that colours and remarks are inverted : the bluer object must be identified with Basle N° 203 and PB 3388.

916 KUV 494-14 : spectral type from Wegner and McMahan (1986).

923 US 437 was obscured by the mylar frame on V plate only.

929 HZ 42 : spectral type from Greenstein (1966).

940 ST 341 was obscured by the mylar frame on U plate only.

951 PB 3417 was not detected on B plate : B > 19.45.

970 Blend of 2 objects, PB 3424 and 3425, only separated in the PB catalogue and composed of a couple of white dwarfs (Reboul et al., 1986,1987).

1034 US 487 has a V > 19 diffuse companion, 5.5 arcsec westward.

1036 KUV 494-15 : spectral type from Wegner and McMahan (1986).

1041 HZ 43 : DAwk after Greenstein (1966), DA1 after Green (1976).

1043 ST 214 was not detected on U plate : U > 19.65.

1093-1094 US 527 and US 528 are permuted on Usher's finding chart, but the coordinates are right.

1095 US 529, according to the coordinates, is about 30 arcsec to the north of the pointed object on the finding chart, which is red.

1111 ST 53 is very diffuse, its measured position may then be uncertain.

1116 US 539 was not detected on B plate : B > 19.45.

1131 US 551 has a V = 15.5 companion, 10 arcsec distant to the west.

1135 US 553 was not detected on B plate : B > 19.45.

1142 US 556 was not detected on U plate : U > 19.65.

1143 US 557 was not detected on U plate : U > 19.65.

1152 PB 3498 has a V = 14.0 companion, 9 arcsec distant to the south.

1163 F 78 : spectral type after Graham (1970).

1164 US 588 is probably the object indicated on Usher's finding chart; there is no object at Usher's coordinates !

1168 US 573 : disagreement between the coordinates and the object pointed by Usher on the finding chart. No object is visible at this pointed position on PB and PSS plates but, at 40 arcsec to the north, the UV–rich measured object corresponds to coordinates.

1172 US 575 has a V > 19 diffuse companion, 5 arcsec to the south.

1175 US 576 : the coordinates of the pointed object on the finding chart disagree with Usher's coordinates — especially in α (6 sec.) — but no neighbouring object is visible and the agreement in U,B,V is fair.

1187 US 590 : the coordinates of the pointed object on the finding chart disagree with Usher's coordinates — especially in δ (1' 30") — but no neighbouring object is visible and the agreement in U,B,V is fair.

1190 US 593 was not detected on U plate : U > 19.65. It was neither detected on B plate : B > 19.45.

1190-1191 US 593 and US 592 are permuted on Usher's finding charts.

1197 US 600 is just next to the mylar frame and this led to a pollution of the local sky background on V plate. Therefore, V magnitude is uncertain.

1203 US 604 has a V = 15.4 companion, 6 arcsec distant southward.

1204 US 605 is just next to the mylar frame and this led to a pollution of the local sky background on V plate. Therefore, V magnitude is uncertain.

1208 US 607 was obscured by the mylar frame on U and V plates.

1210 US 609 and US 610 are permuted on Usher's finding charts. US 610 is not present in the catalogue because it was obscured by the mylar frame.

1211 TN 155 was obscured by the mylar frame on U plate only.

1212 TN 156 was obscured by the mylar frame on U plate. Moreover, its proximity to the mylar frame led to a pollution of the local sky background on V plate and V magnitude is therefore uncertain.

1217 PB 3522 was obscured by the mylar frame on U plate. Moreover, its proximity to the mylar frame led to a pollution of the local sky background on B plate and B magnitude is therefore uncertain.

1221 US 628 was obscured by the mylar frame on U plate. Moreover, its proximity to the mylar frame led to a pollution of the local sky background on B plate and B magnitude is therefore uncertain.

TABLE 1. *Berger Plates (1962 April 27).*

Plate N°	*exposure*	*emulsion*	*filter*	*colour*	*quality*
PS 6557	15 min	103aD	#3	*V*	good
PS 6558	10 min	103aD	#3	*V*	good
PS 6559	60 min	103aO	UG1	*U*	fair
PS 6560	7 min	103aO	GG13	*B*	fair*

(*) : *broken corner*

TABLE 2. *Sky background density values over the plates.*

a) V–15 min plate

0.365	0.379	0.370	0.352
0.362	0.364	0.368	0.361
0.363	0.371	0.376	0.367
0.333	0.366	0.366	0.339

Mean sky background value : 0.363

b) V–10 min plate

0.310	0.341	0.334	0.317
0.323	0.345	0.334	0.320
0.326	0.337	0.330	0.326
0.312	0.331	0.314	0.301

Mean sky background value : 0.325

c) U plate

0.323	0.312	0.321	0.311
0.324	0.312	0.314	0.320
0.347	0.335	0.334	0.338
0.332	0.333	0.328	0.316

Mean sky background value : 0.325

d) B plate

0.331	0.333	0.307	0.322
0.328	0.340	0.313	0.309
0.326	0.356	0.327	0.318
0.312	0.346	0.334	0.312

Mean sky background value : 0.326

TABLE 3. *Photoelectric standards.*

P 6	P 13	P 22	P 30	P 38	B 4(1)
P 7	P 14	P 23	P 31	P 39	B 20(2)
P 8	P 15	P 24	P 32	P 40	B 45(3)
P 9	P 16	P 26	P 33	P 41	B 51
P 10	P 19	P 27	P 34	P 43	F 4(4)
P 11	P 20	P 28	P 36	P 44	F 11
P 12	P 21	P 29	P 37	P 45	

(1) : *not detected on* $V - 10$ *min and B plates, no U magnitude available*
(2) : *no U magnitude available*
(3) : *not detected on U plate*
(4) : *not detected on* $V - 10$ *min and B plates, no U magnitude available*

TABLE 4. *Photometric calibration.*

Plate N°	*colour*	*magnitude range*	*residual*
PS 6557	*V*	9.62 – 20.42	0.05 mag.
PS 6558	*V*	9.62 – 18.86	0.08 mag.
PS 6559	*U*	10.02 – 19.64	0.09 mag.
PS 6560	*B*	10.09 – 19.46	0.06 mag.

TABLE 5. *Comparison with Basle sequence (46 stars).*

Colour	*systematic difference*	*dispersion*
U	0.13 mag.	0.14 mag.
B	0.00 mag.	0.08 mag.
V	0.00 mag.	0.12 mag.

TABLE 6. *Comparison with Coma sequence (27 stars).*

Colour	*systematic difference*	*dispersion*
U	0.01 mag.	0.21 mag.
B	−0.17 mag.	0.13 mag.
V	0.05 mag.	0.11 mag.

TABLE 7. *Astrometric calibration.*

Plate N°	*colour*	*residual*
PS 6557	*V*	0.55"
PS 6558	*V*	0.55"
PS 6559	*U*	0.54"
PS 6560	*B*	0.45"

TABLE 8. *Plate-to-plate consistency of positions for all the aimed objects.*

Plate N° – to – plate N°	*dispersion(σ)*
PS 6557 – PS 6558	0.54"
PS 6557 – PS 6559	0.76"
PS 6557 – PS 6560	0.70"
PS 6558 – PS 6559	0.68"
PS 6558 – PS 6560	0.63"
PS 6559 – PS 6560	0.68"

TABLE 9. *Plate-to-plate consistency of positions for stellar-like objects.*

Plate N° – to – plate N°	*dispersion(σ)*	*discr. > 1"*	*discr. > 1.5"*	*highest discr.*
PS 6557 – PS 6558	0.52"	8%	0%	1.58"
PS 6557 – PS 6559	0.72"	20%	8%	3.15"
PS 6557 – PS 6560	0.70"	22%	6%	2.65"
PS 6558 – PS 6559	0.62"	14%	3%	2.16"
PS 6558 – PS 6560	0.62"	14%	2%	2.04"
PS 6559 – PS 6560	0.63"	14%	3%	2.46"

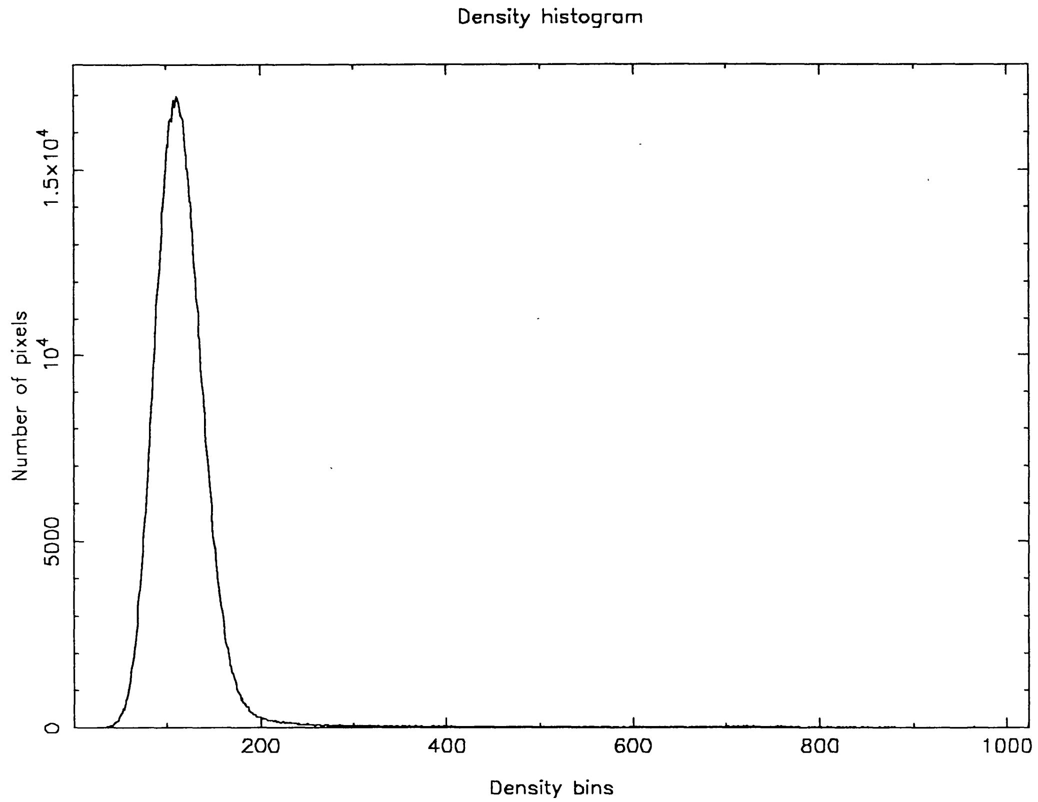

FIGURE 1. Density histogram of pixels (V-15 min plate). Conversion to MAMA photographic density is obtained by dividing the abscissas by 283.41.

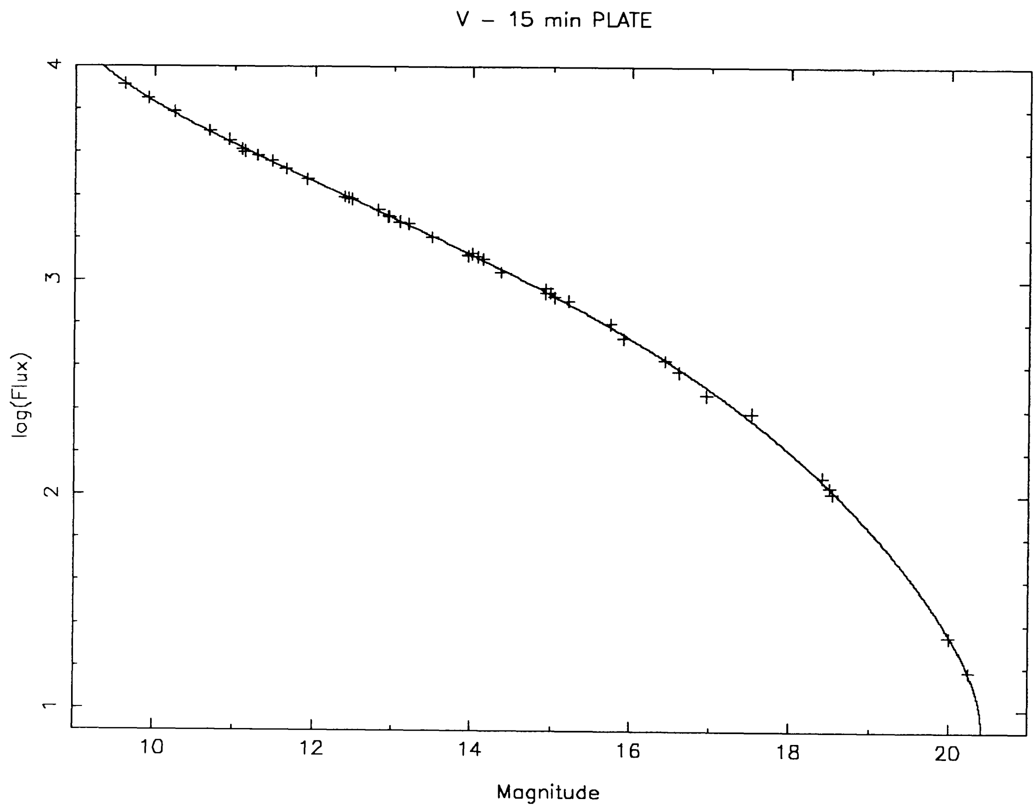

FIGURE 2a.

FIGURE 2. Photometric calibration. a) V-15 min plate, b) V-10 min plate, c) U-plate, d) Bplate.

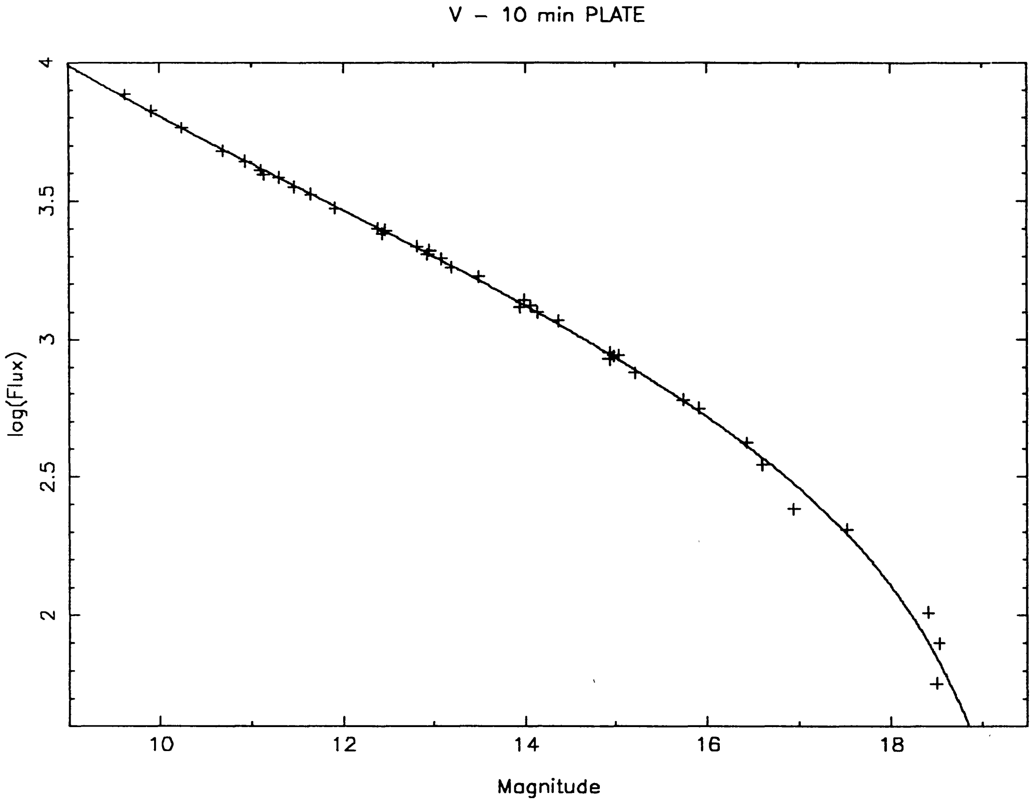

FIGURE 2b.

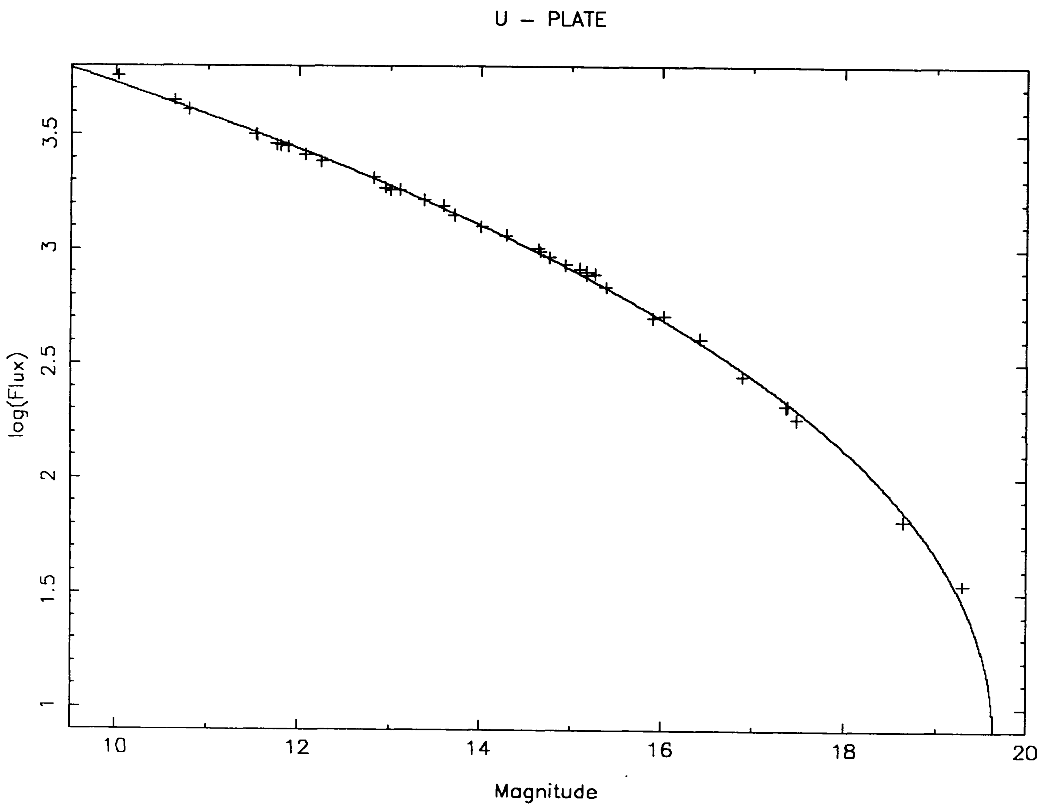

FIGURE 2c.

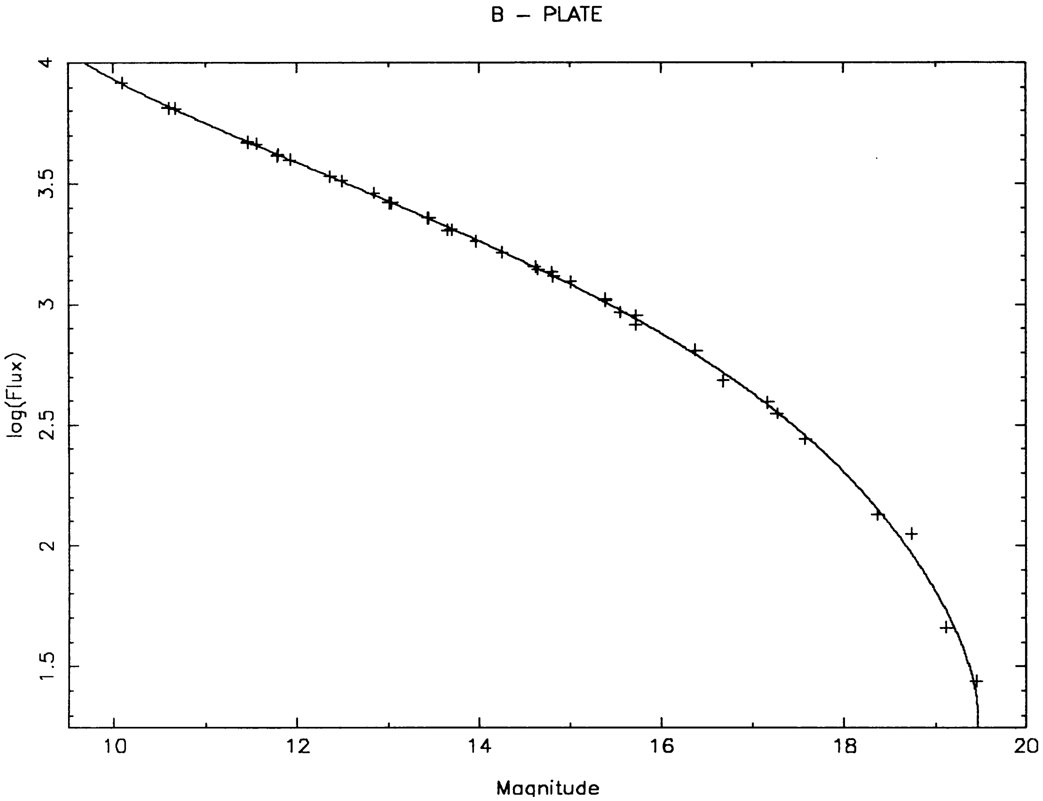

FIGURE 2d.

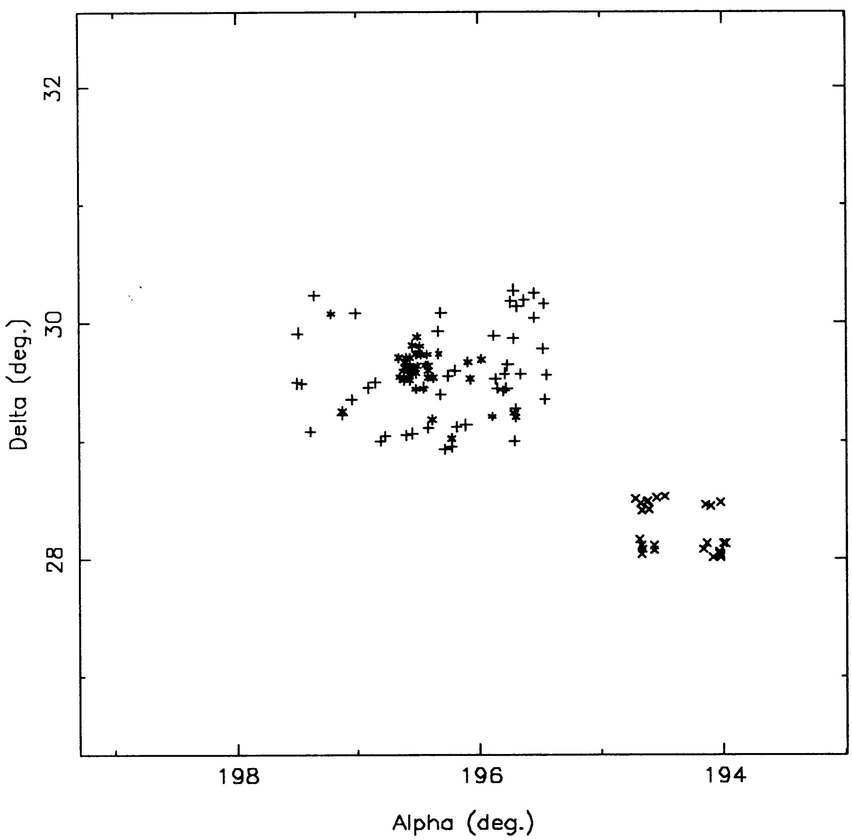

FIGURE 3. Positions of calibration and testing photometric sequences in the field: "*" for calibration stars, "+" for Basle test stars, "×" for Coma test stars.

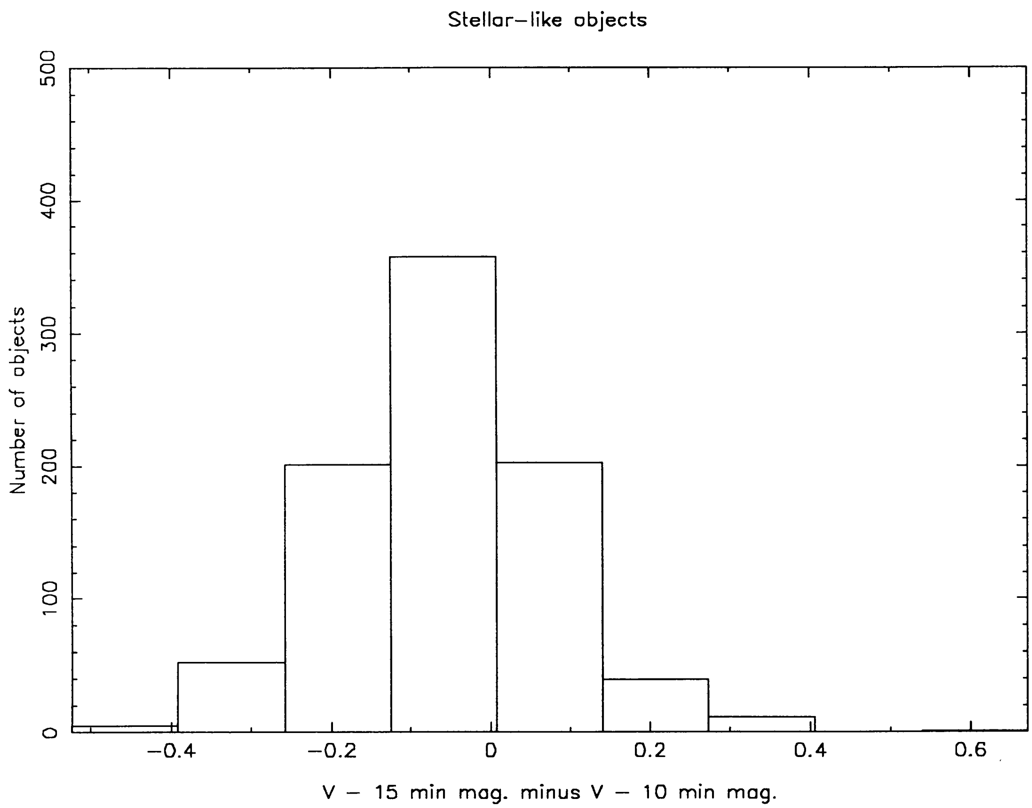

FIGURE 4a.

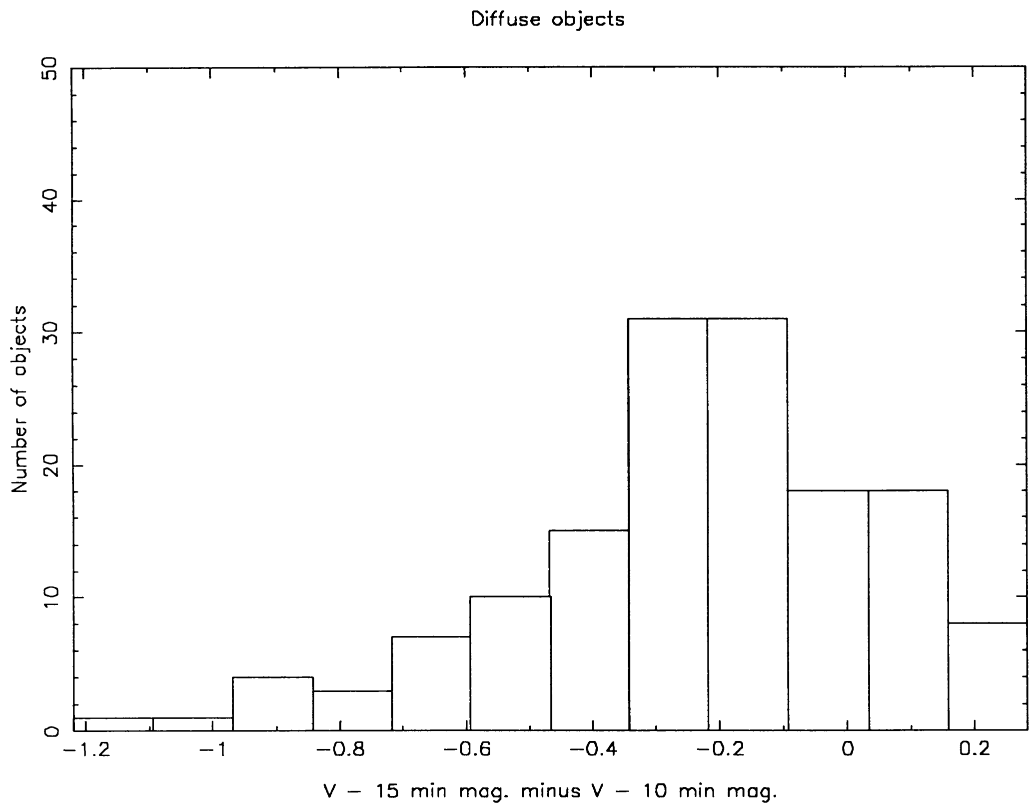

FIGURE 4b.

FIGURE 4. Histograms of difference V-15 min magnitudes *minus* V-10 min ones. a) For stellar-like objects; b) For diffuse objects.

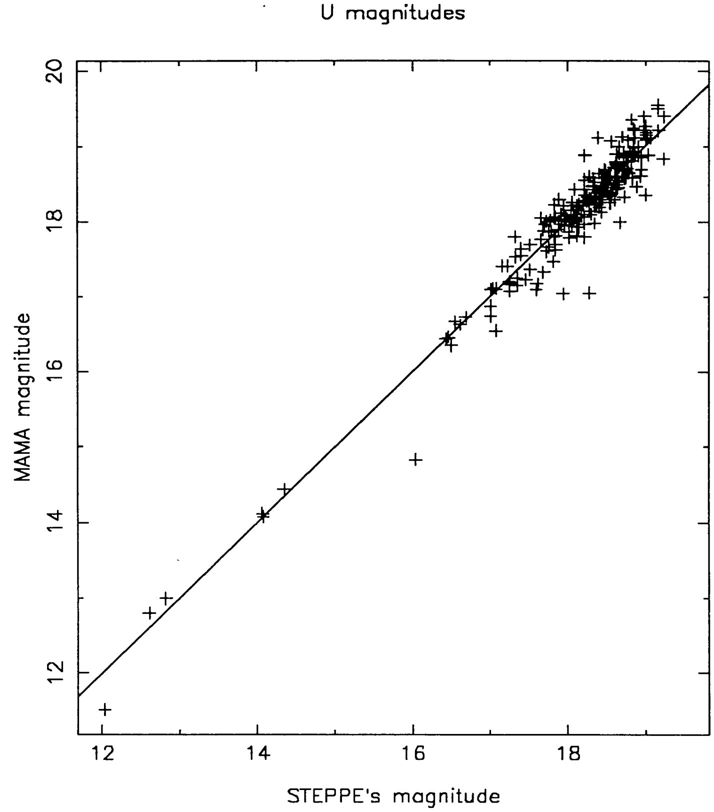

FIGURE 5a.

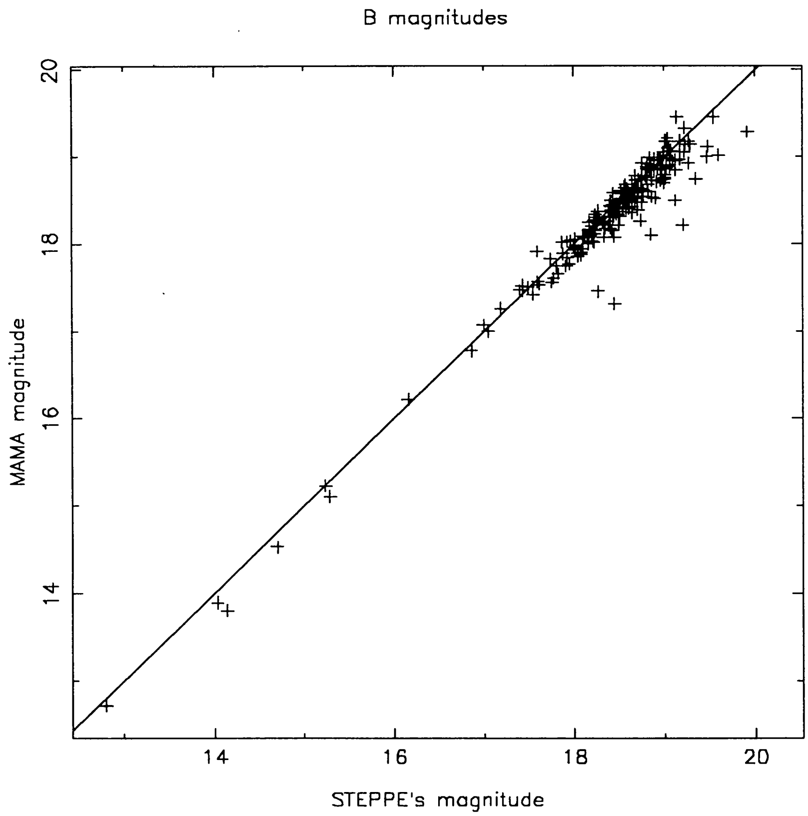

FIGURE 5b.

FIGURE 5. Photometric comparisons MAMA-Steppe for stellar-like objects. a) *U* magnitudes; b) *B* magnitudes; c) *V* magnitudes.

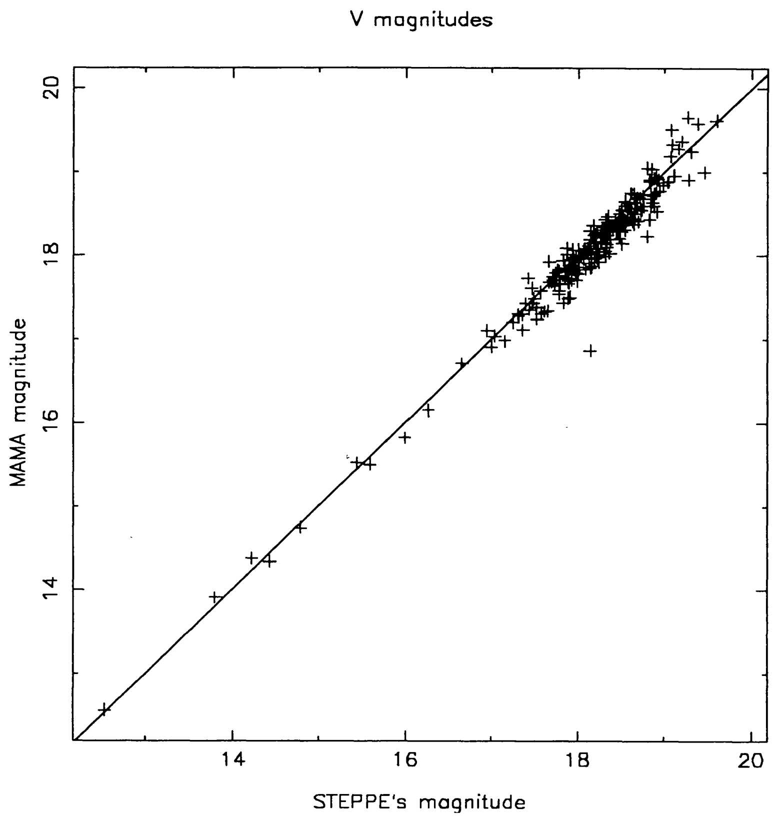

FIGURE 5c.

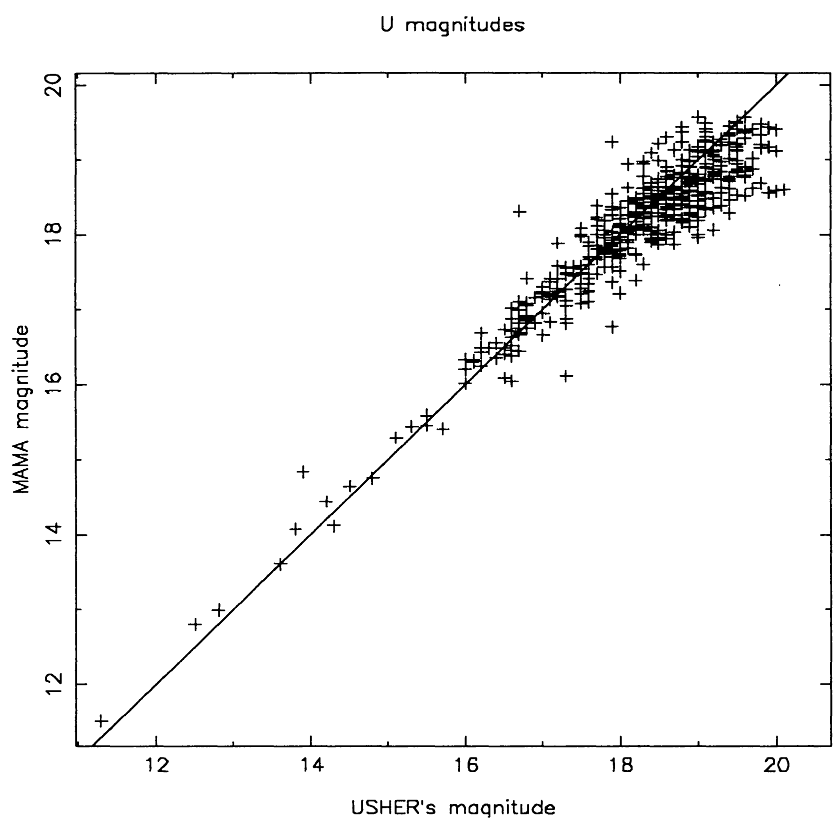

FIGURE 6a.

FIGURE 6. Photometric comparisons MAMA-Usher for stellar-like objects. a) U magnitudes; b) B magnitudes; c) V magnitudes.

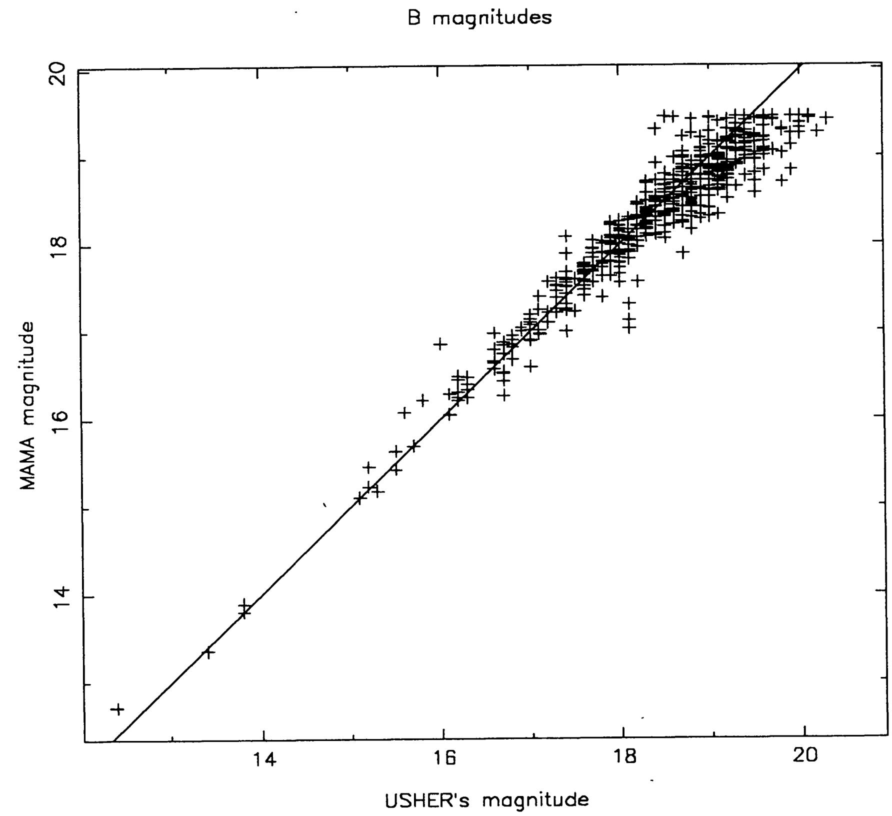

FIGURE 6b.

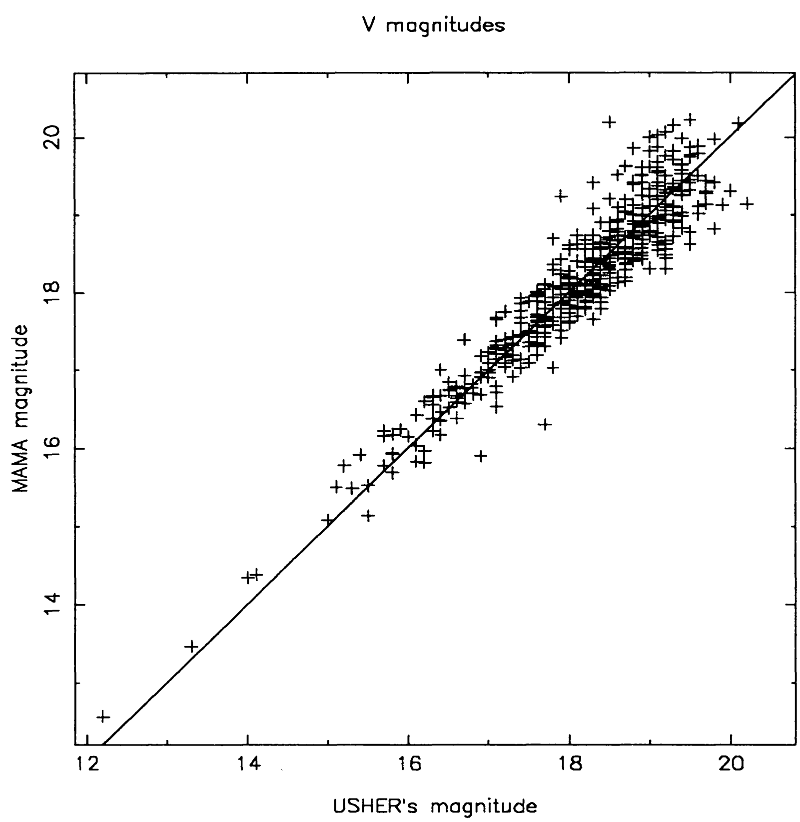

FIGURE 6c.

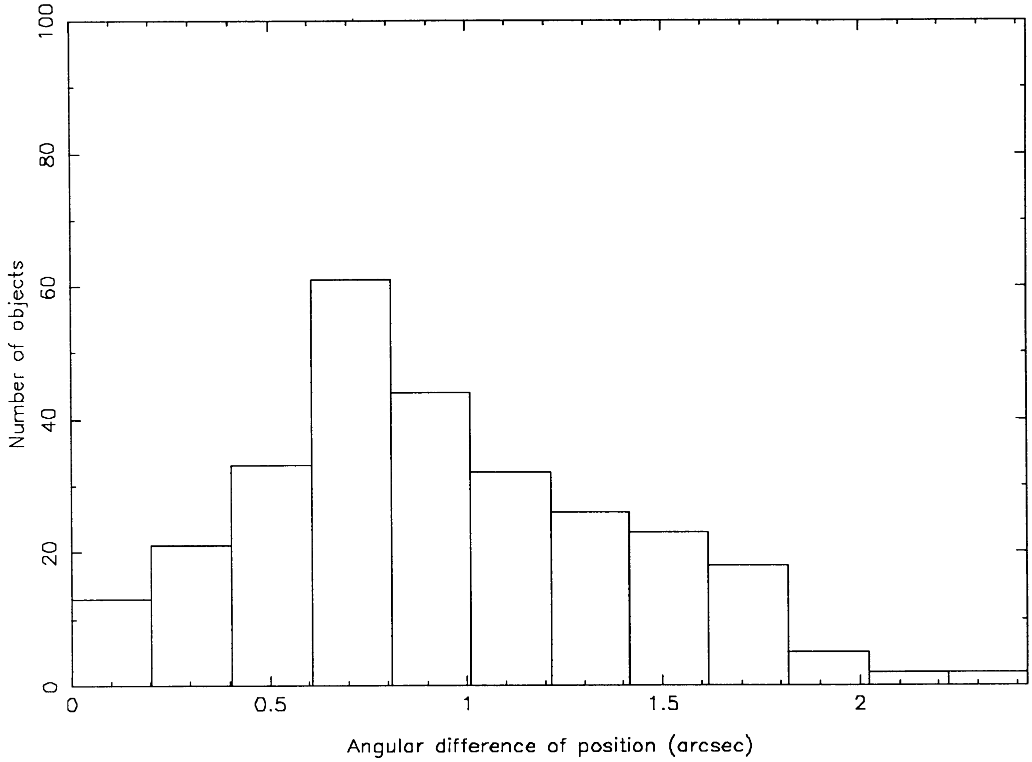

FIGURE 7. Astrometric comparisons: histogram of angular differences with positions measured by Steppe.

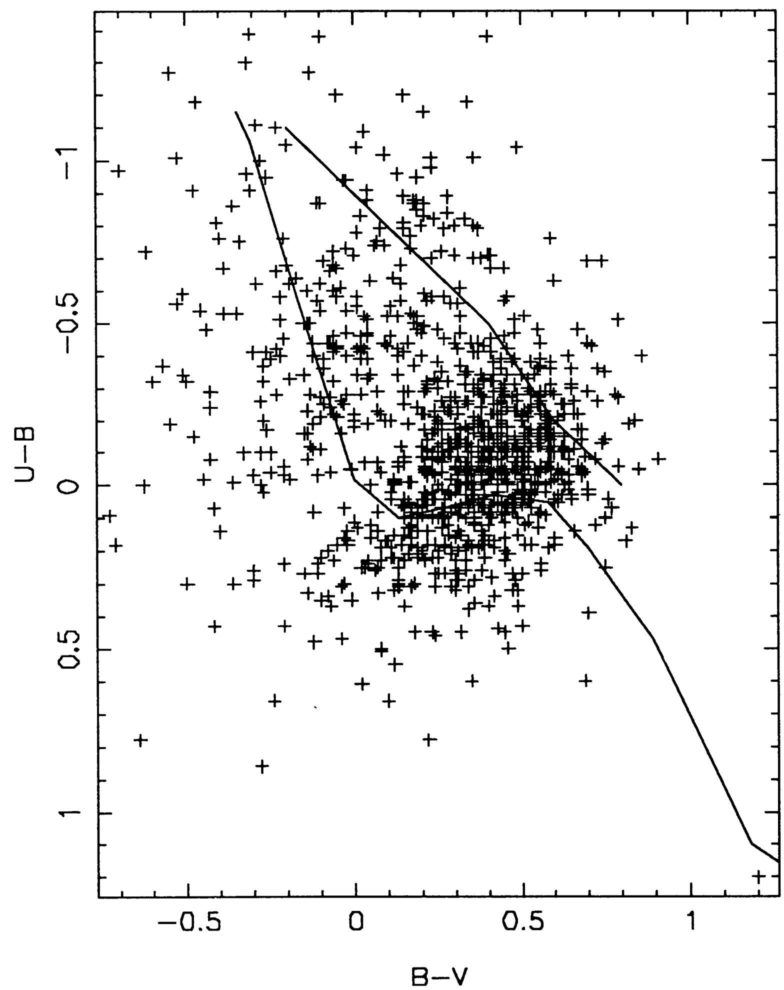

FIGURE 8. $U-B/B-V$ diagram of stellar-like measured objects. Main sequence and locus of white dwarfs are added for comparison.