

From: Patrick Leahy <jpl@ast.man.ac.uk>
To: abridle@NRAO.EDU
Subject: Atlas on the Web
Date: Thu, 9 Nov 1995 19:26:26 +0000 (GMT)

Dear Alan,

I put in a poster paper about the Atlas project at the Bologna meeting and received a certain amount of enthusiasm. The most useful suggestion that several people made was that we install a version of the Atlas on the Web. Do you have disk space for this at Charlottesville? I think the basics would be just an ftp access point to the fits files, though it would be nice to put on gifs of images and maybe contour maps. If CV can't handle it we could put it on at Jodrell, though our web connections are currently pretty slow.

Richard Strom was over here a few weeks ago for a week and we did some more work (including finding some nice WSRT data on 3C264, (unfortunately in need of calibrating further). Unfortunately we didn't manage to add a single finished produce to the atlas (which still lacks 5 images completely).

I'd be grateful if I could copy over the images you got from Tony Willis: NGC6251 and 3C236 I think, as these are the only ones I don't have copies of at present.

cheers,

Paddy

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@ast.man.ac.uk>
Subject: Re: Atlas on the Web
Date: Mon, 13 Nov 1995 12:15:50 -0500

Patrick Leahy writes:

>
> Dear Alan,
> I put in a poster paper about the Atlas project at the Bologna
> meeting and received a certain amount of enthusiasm. The most useful
> suggestion that several people made was that we install a version of the
> Atlas on the Web. Do you have disk space for this at Charlottesville?
> I think the basics would be just an ftp access point to the fits files,
> though it would be nice to put on gifs of images and maybe contour maps.
> If CV can't handle it we could put it on at Jodrell, though our web
> connections are currently pretty slow.

Hi Paddy, right now we are very tight for disk space in the public areas,
in fact there isn't enough for me to put the 5 Mb of FITS files for
NGC6251 and 3C236 where you can grab them. I'll look into various
options for setting up a WWW system for the Atlas, I agree that it
would be a useful thing to do. I guess we'd need about 75 Mb permanently
for the radio data in FITS format, that's a lot larger than any
private allocations on polaris at the moment but peanuts compared
with things like the NVSS. I'll see what the options are.

>
> Richard Strom was over here a few weeks ago for a week and we did some
> more work (including finding some nice WSRT data on 3C264, (unfortunately in
> need of calibrating further). Unfortunately we didn't manage to add
> a single finished produce to the atlas (which still lacks 5 images
> completely).
>
> I'd be grateful if I could copy over the images you got from Tony Willis:
> NGC6251 and 3C236 I think, as these are the only ones I don't have copies
> of at present.
>

I believe they are on a tape that I sent you some time back but as soon as
I can get the disk space to make them ftp-able I'll do that. Or if you
have a public area at JB I can ftp them to I'll do that right away,

Glad to hear the Bologna poster was received o.k., it's something that
should be interesting to a lot of people. I have been thinking of grabbing
the digital Sky Survey images to match each of our radio fields, this
might be especially useful if we HGEOM them into the same frame as
a standard product?

A.

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@ast.man.ac.uk>
Subject: Re: Atlas on the Web
Date: Mon, 13 Nov 1995 12:19:54 -0500

Patrick Leahy writes:

>
> I'd be grateful if I could copy over the images you got from Tony Willis:
> NGC6251 and 3C236 I think, as these are the only ones I don't have copies
> of at present.
>

The 50cm and 90cm FITS images are now in /pub/NRAO-staff/abridle on
ftp.cv.nrao.edu, with obvious names. Let me know when you have them
copied o.k. as the space in the ftp server is at a real premium just
now!

Cheers, A.

From root Mon Nov 13 13:49:47 1995
X-VM-v5-Data: ([nil nil nil nil t nil nil nil nil]
["608" "Mon" "13" "November" "1995" "18:46:23" "+0000" "Patrick Leahy"
"jpl@jb.man.ac.uk" "<Pine.SOL.3.91.951113184156.9299B-100000@fafnir>" "15" "Re:
Atlas on the Web" "^From:" nil nil "11" nil nil nil nil]
nil)
Received: from nessie.mcc.ac.uk by polaris.cv.nrao.edu (AIX 3.2/UCB 5.64/4.03)
id AA31954; Mon, 13 Nov 1995 13:49:39 -0500
Received: from jb.man.ac.uk (actually jbss0.jb.man.ac.uk) by nessie.mcc.ac.uk
with SMTP (PP); Mon, 13 Nov 1995 18:46:06 +0000
X-Sender: jpl@fafnir
In-Reply-To: <9511131719.AA131434@polaris.cv.nrao.edu>
Message-Id: <Pine.SOL.3.91.951113184156.9299B-100000@fafnir>
Mime-Version: 1.0
Content-Type: TEXT/PLAIN; charset=US-ASCII
Content-Length: 608

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Alan Bridle <abridle@polaris.cv.nrao.edu>
Subject: Re: Atlas on the Web
Date: Mon, 13 Nov 1995 18:46:23 +0000 (GMT)

Thanks for the messages. I'm trying to grab the FITS files right now (in another window!). The next messages are just FYI. The first is the text of the poster as put up in Bologna, the next is the 2-page summary for the proceedings.

It looks like we can actually make Jodrell the atlas home node: our network link is being substantially upgraded so think it ought to be useable. In any case I've given the Jodrell home page address as a starting point for looking for the Atlas. By the time we get round to putting out preprints we should at least have a "page under construction"!

cheers,

Paddy

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Atlas on the Web
Date: Mon, 13 Nov 1995 13:53:01 -0500

Patrick Leahy writes:

>
> Thanks for the messages. I'm trying to grab the FITS files right now (in
> another window!). The next messages are just FYI. The first is the text
> of the poster as put up in Bologna, the next is the 2-page summary for
> the proceedings.
>
> It looks like we can actually make Jodrell the atlas home node: our
> network link is being substantially upgraded so think it ought to be
> useable. In any case I've given the Jodrell home page address as a
> starting point for looking for the Atlas. By the time we get round to
> putting out preprints we should at least have a "page under construction"!
>

Sounds good, and I'll think of it in terms of making a "mirror site"
here for U.S. users, then.

A.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: abridle@nrao.edu, Richard Strom <strom@nfra.nl>
Subject: Proceedings version of poster (LaTeX, needs Kluwer style file)
Date: Mon, 13 Nov 1995 18:51:04 +0000 (GMT)

% The CRCKAPB.STY should be in your LaTeX directory.

% Begin your text file with:

```
\documentstyle[editedvolume]{crckapb}
```

```
\newcommand{\stt}{\small\tt}
```

```
\newcommand{\etal}{et~al.}
```

```
\newcommand{\dg}{^{\circ}}
```

```
\begin{opening}
```

```
\title{An Atlas of Extragalactic Radio Sources}
```

```
\subtitle{Basic Instructions}
```

% You can split the title and subtitle by putting
% two backslashes at the appropriate place.

```
%\author{A.N. AUTHOR1$^1$, A.N. AUTHOR2$^2$, A.N. AUTHOR3$^3$}
```

```
%\institute{\$^1$ Affiliation1 - Institute address1\\
```

```
%      $^2$ Affiliation2 - Institute address2\\
```

```
%      $^3$ Affiliation3 - Institute address3\\}
```

```
\author{J.P. Leahy$^1$, A.H. Bridle$^2$, R.G. Strom$^3$}
```

```
\institute{\$^1$ University of Manchester - Jodrell Bank, Cheshire, UK \\
```

```
      $^2$N.R.A.O. - Charlottesville, Virginia 22903, USA \\
```

```
      $^3$N.F.R.A. - PO Box 2, 7990 AA Dwingeloo, the Netherlands\\}
```

```
\end{opening}
```

```
\runningtitle{An Atlas of Extragalactic Radio Sources}
```

```
\begin{document}
```

% The \begin{document} command comes after the \end{opening}
% command.

```
\section{Overview}
```

Our {\it Atlas of Extragalactic Radio Sources} will present high-quality images of the {\bf nearer half} of ``3CRR'', the sample defined by Laing, Riley & Longair (1983). This is the best-studied complete sample of extragalactic radio sources. All 173 members have secure redshifts and most have been imaged in the radio at high resolution. There is also copious information on their optical line emission, and many have been detected in the sub-mm, FIR, and in X-rays. 3CRR is widely used as a baseline against which fainter, higher-redshift samples can be compared to define the evolution of the population (e.g. Neeser \etal\ 1995; Law-Green, this conference).

At present, modern radio data on 3CRR is partly unpublished and the rest is spread across many papers. The digital images are not easily accessible, which hinders systematic morphological analysis. The {\it Atlas} will solve (half) this problem. Many of its images have been contributed by other observers, to whom we are very grateful.

The sample is defined as: extragalactic objects with $S_{\nu} \geq 10.9 \text{ Jy}$, $\Delta \nu \geq 10 \text{ MHz}$ and $b^{\text{II}} \geq 10 \text{ MHz}$ (these define 3CRR), and $z \leq 0.5$; we exclude the starburst galaxy 3C\,231 (M\,82), to give 85 members, all DRAGNs. The high-redshift part of 3CRR is excluded mainly because the large majority have been imaged at high resolution by Laing & Owen (unpublished).

The sample contains 21 objects with powers below the FR break, and of these only three "fat doubles" lack jets. About a third of the objects above the FR break differ from the "classical" symmetric structure with hotspots at both ends. Twenty-seven of the 59 powerful radio galaxies show jets; another 6 have possible jets. Of these, 12 (possibly 13) have twin jets, suggesting that jets are much less one-sided in powerful radio galaxies than quasars; however, only 4 (5) of these are classical doubles. There are also 5 quasars, all with jets. Cores are now detected in nearly all sample members (the exceptions have usually not been observed to sub-mJy levels at high frequency). Not all these features are visible in the Atlas images.

The Atlas images have FWHM beam $\leq 5\%$ of the target largest angular size (typically $\sim 2.5\%$), and sensitivity and uv-coverage sufficient to show the largest and faintest components in each DRAGN. The images are mostly at 20 cm, and are from the WSRT, VLA, MERLIN or EVN as appropriate for the angular size. The Atlas will also contain tables of basic data on each DRAGN, including flux densities from 10 MHz to 1 keV, basic morphological data derived from the images, and possibly optical spectra.

We now have images for nearly all sample members, although in a few cases they do not meet (or barely meet) our target criteria, and improved images are being produced. We hope to make our current collection of images available on the World-Wide Web (look for details on <http://www.jb.man.ac.uk/jb.html>). Distribution on CD should occur in 1996 as part of the NRAO CD series; publication in print may be some time later. Fig. 1 shows an image recently made for the project.

```
\begin{figure}
\vspace{7cm}
\caption{3C\,305 at 20 cm (MERLIN + VLA image). Beam 0.15 arcsec.}
\end{figure}
```

```
\begin{thebibliography}{}
\bibitem{}
Laing, R.A., Riley, J.M., Longair, M.S., 1983. MNRAS, 204, 151.
\bibitem{}
Law-Green, J.D.B. \etal, 1995. MNRAS, 274, 939.
\bibitem{}
Neuser, M.J, Eales, S.A., Law-Green, J.D., Leahy, J.P., Rawlings, S. 1995.
ApJ, 451, 76.
\end{thebibliography}
```

```
\end{document}
```


From: Patrick Leahy <jpl@jb.man.ac.uk>
To: abridle@nrao.edu
Subject: Slow link!
Date: Mon, 13 Nov 1995 20:17:45 +0000 (GMT)

I'm not having much luck pulling these files across. The link hung up after about 10kbytes were transferred the first time. Now its stopped at 5k. I'll leave it running on the first file just in case, but I'll need the files there at least until your tomorrow morning to pick up the rest. I'm going home now!

cheers,

Paddy

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Slow link!
Date: Mon, 13 Nov 1995 15:52:41 -0500

Patrick Leahy writes:

>
> I'm not having much luck pulling these files across. The link hung up
> after about 10kbytes were transferred the first time. Now its stopped
> at 5k. I'll leave it running on the first file just in case, but I'll
> need the files there at least until your tomorrow morning to pick up
> the rest. I'm going home now!
>
> cheers,
> Paddy
>

OK, I'll hang on to them as long as possible.

A.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: abridle@nrao.edu
Subject: Got 1
Date: Tue, 14 Nov 1995 17:31:47 +0000 (GMT)

Hi Alan,

I pulled across the little map of 3C236 (very nice too!) but am having trouble with the others. I got 1/3 of one of them once, but the net keeps hanging & timing out before the others come through!

cheers,

Paddy

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: abridle@nrao.edu
Subject: Got 'em!
Date: Wed, 15 Nov 1995 08:42:30 +0000 (GMT)

Hi Alan,

Thanks for the images, which I just managed to pull across while everyone in the USA was asleep!

cheers,

Paddy

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Alan Bridle <abridle@nrao.edu>
Subject: Re: Atlas
Date: Mon, 1 Jul 1996 19:30:41 +0100 (BST)

Alan,

I never replied to your query about the Atlas. Here is how things stand at present:

I still have no images at all of six objects, all of which Richard Strom is supposed to be digging out for us. These are

3C31, 3C326, NGC7385, DA240, 4C73.08.

I have not been bugging him because I want to set my own house in order first. There are a few MERLIN images I am trying to get finished. We already have good images of 3C268.3 (5 GHz) and 3C19, 153, 299 305, 401, and 438 (all L-band). For the next few weeks I plan to finish off 3C346, 295, 67 and possibly 48. When the end is clearly in sight I will start bugging RGS again about the objects listed above. I need to get a paper out about the MERLIN L-band images, because they are quite pretty and our public profile needs raising! But at the same time I'm going to start building some Atlas web pages, as promised at Bologna.

I hope this convinces you that I haven't abandoned the project, anyway.

cheers,

Paddy

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Alan Bridle <abridle@nrao.edu>
Subject: Re: Atlas
Date: Tue, 2 Jul 1996 19:58:19 +0100 (BST)

On Mon, 1 Jul 1996, Alan Bridle wrote:

> I now have a good L-band VLA image of 3C31 at 5.5" resolution,
> (see <http://www.cv.nrao.edu/~abridle/3c31.htm> -- contains 44k GIF)
> from a project with Robert Laing, Luigina Feretti, Gabriele Giovannini,
> Paola Parma and Rick Perley. If Richard doesn't come through with WSRT
> data for that one, we could probably use that image ahead of its "full"
> publication. I'll consult with my co-authors if we start to think we'll need it.

So I looked at your web pages. Fantastic stuff! I love the way the diffuse tails are closing up behind the main jets. The only problem is, your picture still only shows the inner half of the object... Richard has sent me a hardcopy of a 327 MHz map which shows a total size of well over 45 arcmin (and no obvious sign of having reached the end). So although I don't have a fits image, I'm sure this will be one of the easiest to get from Richard.

I'm tempted to suggest that we include your image as well, although originally I was trying to avoid using images that just showed the inner bits of objects. The trouble is, if we do, there's no end to the chasing round after high-res pictures of 3C449, Virgo A etc etc etc. Of course in the web version I can just put a link in to your pictures...

cheers,

Paddy

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Atlas
Date: Tue, 2 Jul 1996 15:09:56 -0400

Patrick Leahy writes:

>
> So I looked at your web pages. Fantastic stuff! I love the way the
> diffuse tails are closing up behind the main jets. The only problem is,
> your picture still only shows the inner half of the object... Richard has
> sent me a hardcopy of a 327 MHz map which shows a total size of well over
> 45 arcmin (and no obvious sign of having reached the end). So although I
> don't have a fits image, I'm sure this will be one of the easiest to get
> from Richard.
>

I do have some lower-resolution images, of course, showing everything that was detected by Bonn ... But let's see what we can get from Richard.

> I'm tempted to suggest that we include your image as well, although
> originally I was trying to avoid using images that just showed the inner
> bits of objects. The trouble is, if we do, there's no end to the
> chasing round after high-res pictures of 3C449, Virgo A etc etc etc.
> Of course in the web version I can just put a link in to your pictures...
>

It won't hurt to have a few "case studies" at higher resolution in the digital catalog, but you're right for a Web version it may be just as useful simply to make links to a few high-resolution GIFs.

A.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Alan Bridle <abridle@nrao.edu>
Subject: Re: Atlas Web pages
Date: Tue, 16 Jul 1996 14:07:44 +0100 (BST)

Alan,

Re your offer of help: how exactly did you produce the GIF images on your web pages? I'm experimenting at the moment and finding that most obvious ways of producing GIFs/JPEGs from AIPS images seem to substantially degrade the quality.

Any hints welcome!

Paddy

From: abridle (Alan Bridle)
To: abridle
Subject: forwarded message from Alan Bridle
Date: Tue, 16 Jul 1996 10:53:29 -0400

----- start of forwarded message (RFC 934 encapsulation) -----
Content-Length: 1953
Received: by polaris.cv.nrao.edu (AIX 3.2/UCB 5.64/4.03)
id AA44761; Tue, 23 Apr 1996 13:17:11 -0400
Message-Id: <9604231717.AA44761@polaris.cv.nrao.edu>
From: abridle (Alan Bridle)
To: mrupen
Subject: PS conversion to GIF
Date: Tue, 23 Apr 1996 13:17:11 -0400

Mike,

After we talked about this while you were here, I extracted the bit of latex2html that does PS to GIF conversion. It is a simple perl script that can be run on its own (provided you have GS and pbmplus!); in the latex2html package it default to 1-bit GIF output, here it is set for 24-bit intermediate images, which make for the best final output, I find). It does not afford size control over the final GIF but the output is a sensible size and can be resized again with the usual utilities if needed.

Usage: pstogif <psname>.ps <psname>.gif

=====

```
#!/bin/sh
# Script to convert an arbitrary PostScript image to a cropped GIF image
# suitable for incorporation into HTML documents as inlined images to be
# viewed with Xmosaic.
#
# This is a modified version of the pstoepsi script
# by Doug Crabill dgc@cs.purdue.edu
#
# Note in the USAGE line below, the source PostScript file must end
# in a .ps extention. This is a GhostScript requirement, not mine...
#
# This software is provided without any guarantee.
#
# Nikos Drakos, nikos@cbl.leeds.ac.uk
# Computer Based Learning Unit, University of Leeds.
#
# Tue Jun 8 13:11:53 BST 1993

USAGE="Usage:
  $0 <file>.ps <file>.gif"

### Edit these variables if you want to run the script outside the translator
###
GS='gs'
PSTOPPM='pstoppm.ps'
PNMCROP='pnmcrop'
PPMTOGIF='ppmtogif'
#####
```

```
BASE=`basename "$1" .ps`

if [ $# -ne 2 -o ! -f "$1" -o "$1" = "$BASE" ] ; then
    echo $USAGE 1>&2
    exit 1
fi

trap 'rm -f ${BASE}.ppm; exit' 1 2 3 4 13 15

$GS -q -dNODISPLAY $PSTOPPM << ND
100 100 ppmsetdensity
($BASE) ppm24run
ND

if test -f ${BASE}.ppm
    then $PNMCROP ${BASE}.ppm | $PPMTOGIF - > $2
else for i in `ls ${BASE}.[1-9]*ppm`
    do $PNMCROP $i | $PPMTOGIF - > `echo $i |sed 's/\.\.(.*\)ppm/\1\.xbm/'`;
    echo "Writing `echo $i |sed 's/\.\.(.*\)ppm/\1\.xbm/'`"
    done
fi

rm -f ${BASE}.ppm
rm -f ${BASE}.[1-9]*ppm

exit 0
----- end -----
```

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Alan Bridle <abridle@nrao.edu>
Subject: Re: Atlas Web pages
Date: Tue, 16 Jul 1996 16:41:30 +0100 (BST)

Thanks for the messages. I agree TVCPS seems to be the most damaging step; that's what I've used so far. This just proves your images are even better than I thought, I suppose. I will try your route, but also keep trying to cutout the PS middleman.

cheers,

Paddy

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: abridle@nrao.edu
Subject: Where are they now?
Date: Wed, 24 Jul 1996 13:02:31 +0100 (BST)

Dear Alan,

Atlas web pages are currently under construction. I have just been doing a credits page giving addresses of all contributors. I am sure this will expand considerably as we are asked to include co-authors and collaborators by the people who actually sent us the data. Meanwhile, I have lost a few American astronomers, so I was wondering if you could help me with their current addresses:

David Clarke
Roger Linfield
JingPing Ge

On another point: I am putting in various bits of introductory material aimed both at non-radio astronomers and at random web surfers (presumably with an astronomical bent). I thought it would be interesting to put in a short history of the evolution of this sample, which as far as I know goes something like

3C -- 3CR -- "200 source sample" of MKN etc -- "166 source sample" of JPR etc -- "173 source sample" of LRL --(truncated version in the Atlas).

I guess that makes the LRL sample 3CRRRR ??

In fact there is quite a story here, mostly about Martin Ryle and the development of aperture synthesis, especially if you see 3C as a response to the 2C debacle, which is what I understand. I think that at least on the Web version, it could be told in a more informal and personal style than a simple recitation of the basic facts. Whether the early part could be made both interesting and non-inflammatory to those involved is another matter, but if so, I'd like to include it. Since you were at MRAO in the middle of the period, would you consider writing something on this?

cheers,

Paddy

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: abridle@nrao.edu
Subject: Atlas web site
Date: Thu, 1 Aug 1996 16:34:09 +0100 (BST)

Dear Alan and Richard,

There is now a skeleton set of web pages for the atlas, which is temporarily at

<http://www.jb.man.ac.uk/~jpl/atlas/>

This contains various introductory material aimed at students and scientifically literate web surfers (fairly fragmentary), a first draft of the text of the Atlas proper, prototype data tables (with most of the data not filled in yet), and one sample "main page" with image, data and notes on a specific object (3C16 just happened to be lying around).

I think there is enough there for you to see what I'm aiming at, so please have a look and let me have some feedback. Please don't pass the URL around yet. I put this together using Netscape V. 2.01, and it uses tables all over the place, so it doesn't really work for Mosaic (at least in the version we have here). I don't plan to do any more work on this until I get your comments.

regards,

Paddy

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jlb.man.ac.uk>
Subject: Re: Where are they now?
Date: Mon, 12 Aug 1996 09:08:05 -0400

Patrick Leahy writes:

>
> Dear Alan,

> Atlas web pages are currently under construction. I have just been
> doing a credits page giving addresses of all contributors. I am sure this
> will expand considerably as we are asked to include co-authors and
> collaborators by the people who actually sent us the data. Meanwhile, I
> have lost a few American astronomers, so I was wondering if you could
> help me with their current addresses:
>
> David Clarke

Dept. of Astronomy & Physics, St. Mary's University, Halifax, NS B3H 3C3, Canada
dclarke@olympus.stmarys.ca

> Roger Linfield

JPL, 238-700, 4800 Oak grove Dr., Pasadena, CA 91109
rpl@logos.jpl.nasa.gov

> JingPing Ge
I think he is at Steward Observatory, but I am not certain. Frazer Owen might
have the answer?

>
> On another point: I am putting in various bits of introductory
> material aimed both at non-radio astronomers and at random web surfers
> (presumably with an astronomical bent). I thought it would be interesting
> to put in a short history of the evolution of this sample, which as
> far as I know goes something like
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> the Web version, it could be told in a more informal and personal style
> than a simple recitation of the basic facts. Whether the early part could
> be made both interesting and non-inflammatory to those involved is
> another matter, but if so, I'd like to include it. Since you were at
> MRAO in the middle of the period, would you consider writing something on
> this?

I'll take a crack at it. I would tend avoid launching into the history
of the "2C debacle" however, but would rather characterize 3C as an
attempt to make a "reliable, confusion-free" survey, or some such.

A.

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jib.man.ac.uk>
Subject: Re: Atlas web site
Date: Wed, 14 Aug 1996 12:11:11 -0400

Patrick Leahy writes:

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> <http://www.jib.man.ac.uk/~jpl/atlas/>
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> do any more work on this until I get your comments.
>

Paddy, this is a very impressive start and it will take a while to absorb all that is there and give you substantive comments.

I think the overall level and format are both excellent. I am a strong believer in hypertext Glossaries so I like the general approach very much. (My own attempt in this direction is the AIPS++ Glossary, but I do not think we can raid much from it to speed up the Atlas work).

Just a few quick comments:

The darkish-blue background is hard to read against. I think a lighter background would cause much less eyestrain. I have experimented with some on my own pages but it's hard for anyone to argue against white or near-white. Almost any strong colour offends someone's sense of aesthetics and clashes with image pseudocoloring to some extent. There are also color-blind folks in the radio astronomy community so we have to watch out for things that will be illegible to them. White background, while unimaginative, is usually legible and hard to argue against on functional grounds.

NCSA X-Mosaic is incompetent re Tables in almost all incarnations, though its MS-Windows equivalent works fine. I agree that we should go with HTML 3.2 Tables structures despite this.

Are you thinking about making links to hard-copy versions? I presume this is presently mastered in HTML? It may be worth thinking about mastering it in LaTeX with the latex2html html.sty file before it gets too far. (I have recently taken a crash course in the latest version of latex2html for AIPS++ documentation (summary of my conclusions and suggestions is at

<http://www.cv.nrao.edu/~abridle/l2h4aips/l2h4aips.html>). I ask this only because this package will soon be one in which getting hard copy one page at a time via the browser "Print" option will be very tedious. It's a strategic decision: perhaps you want to keep it that way to minimize the numbers of hard copies that are taken, but I'm sure there will be a demand for a Postscript version and that is much easier to co-master from LaTeX these days.

The navigation bar is a good idea (it might ultimately become an HTML frame once the browsers are generally frame-capable?) but the meaning of <<<<< and >>>>> will not be obvious without trial by the user. (The distinction between "Previous" and "Next" in an index and "Back" and "Forward" in a browser history is always slightly confusing to users, though it can be discovered quickly by experimentation. I do not have a terse solution for this.)

The "icons" could be made about a factor of 50% smaller and it might be useful to intersperse the thumbnail rows on the icon page with text rows giving the source names.

Shoudn't "3CR" be in the title?

I'll get back to you with more detailed comments soon, this is mainly just to say that my initial impression is very favorable indeed.

Cheers,

A.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Richard Strom <strom@nfra.nl>
Cc: abridle@nrao.edu
Subject: 3CRR Atlas
Date: Fri, 19 Jul 1996 19:10:34 +0100 (BST)

Dear Richard,

I have just put the finishing touches on the MERLIN data I took for the Atlas back in 1993. I now have some sort of image of everything to hand except for the last few Westerbork objects. Is there any chance that you could collect these up in the near future? I am currently setting up some web pages for the atlas (vestigial at present, I'll give you an address as soon as there is something worth looking at). I hope to get JPEG images and some basic data for the whole sample onto the web before September, and also an ftp area for fits images. This will constitute a "Mark I" atlas. There are still a few objects which fall below the original quality criteria, and in most cases I have some uv data which should produce better maps, so my plan is to do that after the initial web version is up but before we go to hardcopy and/or CD-ROM.

regards,

Paddy

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Alan Bridle <abridle@nrao.edu>
Subject: Re: Atlas web site
Date: Wed, 21 Aug 1996 15:26:23 +0100 (BST)

Dear Alan,

Thanks for the encouragement; very welcome as I don't seem to be able to do a thing right at the moment in other areas!

I am trying to lighten up the background a bit (only on the index page at the moment). I'm not a big fan of white pages; for a start the white lines in netscape tables and rules become invisible, which spoils part of the effect; and a slightly darker colour is supposed to be more restful (I guess that's why the default is grey). Also a slightly unusual colour gives a bit of corporate image, of course. Latest version is a bit lurid, I think.

You're right that currently the text is mastered in html. I had a look through your latex2html document. I'm in two minds about this. I can see that there are some advantages, but most of the text associated with the Atlas is in the "introductory material" which isn't really designed for downloading en masse. I still think we should aim to produce a hardcopy version eventually, but the text will be more oriented towards the professionals, so I'm not sure that a dual use text will be all that beneficial. The downside of latex2html is that the results look a bit samey (standard buttons etc), and I'd rather use html3.2 codes for quasi maths where possible (it doesn't hurt to have a pressing reason for not using formulae, when you're writing for the public!). The main pages and the tables will be produced automatically from a master table with all the data, plus a collection of plain text files with the notes, once the format is fixed. I'll probably write this in fortran to save time tho' I'm tempted to learn C which is supposed to be better for this sort of thing.

Thanks for the comments on the navigation bar. I was aware of the "next" problem, and >>> is really just a temporary fix until someone has a better idea. One of the style guides I looked through made the point that there should be at least one clearly defined sequential path through a document, which is why I put these in.

On '3CR', not really appropriate! 'LRL' or '3CRR' perhaps. I use '3CRR Atlas' in all the document titles but there is already one opaque acronym in the official title. Since no-one has published such an atlas before (unless you count Pacholczyk's 'handbook'), we could probably get away without qualifying the title any more.

regards,

Paddy

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Abridle@nrao.edu, Richard Strom <strom@nfra.nl>
Subject: Atlas
Date: Wed, 21 Aug 1996 15:33:18 +0100 (BST)

Dear Alan and Richard,

Last week Bill Sparks passed through Jodrell. It turns out that he is PI of the HST '3CR' snapshot project, which he described as a "community service" operation, so I asked him whether he would be interested in putting the images on the web as part of our Atlas. He didn't want to make a commitment there and then, but I promised to send him the URL of the current web pages, so that he can see what we are trying to do. I'm just going to do this now, with a rider that everything may change before the thing is publically released. What do you think about the idea of including this stuff?

regards,

Paddy

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Atlas web site
Date: Wed, 21 Aug 1996 12:22:42 -0400

Patrick Leahy writes:

> Thanks for the encouragement; very welcome as I don't seem to
> be able to do a thing right at the moment in other areas!
>

Happy to oblige!

> page at the moment). I'm not a big fan of white pages; for a start the
> white lines in netscape tables and rules become invisible, which spoils
> part of the effect; and a slightly darker colour is supposed to be more
> restful (I guess that's why the default is grey). Also a slightly unusual
> colour gives a bit of corporate image, of course. Latest version is a bit
> lurid, I think.

I agree that off-whites have definite advantages for the long term. I was all set to use them in my aips++ documentation until I discovered that some browsers misinterpret some hex combinations, and a delicate off-white can come up in some browsers as dark blue, lurid green, etc!

This <BGCOLOR> incompetence should soon be a thing of the past, as the commercial web sites insist on predictable color. But any color choice that is not one of the standard 16 "Windows" colors specified as hex code needs to be tested across a range of browsers and platforms, unfortunately. (The mid-blue #62B0CC" may be a bit dangerous in that respect, but if you do go with something like that, I would personally find "#99CCCC" a bit easier to read. Someone who is red-green color blind might disagree, however.)

> The downside of latex2html is that the results look a bit
> samey (standard buttons etc), and I'd rather use html3.2 codes for quasi
> maths where possible (it doesn't hurt to have a pressing reason for not
> using formulae, when you're writing for the public!).

The standard buttons do have an upside, too: people who see a lot of latex2HTML'd documents get used to their meanings. And there do seem to be a lot of latex2HTML'd docs appearing on the (scientific) Web now.

Every rev of LaTeX2HTML is a little smarter at not making GIFs for entities that can be expressed using the full ISO-Latin character set (which does have some interesting symbols). Also, when the math mode in HTML is standardized, latex2HTML will support that; so a given source file, written now, should be convertible to ever-better looking HTML as both latex2HTML and the browsers evolve.

What do you see as the demography of the Atlas Website "public"? Part of its readership may be technical folks for whom some math presence is helpful. Perhaps parts of the Atlas Website, but not all, might be appropriate to master in TeX? And any valid HTML structure can be mastered from a single LaTeX source file using the Latex2HTML htmlonly and rawhtml environments. This takes some getting used to, but has the upside that it can make editing across a whole site a lot easier because it's all in one original file....

For an example of a composite site done this way, you might take a peek at <http://www.gps.caltech.edu/~eww/astro/astro.html> (Eric Weisstein's "Treasure Trove of Astronomy") if you haven't run into it already.

> Thanks for the comments on the navigation bar. I was aware of the "next" > problem, and >>> is really just a temporary fix until someone has a better > idea. One of the style guides I looked through made the point that there > should be at least one clearly defined sequential path through a document, > which is why I put these in.

I sympathize with that. It's easy to get hyper-lost in hypertext Webs, and it does help a reader to have the option of reading them linearly!

>
> On '3CR', not really appropriate! 'LRL' or '3CRR' perhaps. I use > '3CRR Atlas' in all the document titles but there is already one opaque > acronym in the official title. Since no-one has published such an atlas > before (unless you count Pacholczyk's 'handbook'), we could probably get > away without qualifying the title any more.
>

Point taken about 3CRR! But for a technical audience the 3CRR is more of an icon than DRAGN (despite your promotional efforts!). Including it might help people to discover the site using search engines based on "3C", "3CR" tokens. Some engines delve into the <BODY> text, but some search only on <TITLE> content. I guess we could bridge that gap with some <META> information in the <HEAD>, but I'm not sure how extensively that is used.

Note that I don't feel strongly about any of these points, I am raising them just to bring up issues that may be worth considering before the Website becomes too huge to change conveniently! And because I've hit a few things of this ilk already in starting up the aips++ documentation

A.

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Atlas
Date: Wed, 21 Aug 1996 12:29:05 -0400

Patrick Leahy writes:

> Dear Alan and Richard,
> Last week Bill Sparks passed through Jodrell. It turns out that he
> is PI of the HST '3CR' snapshot project, which he described as a
> "community service" operation, so I asked him whether he would be
> interested in putting the images on the web as part of our Atlas. He
> didn't want to make a commitment there and then, but I promised to send
> him the URL of the current web pages, so that he can see what we are trying
> to do. I'm just going to do this now, with a rider that everything may
> change before the thing is publically released. What do you think about
> the idea of including this stuff?
>

Excellent idea if they are willing and it might be useful
also to have STScI mirror our site once it's ready.

Another option to contemplate might be to provide fields from the
Digitized Sky Survey for all of our sources.

A.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: abridle@nrao.edu, Richard Strom <strom@nfra.nl>
Subject: Atlas Web pages
Date: Tue, 29 Oct 1996 22:50:51 +0000 (GMT)

Dear Alan and Richard,

I have just run the program which automatically generates all the Atlas main pages, so there is now something new for you to look at.

There is also a new (and I hope final) address:

<http://www.jb.man.ac.uk/atlas/>

Once I have done a few more jobs (listed below), which I hope will be in a week or two, I think there will be enough there to e-mail contributors and other interested parties to announce that the site is available.

So,

PLEASE LET ME HAVE ANY GENERAL
EDITORIAL COMMENTS AS SOON AS POSSIBLE.

The data on these pages has not been checked very thoroughly, so any corrections would be welcome. Even more welcome would be brief text on any objects you are particularly interested in, to go on the pages.

There are six objects lacking any sort of image at the moment, viz 3C31, DA240, 4C73.08, and NGC 7385 (which I'll be looking to Richard to supply) and 3C67 and 3C268.3, where I will be picking up new MERLIN maps from Simon Garrington in a couple of days.

In addition, it would be nice to get better maps of various objects. In particular I'm looking forward to getting maps of 3C84, 3C264 and 3C326 from Richard (and 21 cm images of 3C35, 3C66 and 4C35.40 would also be useful). For a few of the ropier VLA images, I am collecting archive data which I hope to piece together later on (these are 3C109, 200, 234, and 300); and 3C295 deserves a MERLIN map at some point.

There are a couple of dozen "big pictures" of various objects which will eventually be accessed via links from the main pages, but at the moment you can't reach them. I haven't figured out how to put these in automatically yet.

My top priorities at present are:

- 1) Put in contributors actual names, hyperlinked to the reference list where appropriate.
- 2) Link in big pictures.
- 3) Make the icon images.
- 4) Make the "Radio Data" and "Optical Data" tables.

I plan to e-mail contributors when the above is done, to get them to check details of credits etc.

Of course there is still a lot of other stuff to do. I still need to

make a lot of the structural measurements, so that table will be delayed quite a bit. The layman's introduction also needs a lot of work, and there are spaces for pictures throughout which need to be generated or scanned in.

Even so, this project now actually looks as though it might terminate, which was not obvious a year or so ago!

looking forward to your replies,

Paddy

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Atlas Web pages
Date: Wed, 30 Oct 1996 16:10:27 -0500

Patrick Leahy writes:

>
> Dear Alan and Richard,
> I have just run the program which automatically generates all the
> Atlas main pages, so there is now something new for you to look at.
>
> There is also a new (and I hope final) address:
>
> <http://www.jb.man.ac.uk/atlas/>
>
> Once I have done a few more jobs (listed below), which I hope will be in a
> week or two, I think there will be enough there to e-mail contributors and
> other interested parties to announce that the site is available.
>
> So,
>
> PLEASE LET ME HAVE ANY GENERAL EDITORIAL COMMENTS AS SOON AS POSSIBLE.
>

Hi Paddy, I'll check the pages over a.s.a.p. but it will be in another day or two as I'm in a multi-ring circus here just at the moment. Nothing new, except that this one is worse than usual! But I'll take a really good look at them over the weekend if not before.

A.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: twillis@drao.nrc.ca
Cc: abridle@nrao.edu
Subject: Your images of 3C236 and NGC6251
Date: Thu, 31 Oct 1996 21:38:52 +0000 (GMT)

Dear Dr Willis,

A couple of years ago you kindly gave Alan Bridle copies of your new-ish WSRT images of 3C236 and NGC6251 for our "3CRR Atlas" project. I am in the final stages of getting the WWW version of this up and I have a couple of questions.

First, how should we credit these images? As far as I know they are still unpublished, so I have put Willis (unpublished) provisionally. Please let me know if I have missed any publications or collaborators.

Second, the image headers do not give the clean beam size. Do you have a record of what was used?

Many thanks again for letting us use these images!

regards,

Paddy Leahy

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Atlas Web pages
Date: Wed, 6 Nov 1996 12:53:47 -0500

Hi Paddy,

I've started going through the Web pages, and have a few comments; more will come.

The overall layout and approach are both excellent, you're doing a great job there.

I think it would be a good idea to standardise whether the radio images are greyscales (3C285, 3C310, 3C314.1, 3C386) or color. Also, some of the most extended structures (e.g. 3C66B, A1552) are getting lost in the deep blue -- I haven't done a color count on the GIFs but some of the standard 6 x 6 x 6 Netscape palette deep blues are absolutely invisible against black and a few of the transfer functions probably need adjustment to log to ensure that the extended structures show up properly.

The greyscales, while much less striking at first sight, have a better visual dynamic range and also print very much better, by the way.

The "extended" structural classification is a good idea.

But I am a bit dubious about distinguishing Jetted Doubles from Classical Doubles. Especially as the classification seems highly restrictive, "one jet and one opposing hot spot". Maybe I'm missing an important point here, but maybe that also means the point needs to be explained? I'm curious to read more about why the jetted class is worth distinguishing, and why only when the hot spot opposes the one jet. 3C48 and 3C401 come across as defining two rather different sorts of phenomenon, 401 being a simple variant of the "Classical Double" in which one jet is apparently thrashing around the lobe somewhat, while 48 seems more like an asymmetric variant of the steep-spectrum core phenomenon, with no (known) large-scale lobe structure.

I gather the definition of the "Peculiar" Doubles rests on the plume-like extensions. "Peculiar" is a slightly derogatory word, and perhaps worth avoiding for that reason. Given that we've used "Tailed Twin Jets" and "Wide-Angle Tails", might we call these "Tailed Doubles"? It's easy to see them as cousins of 3C171, for example.

Unpublished credits: Perley, Laing, Bridle, etc. Here we should use authors' initials as well as last names?

3C31: better to refer to my 3c31.htm page than to the images.htm page, which has lots more on other sources?

3C219: could refer to my 3c219.htm page which has a larger version of the image; also 3c219montg.htm shows the jet and counterjet in much more detail

3C288: could refer to my 3c288.htm page, which has a higher-resolution image

3C351: mention that the mottling is likely a CLEAN artifact? It's a particularly awful case with this transfer function.

3C436: large image is very dark and source has also been rotated?

Some images, but not all, contain crosses; are these marking the ID or were they where AIPS cursors got captured unintentionally when making the images?

Steep-spectrum core images: need scale info and provenance on pages that show them.

The Glossary is getting a bit long to be a true glossary. Perhaps it would be better to split the AGN and Galaxy sections onto their own pages, so that glossary entries can be kept down to single definitions that would not be more than a paragraph or two each? Overall, this section is pretty good, though.

Index: "What is a DRAGN?" doesn't match title of its page

The Radio Sky: line 3: normal stars produce almost no radio waves
second para: no mention of stellar thermal emission?
third para: some huge starbursts are detectable at high-z, in deep surveys, and there will be more. Say "much fainter" rather than "too faint to detect", which will age into incorrectness?

What are DRAGNS? definition should mention magnetic fields ("magnetised plasma"?)

para.5 "clouds surrounding the jets" - not in every case, how about "around and near" the jets?

I don't like the bit about "end of the jet" being where the jet "collides with the surface of the lobe". Jets can and do thrash themselves into oblivion in some sources, without obviously reaching anything that is a candidate for the "surface of the lobe". We should allow for the case where the jet behaves like the "self-actuated dentist drill" in response to the turbulence and shocks it has previously created in the lobe. The "end of the jet" is sometimes well-defined, and marked by a hot spot (possibly transient) but sometimes not. We should say something that emphasises the likely time-variable nature of this situation in any one source, and the certain fact that "the end of the jet" is not always well defined, e.g. 3C401.

On the naming of DRAGNs: "modern deep surveys" (e.g. Condon et al.) could also be an HTML link to <http://www.cv.nrao.edu/~jcondon/nvss.html> or to <http://www.cv.nrao.edu/NVSS/>

Description of tabular data: Λ 1/2 should mention that this is for the whole-source integrated depolarization.

I haven't had time to check the data areas, and these comments are really just from skimming. I'll send more later.

The overall look-and-feel is very good indeed, I'm really impressed by the degree of integration already achieved! I do however find it a bit confusing that the <<<< and >>>> buttons are around the Atlas Index button and generally move you up and down in that, but that once you have selected a source from the Alphanumeric list they move you around from source to source in the Atlas images, (which is what you really want to do a lot of the time). This arrangement makes sense once you have got used to it, but it takes a little while to realise just how it is going to work.

Cheers, A.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: twillis@drao.nrc.ca
Cc: abridle@nrao.edu
Subject: Your images of 3C236 and NGC6251
Date: Thu, 31 Oct 1996 21:38:52 +0000 (GMT)

Dear Dr Willis,

A couple of years ago you kindly gave Alan Bridle copies of your new-ish WSRT images of 3C236 and NGC6251 for our "3CRR Atlas" project. I am in the final stages of getting the WWW version of this up and I have a couple of questions.

First, how should we credit these images? As far as I know they are still unpublished, so I have put Willis (unpublished) provisionally. Please let me know if I have missed any publications or collaborators.

Second, the image headers do not give the clean beam size. Do you have a record of what was used?

Many thanks again for letting us use these images!

regards,

Paddy Leahy

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Atlas Web pages
Date: Wed, 6 Nov 1996 13:00:54 -0500

Paddy,

A couple more items

3C33.1 image has been rotated, but I don't think it says so.

3C449 page lists the Telescope as 5;48, I presume it's WSRT and this is an accident in the database.

A.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Alan Bridle <abridle@nrao.edu>
Subject: Re: Atlas Web pages
Date: Thu, 7 Nov 1996 11:50:20 +0000 (GMT)

Many thanks for the comments. I'll fix the errors you found over the next week or so, I hope.

On the images: I certainly need to put some stuff in saying exactly what is going on. I had in mind to do this on the "Notes on radio images" page.

There is actually a system. I used a linear greyscale, where possible; if this gave real detail too faint to see I went to pseudocolour, and if this wasn't enough (as it usually isn't) I used a logarithmic colour scale.

There is a problem with the faint greylevels, that visibility depends on the monitor (including its age, I suspect). All the pictures look the way I want them on my monitor and other new ones at JB, but some of the faint stuff vanishes on the older monitors. If I set it up right for them, a lot of crud becomes visible on mine! In particular, in 3C66 the faint stuff is full of clean/selfcal artefacts, so I didn't want to emphasise it too much (but the full-size image has a log scale where it shows up all too well, as in 3C351).

Crosses are always optical positions. These havn't worked very well; there are some dot-size crosses on some pictures which are virtually invisible. (I only plotted crosses when the core position was not obvious).

On printing: the standard BGR pseudocolour prints horribly, I know. PHLAME works much better, but gives a lower dynamic range, which is why I havn't used it. At some point it might be worth doing a set of "printable" pictures, but I don't see this as a very high priority (argue if you like!).

I'll get back to you on other points over the next few days.

Paddy

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Alan Bridle <abridle@nrao.edu>
Subject: Re: Atlas Web pages
Date: Thu, 7 Nov 1996 12:10:32 +0000 (GMT)

A quicky: Changing refs to your pages, I notice that 3C31.htm and 3C219.htm are not cross-linked to the other images you have of these objects. I think this is why I used your images page for 3C31. For 3C219, I linked to your montage page as the full-source image there actually shows more detail than the colour-contour version on the 3c219 page itself (or is this an artefact of my viewer??)

Paddy

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Atlas Web pages
Date: Thu, 7 Nov 1996 10:06:21 -0500

Patrick Leahy writes:

>
> A quicky: Changing refs to your pages, I notice that 3C31.htm and 3C219.htm
> are not cross-linked to the other images you have of these objects. I think
> this is why I used your images page for 3C31. For 3C219, I linked to your
> montage page as the full-source image there actually shows more detail
> than the colour-contour version on the 3c219 page itself
(or is this
> an artefact of my viewer??)
>

I think we are seeing some differences between how viewers/VDU's treat palettes. One trouble is that many WWW browsers use only 216 (6x6x6) colors and have their own rules about how to interpolate or dither colors from the actual palette of a GIF or JPG into their color space. Between that and different gammas on different types of monitor, plus the ageing effects that you mentioned, it's impossible to optimize across the whole range of environments people will see.

Plain boring old grey scale gets around some of these problems, but it isn't "cool" so folks start to yawn when they see it.

On my monitor the montage page for 219 does not show the lower levels as well as the image on the main page (which is not color-contoured, BTW so if it looks that way to you there may be some extra quantization coming from your viewer). The montage was optimized for showing the fine structure better, and for sharing the transfer function with the jet detail insert

I think the only way to predict what will be seen in a given browser is to optimize for it by using its palette exclusively; some people have been doing that for Netscape, but its share of the browser market is now dropping precipitously over here so it's not clear that even that strategy can be much better than 50% effective.

I'll add some cross-referencing among my image pages today; it was on my list of things to do. I've recently added 3C288, 3C215 and 3C351 there and am about to add 3C204, 249.1 and 263, plus some reorganization of the indexing page.

Cheers, A.

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Atlas Web pages
Date: Thu, 7 Nov 1996 10:45:42 -0500

Patrick Leahy writes:

>
> There is a problem with the faint greylevels, that visibility depends on
> the monitor (including its age, I suspect). All the pictures look the
> way I want them on my monitor and other new ones at JB, but some of
> the faint stuff vanishes on the older monitors. If I set it up right
> for them, a lot of crud becomes visible on mine! In particular, in 3C66
> the faint stuff is full of clean/selfcal artefacts, so I didn't want to
> emphasise it too much (but the full-size image has a log scale where
> it shows up all too well, as in 3C351).

Perhaps we need to slip a segment in somewhere on "image artifacts"?

>
> Crosses are always optical positions. These havn't worked very well;
> there are some dot-size crosses on some pictures which are virtually
> invisible. (I only plotted crosses when the core position was not
> obvious).

Ah. Is that explained somewhere?

>
> On printing: the standard BGR pseudocolour prints horribly, I know.
> PHLAME works much better, but gives a lower dynamic range, which is why I
> havn't used it. At some point it might be worth doing a set of "printable"
> pictures, but I don't see this as a very high priority (argue if you
> like!).

It's a minor point, but I find that when looking through a large
"document" like this it's often useful to have a printed version as
well as the hypertext. The only generally satisfactory solution that
I've found for image-printing is to use latex2html to make one
all-postscript version and one all HTML/image version of a big doc.

>
> I'll get back to you on other points over the next few days.
>

Here are a few more:

On the title page: para 1, can we drop "assorted" and "to the uninitiated" ?
para.2 "ancillary" (sp)

Description of tabular data: Alpha: would be useful to state the sign
convention clearly on this page. I suggest
an $S(\nu)$ propto $\nu^{-\alpha}$ transparent .gif
from latex2html here and in the Spectral Index
entry of the glossary.

Core: interchange "only" and "meaningful"

lg P_178: emphasize "emitted" (perhaps by
parenthesizing "not received").

IAU name: are there really two l's in "Bessellian"
(I thought one was standard, but I'm not sure)

ID: "coincides" for "is coincident"

S_core: Why Jy here when Core was in mJy?

Glossary: synchrotron radiation: "Nature's favorite" ... thermal radio emission is probably a lot more common, just a lot less luminous. Would it perhaps be correct to say "most efficient" way of making radio waves?

Phenomena: jets, last sentence ("unfortunately": a bit harsh to say we don't know how jets are produced, many would take this as implying that we don't have any ideas ... how about "we don't know the details of how jets are produced"?)

Phenomena: radio-loud AGN: extra "always" in first sentence, comma needed after "all".

Phenomena: compact core, second para. is talking about SSA because it hinges on high surface brightness, so why not be explicit that the "re-absorption" is by the relativistic particles themselves?

Jansky: he did his observing in 1931/32 and announced the results in 1932 and 1933.

Cheers, A.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Alan Bridle <abridle@nrao.edu>
Subject: Re: Atlas Web pages
Date: Thu, 7 Nov 1996 15:54:26 +0000 (GMT)

And another thing....

I'm trying to finalise the "credits" page including the list of contributors (as opposed to the references to publications on each main page). The contributors list is supposed to credit the people who actually worked on the atlas data and maps, which is not necessarily the same thing as the author list of the relevant publication. With that in mind, who should I put in for the images you sent, i.e. 3C98, 215, 288, and 219? You, Rick, Robert Laing, Jack Burns, Ed Fomalont, and Dave Clarke are there anyway, but what about Baum, Hough, Lonsdale, Byrd, Valtonen, and Norman? For instance, I'd guess Mike Norman shouldn't be there unless he was trying his hand at something new!

Also, should I reference Baum et al (1988) for the 3C98 map, as an "early version" was published there?

regards

Paddy

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Atlas Web pages
Date: Thu, 7 Nov 1996 11:43:40 -0500

Patrick Leahy writes:

>
> And another thing....
>
> I'm trying to finalise the "credits" page including the list of
> contributors (as opposed to the references to publications on each main
> page). The contributors list is supposed to credit the people who actually
> worked on the atlas data and maps, which is not necessarily the same thing
> as the author list of the relevant publication. With that in mind, who
> should I put in for the images you sent, i.e. 3C98, 215, 288, and 219?
> You, Rick, Robert Laing, Jack Burns, Ed Fomalont, and Dave Clarke are there
> anyway, but what about Baum, Hough, Lonsdale, Byrd, Valtonen, and Norman?
> For instance, I'd guess Mike Norman shouldn't be there unless he was
> trying his hand at something new!

3C98: me

3C215: me

3C288: me

3C219: David Clarke (images we summed to get this one were from his thesis)

>
> Also, should I reference Baum et al (1988) for the 3C98 map, as an
> "early version" was published there?
>

No, there's a lot more data in the version we're showing, this was a
followup project.

A.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Alan Bridle <abridle@cv3.cv.nrao.edu>
Subject: Re: Atlas Web pages
Date: Fri, 15 Nov 1996 20:38:58 +0000 (GMT)

Alan,

Here are some responses to your comments (where I didn't do just what you asked).

I think para 2 of the "sky" doesn't need a mention of stellar thermal emission; as far as I know this has never been detected, and certainly never makes up a significant fraction of the radio luminosity, in an extragalactic source, which is what we're talking about there.

On DRAGN definitions: if you follow the plasma link, you find that all cosmic plasmas are magnetised (as far as I know this is true), so I'd let the original version stand.

I've changed the end-of-jet description a bit. I found it easier to add your qualifications as a rider to the Blandford/Rees picture than to include them from the start. If you can put it a better way, please send me some text.

Synchrotron radiation is nature's favorite, if you count the photons that are produced! I'll put a rider on here, the entry is only a stub at present.

I didn't put the NVSS link in yet. Is it deep enough to pick up mainly starbursts, as this context would imply? I thought not.

Have I missed something in the theory of jets? We have lots of theories, which means lots of wrong ideas. If you had to write a statement on jet production that a clear majority of people in the field would be willing to sign, I think it would still be very wooly. We know that accretion is involved and that disks almost certainly play a role. Most people have given up pretending you can ignore magnetic fields. But to say that jets are a byproduct of magnetised accretion disks is not the same thing as explaining how jets are produced!

I'm a bit tired at the moment, so I don't want to take you up on Jetted Doubles and Peculiar doubles right now. I think we should agree a common line here before going public though. I may get a chance to put some thoughts together over the weekend.

There is various other new stuff in the last week: see the What's New message.

cheers,

Paddy

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Atlas Web pages
Date: Fri, 15 Nov 1996 17:36:34 -0500

Hi Paddy,

I just checked in again over the WWW; you already anticipated my next comment with the "Data Page", I had started "using" the Atlas for a few everyday things earlier this week to check its interface aspects. I was about to send you a message suggesting that a one-button step to the per-source data was needed! The draft of these data pages looks really good, but as they are quite long it may help to put a standard within-page navigation bar across the top of each one, divided at least into "general", "radio" and "optical". and perhaps as finely into the actual table headings.

The bottom-of-page navigation is now clearer, at least to me!

The icon list draft looks nice visually but is indeed very slow to load, as you mention in your up-front comments. It will be interesting to see how the tradeoff between JPEG unprocessing and the longer transmission time (size) of GIFs pans out. The power of having them all side-by-side is very clear: it's an excellent display that really reinforces the value of having collected them all in a standardised format.

The "radio image" explanatory page showing the different color displays is very nice. I think we could debate which of the log gray and log pseudo-color images shows more detail, but it's nice example of how they each emphasise different details in the same source! Some fine details are easier to see in the grayscale, others in pseudocolor. It's the psychology of distinguishing gradients in color and in intensity at work again. But collecting so many different displays side-by-side was a master-stroke, and I'd like to link my own image pages to this description as soon as you're happy for that to happen!

You've done a huge amount of work here, I'm sure it is going to be very much appreciated!

A.

P.S. Some tiny things on/for the "Credits" page:

David Clarke may object to being called "Dave" Clarke. His department has a home page at http://mnbsun.stmarys.ca/WWW/smu_home.html and he has a personal page at <http://mnbsun.stmarys.ca/~dclarke/dclarke.html>

Ghataure needs a comma after Group and a period after Southampton.

It might be a good idea to put countries after everyone, rather than just after Akujor.

Groningen is mis-spelled under Barthel and Hes.

Greg Taylor has a home page at <http://www.nrao.edu/~gtaylor/> (including

a link to a huge image of Cyg A at 6cm.)

Phil Kronberg is in the Department of Astronomy at U. of T. and their home page is at <http://www.astro.utoronto.ca/home2.html>. Phil's personal entry is <http://www.astro.utoronto.ca/staff.html#PPK>

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Atlas Web pages
Date: Fri, 15 Nov 1996 17:38:08 -0500

One more item from the credits page jumped out just after I sent the previous message: the A in DRAO (Willis) stands for Astrophysical, not Astronomy.

A.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: ABRIDLE@cv3.cv.nrao.edu
Subject: JDs and PDs
Date: Mon, 18 Nov 1996 18:58:46 +0000 (GMT)

Dear Alan,

Jetted Doubles: My thought behind this class is that, at least at first sight, they appear transitional between the two FR types, with one lobe basically FR I and the other FR II. Of course the fact that on close examination the jets appear to be strong-flavour does not really support this. There are some other similarities as well between the central four objects in this group, 3C200, 346, 401 and 3C15 (from our forthcoming Hotspots II paper); namely they are all quite small and have weak emission lines.

You may well be right that these objects do not differ profoundly from classical doubles with well-defined hotspots in both lobes, but they do look different and it would be jumping the gun a bit to assume that this is just a brief episode in the life of an otherwise ordinary object.

I also agree that 3C48 may be rather different, and also the high-powered JDs like 3C9 and 280.1, although the latter do actually look quite similar to the prototypical galaxies. Probably it wasn't a good idea to put in 3C48 as a type example: I was trying to emphasise that the classification covered quasars with hotspotless jets, but 3C48 and friends like 3C147 may be something else again.

Peculiar Doubles: on the name of these things, "peculiar" has a good pedigree as a morphological term! You can see from the classifications actually used that I'm in two minds about this one, as they are actually all listed as "CDPec" rather than "Peculiar Double", though in a sense a peculiar classical double is a bit of an oxymoron. You are quite right that they are closely associated with WATs; putting 3C171 and 3C123 in different classes does seem a bit forced. This is certainly worth mentioning in the description. On the other hand describing 3C249.1 as a WAT doesn't really ring true either; I suppose these have the same borderline status between WATs and CDs that JDs have between TJs and CDs. I wonder if we could make anything of that?

This hasn't reached much of a conclusion, but I'd be interested in your reaction.

Paddy

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: abridle@NRAO.EDU
Subject: Atlas announcement
Date: Wed, 20 Nov 1996 18:37:55 +0000 (GMT)

Dear Alan,

As far as I can see we're at the stage where we can announce this Atlas to the world. This is my suggested course of action: what do you think?

* Start the process by e-mailing all contributors inviting them to have a look and pass any comments.

* About a week later mailshot to a long list of "3C" people including all the participants of IAU 175.

*I'll also put an announcement in the newsgroups sci.astro and sci.astro.research.

* When e-mailing the contributors, I'll point out that we plan to make the fits images available by FTP, and ask anyone who is not happy about this happening to their images to let me know. I'm planning to do this about the end of the year (AFTER I've measured up all the maps myself!).

I guess I'll have to ring up Richard Strom to touch base with him, as I've only had one short e-mail from him since August.

One thing we should think about before going public is copyright. The two obvious options are (1) don't mention it at all; (2) Copyright everything the "publisher", i.e. University of Manchester (I think the University would take a dim view if I copyrighted it myself, or jointly with you). We also need to say clearly somewhere that any reproduction or use of individual images should give credit to those named in the "Credits" field of the main pages. What do you think?

regards,

Paddy

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: abridle@NRAO.EDU
Subject: M84, 3C215
Date: Wed, 20 Nov 1996 18:39:19 +0000 (GMT)

One other thing: you originally sent me high-resolution images of M84 (at 1.75 and 0.45 arcsec resolution) and of 3C215. Shall I include these as "supplementaries"?

Paddy

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jib.man.ac.uk>
Subject: Re: Atlas announcement
Date: Wed, 20 Nov 1996 16:52:18 -0500

Patrick Leahy writes:

>
> Dear Alan,
> As far as I can see we're at the stage where we can announce this
> Atlas to the world. This is my suggested course of action: what do you
> think?

I agree, everyone should understand the bits that are still "under construction".

>
> * Start the process by e-mailing all contributors inviting them to have a
> look and pass any comments.

Definitely the right place to start. It will be good to give the contributors some advance notice that the collection is now available.

>
> * About a week later mailshot to a long list of "3C" people including all
> the participants of IAU 175.

I'd hold off on setting a timescale for this until we see what the response (if any) is from the contributors.

>
> *I'll also put an announcement in the newsgroups sci.astro and
> sci.astro.research.

I'd leave that for a bit later, too. There may be some loose ends to tie before that.

>
> * When e-mailing the contributors, I'll point out that we plan to
> make the fits images available by FTP, and ask anyone who is not happy
> about this happening to their images to let me know. I'm planning to
> do this about the end of the year (AFTER I've measured up all the maps
> myself!).
>
> I guess I'll have to ring up Richard Strom to touch base with him, as
> I've only had one short e-mail from him since August.
>

I agree on both.

> One thing we should think about before going public is copyright. The two
> obvious options are (1) don't mention it at all; (2) Copyright everything
> the "publisher", i.e. University of Manchester (I think the University
> would take a dim view if I copyrighted it myself, or jointly with you).
> We also need to say clearly somewhere that any reproduction or use of
> individual images should give credit to those named in the "Credits"
> field of the main pages. What do you think?
>

I think copyrighting on the WWW is something of a moot point, as "theft" is so easy. I've restricted it on my pages to putting copyright captions in the images themselves, so thieves do at least have to do some work to remove the VLA and NRAO attributions. That's not practical or even desirable for all the Atlas images, however.

We are also copyrighting to AUI everything that might become part of aips++ distributed source or documentation but this is mainly to cover the case where someone later on tries to resell the entire aips++ package as a commercial product and charge us a license fee for using it! I doubt that this will arise with the Atlas.

With regard to copyrighting to the University of Manchester, might that get us into trouble if we later try to "mirror" the collection in the U.S. for example? It may be about time that I looked again into your original question about mirroring the Atlas on an NRAO machine; not only would it reduce the load on your machine from U.S. users but it might encourage use of it over here by speeding response. How much disk space would be needed at the moment?

Overall, I favor a statement that anyone re-using the images should give credit to their originators. I think that gets the main point across and emphasizes the fact that the data were obtained from a variety of sources whose co-operation (however grudging in some cases) was essential to the project!

A.

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: M84, 3C215
Date: Wed, 20 Nov 1996 17:02:52 -0500

Patrick Leahy writes:

>
> One other thing: you originally sent me high-resolution images of M84
> (at 1.75 and 0.45 arcsec resolution) and of 3C215. Shall I include these
> as "supplementaries"?
>

Sure, unless you're getting tight on disk space.

A.

P.S. I like the new title page, and icon page indeed runs a lot faster now from here.

Should we perhaps use my low-resolution VLA L Band image for 3C31 as a stop-gap until the WSRT image show up, or do you want to use the missing space as a pressure-point for Richard?

On 3C31's display page, Pices---->Pisces.

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Credits page
Date: Wed, 20 Nov 1996 17:19:16 -0500

Some more things we could
add for consistency:

City and state/province names for institutes that don't already
contain them.

Burns: Las Cruces, New Mexico
Christiansen: Chapel Hill, North Carolina
Clarke: Halifax, Nova Scotia
Comins: Orono, Maine
Ge: Tucson, Arizona
Kronberg: Toronto, Ontario
Spangler: Iowa City, Iowa
Tzioumis: Sydney, New South Wales
Willis: Penticton, British Columbia

Format of the "telescopes" section

At least in Netscape, it needs a break between MERLIN and VLA and
between VLA and WSRT, because there is a break already in the middle
of the VLA segment.

Should we say a bit more about who Mike Evans is?

A.

From: Patrick Leahy <jpl@jib.man.ac.uk>
To: Atlas contributors <abridle@NRAO.EDU>, Adam Black <ablack@cup.cam.ac.uk>, Alan Pedlar <ap@jib.man.ac.uk>, Chidi Akujor <chidi@mpifr-bonn.mpg.de>, "Chris O'Dea" <odea@stsci.edu>, David Clarke <dclarke@olympus.stmarys.ca>, efomalont@NRAO.EDU, Everton Ludke <eludke@nepae.ufsm.br>, fowen@NRAO.EDU, Gabriele Giovaninni <GGIOVANNINI@astbol.bo.cnr.it>, Gary Hill <hill@hall.usm.uni-muenchen.de>, Ger de Bruyn <a.g.de.bruyn@astro.rug.nl>, gtaylor@NRAO.EDU, Guy Pooley <ggp1@mrao.cam.ac.uk>, Harbinder Ghataure <hsg@phastr.soton.ac.uk>, "Jack O. Burns" <JBURNS@NMSU.EDU>, jcondon@NRAO.EDU, Jing-Ping_Ge@jib.man.ac.uk, Patrick Leahy <jpl@jib.man.ac.uk>, Julia Riley <julia@mrao.cam.ac.uk>, jwrobel@NRAO.EDU, Kurt Roettiger <kroett@pecos.astro.umd.edu>, Luigina Feretti <lferretti@astbol.bo.cnr.it>, Martin Hartcastle <mjh22@mrao.cam.ac.uk>, "Neil F. Comins" <galaxy@perseus.umephy.maine.edu>, Pat_Crane@jib.man.ac.uk, Paul Alexander <PA@MULLARD-RADIO-ASTRONOMY.CAMBRIDGE.AC.UK>, Peter Barthel <pdb@astro.rug.nl>, "Phil P. Kronberg" <kronberg@astro.utoronto.ca>, Peter Wilkinson <pnw@jib.man.ac.uk>, Richard Strom <strom@nfra.nl>, Robert Laing <rl@mail.ast.cam.ac.uk>, Roger Linfield <rpl@logos.jpl.nasa.gov>, Ronald_Hes@jib.man.ac.uk, Steve Spangler <srs@astro.physics.uiowa.edu>, Simon Garrington <stg@jib.man.ac.uk>, Tasso Tzioumis <atzioumi@atnf.csiro.au>, Tony Willis <twillis@drao.nrc.ca>, Tom Muxlow <twbm@jib.man.ac.uk>, Wayne Christiansen <wayne@envy.astro.unc.edu>, Wil van Breugel <wil@igpp.llnl.gov>, Wim_Jaegers@jib.man.ac.uk
Subject: An Atlas of DRAGNs
Date: Thu, 21 Nov 1996 17:13:20 +0000 (GMT)

Dear Colleague,

Our project to produce an "Atlas of Extragalactic Radio Sources" is materialising as a set of web pages entitle "An Atlas of DRAGNs", at

<http://www.jib.man.ac.uk/atlas/>

Thank you very much for contributing images to this project. (If you didn't know you had, it was probably one of your collaborators).

The site is far from finished, but all the images we have to hand are now installed and you should get a fairly good idea of what's going on. We would now like to invite your comments, before announcing the site to the wider community.

We plan to make all the original images available in FITS format via FTP in a few weeks time. Please let us know if you do NOT want your image(s) to be available in this way.

We have tried to make sure that the attributions for each image are correct, and that our "Credits" page is up to date. However we would be grateful if you would check that all this is correct; please let us know if you would like anything changed.

Finally, if anyone has other high-quality images of objects in our sample

which they would like to contribute, please let us know! This would be especially valuable for the various objects listed on our "Status" page as having data of marginal resolution or sensitivity.

best wishes,

Paddy Leahy, Alan Bridle & Richard Strom

From: abridle (Alan Bridle)
To: jpl@jb.man.ac.uk
Subject: Peculiar doubles and 3C319
Date: Thu, 21 Nov 1996 12:54:50 -0500

Paddy,

I'm still mulling over the classification questions, amidst a zoo of other things unfortunately so it's going slowly. Let's put aside what the name of this class should be, "peculiar" may be just fine. But I may be missing an ingredient in all of this, as I don't understand how 3C319 gets to be a CD Pec. (One part of the CD Pec definition: hotspots in both lobes, but 3C319 has only one detected hotspot. Another part: one or both lobes substantially further from center than hot spot, yet 319's hot spot is right at the end of its lobe).

It seems to me that the only strongly "non-classical" aspect of 319 is that one hot spot is so much brighter than anything else in the structure. So it seems not to fall in either the CD or the CD Pec group as actually defined.

The only definition that speaks of only one hot spot is the Jetted Double (and I'm not sure why the hot spot enters into this one's definition, either).

There's something I'm not understanding at all about your use of the hot spot symmetries, so maybe this does need to be spelled out in more detail

A.

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Constellation names
Date: Thu, 21 Nov 1996 13:06:58 -0500

Believe it or not, 3C123 was once known as Perseus B.

3C219 was Lynx B.

(There is a list of all these anachronisms in Table IV of "Index of Extragalactic Radio-Source Catalogues" by M.J.L.Kesteven & A.H.Bridle, J. Roy. Astron. Soc. Canada, 71, 21 (1977). Now that's an obscure reference for you!)

A.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Alan Bridle <abridle@NRAO.EDU>
Subject: Re: Constellation names
Date: Thu, 21 Nov 1996 21:27:39 +0000 (GMT)

On Thu, 21 Nov 1996, Alan Bridle wrote:

>
> Believe it or not, 3C123 was once known as Perseus B.
>
> 3C219 was Lynx B.
>

By whom? ('tho I once was planning to observe Oph C [3C353]).

> (There is a list of all these anachronisms in Table IV of "Index of
> Extragalactic Radio-Source Catalogues" by M.J.L.Kesteven & A.H.Bridle,
> J. Roy. Astron. Soc. Canada, 71, 21 (1977). Now that's an obscure
> reference for you!)
>
> A.

Not that obscure. We could even afford to bind JRASC in those days!

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Alan Bridle <abridle@NRAO.EDU>
Subject: Re: Peculiar doubles and 3C319
Date: Tue, 3 Dec 1996 19:32:41 +0000 (GMT)

Dear Alan,

More classification conundrums:

The only objects we're still arguing about are 3C351, 382, 346, and 401; but I'm not sure we are classifying everything else the same for the same reasons! The WAT/PD distinction is still a problem.

1) Plumed doubles: In the end the question is how "odd" should the direction of the plume be? My proposed rule, that the end of the plume should be substantially further from the core than the hotspot/end of jet, implies that the angle the plume takes off from at the hotspot should be >90 degrees (if zero degrees is back to the core), unless the plume is rather long.

If we're going to include 3C382 and 3C351, which fail this test, we need another criterion. For instance, 3C295 looks quite like 3C382, especially at high resolution; why not include that? And 3C47 has the same sort of rotation between hotspot axis and lobe axis as in 3C351.

Incidentally, I put 3C388 in this class because of the infamous "relic" emission, especially that beyond the NE lobe, not because of the 3C382-like arc of the bright part of the SW lobe. For 3C303 the crucial point for me is the bright blob beyond the W hotspot, and the wierd shape of the outer boundary, not the 351-like lobe to the SE, (although I must say that 3C303 feels more comfortable with the old "peculiar" label than as "plumed").

Three of these dubious cases have broad lines (303, 351, 382) which suggests that we may be being fooled by projection effects.

2) JRD: the problem here is that both 3C346 and 3C401 do have weak hotspots in their counterjet lobe. In 3C346 it is compact and more than three times brighter than everything else in either lobe, (except the jet), so on the basis of your "one is enough" rule, this ought to be a JCD, even though very fat. I suspect it is highly forshortened. According to Laing's unpublished list, the spectrum is "E", meaning neither classic BLRG nor NLRG, but a LINER-like spectrum; therefore it is not clear whether any weak broad-line region is visible.

In 3C401 the hotspot is more relaxed, but still more than twice as bright as the rest of the N lobe and also anywhere in the S lobe except the jet and the "warmspot" at the S tip of the lobe.

Here are some more general comments on your last message.

On Wed, 27 Nov 1996, Alan Bridle wrote:

> My final
> shift allows us to call CD a source that does not actually exist in
> this sample: a 3C319 with an outward-brightening Western lobe but no
> hot spot.

Are you thinking of any particular beast(s)? How about 3C401 without the jet?

3C79:

> I'm
> fairly confident about it not being a "plumed double", but wonder
> whether it is a cousin of your "winged DRAGNs".

Maybe. The difference between things with wings and things with plumes may be evolutionary. If 3C215 expands along the jet axis, it will eventually turn into 4C12.03; 3C249.1 would turn into 3C321. There are also symmetry issues (wings to me are associated with rotational symmetry).

> To me, the archetypal PD's should look like a variant of the CD's,
> i.e. edge-brightened lobes, hot spots near emission boundaries, or
> both. Archetypal WAT's should look more like FR'I's that have (a)
> suddenly flared (brightened, decollimated) then (b) bent, at or beyond
> the flare.

Is there a difference between a hotspot and a place where a jet brightens and decollimates? The flare points of WATs are also on/near the emission boundaries. I have always seen the plumes/tails of WATs and TTJs as lobes rather than jets, i.e. the components analogous to bridges. I don't think edge-brightening helps much, certainly some PDs (3C215) are edge-darkened on the plume side. We might get somewhere by focussing on the aspect ratio of the plumes/tails: in most PDs they are quite fat, whereas in most WATs (e.g. Aileen O'Donoghue's collection) they are quite slender. This would push 3C171 back towards WATness, though. The inner jets in WATs are supposed to be Laing's "strong-flavour", i.e. FRII-like, although I must admit this is based on pretty flimsy evidence.

> ... there should not be too many
> perverse cases in a small sample.

Sodd's law says there **should** be too many!

>
> 3C171 is deliciously ambiguous in almost all of these respects. It's
> not obviously a flared FR-I (not much sign of inner jets to judge that
> by)

There are weak inner jets, but I don't think this is a distinguishing feature (see above).

> but if it is really a PD there's almost no extended emission
> other than the two plumes to demonstrate this. The "hot spots" are
> very bright, but hard to distinguish from a particularly violent flare
> in a narrow jet. We could decide that to be a PD there has to be some
> evidence for the "regular" classical lobes (in addition to the plumes)
> in which case 3C171 is a WAT, because the "two" plumes are
> all we've got to classify it by and the "hot spots" are deeply enough
> recessed to be possible "flares" in a twin-jet. (Would be helpful to
> have deeper and more sensitive images, no?)

Martin Hardcastle has higher-resolution images (less sensitive!).

RD:

> With 296 there's almost nothing left to classify if you leave the jets
> out, which is such a common attribute of twin-jetted FR'I's that I'm

> happy to leave it alone, with the class name saying that the source
> is a twin jet. I meant my comment to apply to the lobes of FR-II's,
> which means there has to be some distinguishable lobe emission in the
> first place. I agree that there are some hairy cases to worry about,
> but I'd not put 296 in with them.

Hmm, it's true the lobes of 296 are quite weak relative to the jets, but I'd say they are certainly "distinguishable". Maybe where I see lobe (=bridge in this case) you see decollimated jet? Anyway, I would interpret your comments as saying we should retain the statement in the RD definition that any jets should be faint.

3C48

> JD will do if we can refer to evidence for the "other side"; I'm
> just a bit worried about the historical (and ongoing!) problem of core
> misidentification, i.e. how convincing is the evidence that the new
> extreme southern thingy is the other side and not the real core?

I think if the new component had been as compact as the "core", it would have shown up on VLBI maps. Still, it would be nice if Craig wrote this up! NB if J is a modifier this one *is* JRD, as there is no sign of hotspots, at least pending Craig's map.

To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Peculiar doubles and 3C319
Date: Tue, 3 Dec 1996 15:33:38 -0500

Patrick Leahy writes:

>
> The only objects we're still arguing about are 3C351, 382, 346, and 401;
> but I'm not sure we are classfying everything else the same for the same
> reasons! The WAT/PD distinction is still a problem.
>

I think the WAT/PD distinction is intrinsically difficult and perhaps the best thing to do is to dwell on that difficulty a little when making it.

> 1) Plumed doubles: In the end the question is how "odd" should the
> direction of the plume be? My proposed rule, that the end of the plume
> should be substantially further from the core than the hotspot/end of jet,
> implies that the angle the plume takes off from at the hotspot should be
> >90 degrees (if zero degrees is back to the core), unless the plume is
> rather long.
>
> If we're going to include 3C382 and 3C351, which fail this test, we need
> another criterion

Depends on the quantitative meaning of "substantially"? In both 3C382 and 3C351, there is "plume" emission further from the core than the hot spot on the same side. I agree that we could use an explicit 90-degree rule to make a spearation, and these two would fail that, but as you mentioned below that's vulnerable to projection. Whether we do it by an angle, or by an explicit statement of what percent difference we consider "substantial", we'll be making a distinction without much difference somewhere, I'm afraid.

Given the domination of the sample by "straightforward" CD's I'm inclined to tilt the classification a little toward recognising the not-exactly-classical features of the rest, and thus to leave these two in the PD class. But we probably both agree that these ones are near a borderline, so I shan't insist.

> Three of these dubious cases have broad lines (303, 351, 382) which
> suggests that we may be being fooled by projection effects.

Interesting point.

>
> 2) JRD: the problem here is that both 3C346 and 3C401 do have weak
> hotspots in their counterjet lobe. In 3C346 it is compact and more than
> three times brighter than everything else in either lobe, (except the
> jet), so on the basis of your "one is enough" rule, this ought to be a
> JCD, even though very fat.

I was a little surprised right at the start when your definition of "jetted" required a hot spot on the other side from the jet. But on looking through this group I realised why you had focused on that. Question now is: do we keep that as part of using "jetted" as a qualifier? If so, 346 is probably o.k. as JRD. If not, then they probably should both be JCD.

>
> On Wed, 27 Nov 1996, Alan Bridle wrote:
>
> > My final
> > shift allows us to call CD a source that does not actually exist in
> > this sample: a 3C319 with an outward-brightening Western lobe but no
> > hot spot.
>
> Are you thinking of any particular beast(s)? How about 3C401 without the
> jet?

No, I was thinking about it in principle. 401 without the jet would be the closest to it.

>
> Is there a difference between a hotspot and a place where a jet brightens
> and decollimates? The flare points of WATs are also on/near the emission
> boundaries. I have always seen the plumes/tails of WATs and TTJs as lobes
> rather than jets, i.e. the components analogous to bridges. I don't think
> edge-brightening helps much, certainly some PDs (3C215) are edge-darkened
> on the plume side. We might get somewhere by focussing on the aspect ratio
> of the plumes/tails: in most PDs they are quite fat, whereas in most WATs
> (e.g. Aileen O'Donaghue's collection) they are quite slender. This would
> push 3C171 back towards WATness, though. The inner jets in WATs are
> supposed to be Laing's "strong-flavour", i.e. FRII-like, although I must
> admit this is based on pretty flimsy evidence.

Probably not a clean difference, again in the sense that I feel we may end up drawing lines in a continuum of properties. The extremes are fairly easy to recognise (Mach disk candidates at the edge of the lobes versus things that clearly look like local flares and decollimation in ongoing jets) but we are treading right on the ambiguities with the cases that we have problems classifying.

>
> 3C48
> > JD will do if we can refer to evidence for the "other side"; I'm
> > just a bit worried about the historical (and ongoing!) problem of core
> > misidentification, i.e. how convincing is the evidence that the new
> > extreme southern thingy is the other side and not the real core?
>
> I think if the new component had been as compact as the "core", it would
> have shown up on VLBI maps. Still, it would be nice if Craig wrote this
> up! NB if J is a modifier this one *is* JRD, as there is no sign of
> hotspots, at least pending Craig's map.
>

That gets us back to whether the definition of J requires a hot spot on the other side. We keep having problems throwing this one into the same bin as anything else. Maybe we should call it OJ, as it ought to be in a bin of some kind but we haven't managed to find the rules to convict it yet

So, if the J prefix implies an opposed hot spot, 346 and 401 are ok as JRD, but 48 isn't. If it doesn't, then 346 and 401 are JCD and 48 is extreme JRD (where's the lobes?) I'm inclined toward the first version, but the tilt is minor.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Alan Bridle <abridle@NRAO.EDU>
Subject: Re: Peculiar doubles and 3C319
Date: Fri, 22 Nov 1996 00:51:42 +0000 (GMT)

> There's something I'm not understanding at all about your use of
> the hot spot symmetries, so maybe this does need to be spelled out

Actually probably the main thing you're missing is that I had a first stab at these classifications in 1994, revised it about a year later, and wrote the Atlas definition in a hurry about a month ago. There are definitely continuity problems here, so thanks for worrying about it. The idea at the root of the PD/JD business was to point out that many powerful DRAGNs are actually quite far from the "classical" hotspot-at-each-end stereotype. For the JD's it's pretty clear why: one jet thrashes, as you put it, before making it to the end. Really the Peculiaris are everything else, and probably they include several physically different anomalies. To avoid the one-object-per-class syndrome you have to have a rag-bag label, but we obviously need to be explicit about it. When I wrote the the Atlas definition I thought it might be getting at some common trend, but on reflection it's really a fairly inept attempt to say "none of the above"; inept in the sense that it leaves a few peculiar objects (e.g. 3C288) on the outside.

I suppose this "non-classical double" point isn't much of an issue from your point of view, because you have a tighter definition of hotspot and therefore are already in the position that a lot of classical doubles lack a "proper" hotspot at one end. Since I'm prepared to call just about any compact bump near the end of the lobe a hotspot, the few objects lacking even this seem to stand out more. Does that make sense? Another point is that the actual classifications take into account distortions of the structure, which I left out of the definition without thinking too much about it.

As an exercise, I've just compared the current classifications with my 1994 versions which make up the table in Law-Green et al (1995, MN 274, 939).

Our PD definition was: "The lobes of the object are highly distorted. The hotspots may be substantially recessed from the ends of the lobes. These objects may be luminous analogues of the WATs". The only reason it doesn't say this in the Atlas is that I didn't have a copy of the paper to hand when I typed it in. Since it doesn't specify that hotspots must be present, it sorts out several problem cases (but not 3C319).

In 1994 I was counting 3C123, 171, 215, 249.1 288, 303, 305, 388, 433 as PD (plus the high-z objects 3C190, 196, 294, 343.1, & 4C13.66, if this makes anything clearer).

Currently, we have 171 as a WAT, 305 as a "WATPec", 288 as a "TJPec", and 433 as a JD (it fits the wording, but not my platonic ideal).

In 1994 I had 3C338 as a twin-jet, I think based not on the "pseudo-jet" but on the ears sticking out of the core; they don't really qualify as jets on your definition, so now it's a "RDPec".

3C319 falls neatly into a gap in the system. It's not a classical double because one lobe is totally hotspotless (not just a dynamic range problem,

as far as I can see). On the other hand it's got one clear hotspot so that my 1994 label of "Fat Double" (RD now) was wrong; I didn't think very hard when I relabelled it a CD Pec, as you noticed. Actually there are a few others with pretty negligible hotspots on one side: 4C12.03, 3C236, 268.3, 326. It might be a good idea to put off worrying about 3C319 until I've finished measuring "hotspot fractions" for all the lobes, so we can get a better idea of what's normal.

A suggested course of action: change the definition of PD to more or less the Law-Green et al version; also add a note at the top that the "more detailed" scheme may be revised in the light of further analysis.

Of course a factor of ten increase in the number of objects would help show which peculiarities were systematic: have you tried anything like this with the B3 maps?

Paddy

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Peculiar doubles and 3C319
Date: Fri, 22 Nov 1996 10:47:48 -0500

I think it might help the classification to de-emphasize whether hot spots are detected on both sides (especially as at the moment there seems to be only one classification - JD - that allows for sources with only one hot spot, and this class seems really to be aimed at snagging a characteristic of the jets). It is true that what most people think of as a "classical" double is one where the radio source looks like the diagrams in Blandford & Rees (1974) on both sides -- two hot spots, both at the outer edges of the lobes and pretty much on-axis as well. Cyg A at low-ish resolution encouraged this as a benchmark, are there aren't really a lot of clean cases like that around.

I think it was Larry Rudnick who first pointed out that the two lobes of any one 3C source often resemble each other much less than they resemble the lobes of other 3C sources. This was in his flip-flop days, but the point has always struck me as good one and I've looked on the "ideally" symmetric sources as the oddities ever since. The emerging data picture of multiple hot spots, the frequent recession of the most compact ones has also been matched by a modeling picture in which oblique shocks were recognised as much more probable than normal Mach disks (at least in the wild rather than in the lab), that jet "thrashing" is

likely to make hot spots rather transient features, and (more recently) the notion that there may still be some bulk relativistic flow components out there to add some beaming asymmetries to the whole show.

So I have increasingly thought of good hot spot symmetry as a sort of special case, perhaps a lucky accident or perhaps requiring an unusual environment in which the source is coerced into being well-behaved (I won't digress with details of that!). I've therefore tended to bin the FRII's into

a) "classical doubles" - ones where the lobes are pretty classical - edge-brightened, more or less symmetric, and the visible hot spots, whether one or two and whatever their relative brightness, are indeed in the outer halves. In this context I'm quite happy still to have CygA and 3C319 both in the same bin!

b) "plumed doubles" - ones where the outer halves of the lobes have extensions that wander off in "odd directions", i.e. away from the nucleus.

c) "fat doubles" - the usual case of "wooffly lobed", no sign of hot spots, but also not enough collimation in the extended stuff to describe it as a "plume".

When we add extra ingredients to describe jets, it seems to me there are three basic observables to capture: jet sidedness, "prominence" of the brighter jet relative to the lobes, and straightness/kinkiness. As both sidedness and prominence are likely to be orientation-dependent properties (rather than one the source knows about) I've been happy to keep track of them separately, and not make

them a feature of a morphological classification at all. The ones that scream "no, jet prominence can matter when classifying morphology" are the 3C9's where one jet is so bright that you can't even be sure it has a lobe. I would have called these the "jetted doubles", i.e. held that term for where the jets dominate the overall morphology. I agree that where one might draw that dividing line is a bit arbitrary, however. Perhaps we need a term "jet-dominated double" to handle this case?

The ones with "kinky" jets like 3C401 are definitely worth hanging a label on, whether or not they are a transient unstable phase, however.

The bottom line is that I'd be happier if the symmetry and number of hotspots got less attention, provided the source has enough signs of hotspottery somewhere in the outer half of at least one of its lobes that we're happy it's not a "fat double" or a WAT. CD would then be a rather bigger class than yours, but I think with some justification, and I'd use CDpec for the "plumed double".

Perhaps we should have a subclass, quite rare, of "symmetric classical double", where the lobes resemble one another in brightness, shape, hot spot prominence and location, etc particularly well (well enough that Cygnus would be the archetype)? This would recognise the basic point that "classical" symmetry in powerful sources is unusual, rather than the norm. Entry into this sub-class should be through quantitative criteria, based on the structural summary you are working on.

Sorry to keep banging on this when you've already put such a lot of work into it. But the Atlas is likely to carry a lot of weight in future and its classification bins might stick around awhile. I think it's worth sweating over them a bit to try to close up loopholes.

Cheers, A.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Alan Bridle <abridle@NRAO.EDU>
Subject: Re: Peculiar doubles and 3C319
Date: Fri, 22 Nov 1996 17:59:49 +0000 (GMT)

On Fri, 22 Nov 1996, Alan Bridle wrote:

> Sorry to keep banging on this when you've already put such a lot of
> work into it. But the Atlas is likely to carry a lot of weight in
> future and its classification bins might stick around awhile. I think
> it's worth sweating over them a bit to try to close up loopholes.

Please don't apologise! I'm hoping you're right about the impact of the Atlas, so I agree we get this as straight as we can. It's probably useful that we're approaching this from rather different starting points about what's 'typical'. I always thought that Larry was overstressing the asymmetry thing (I seem to remember his paper was essentially anecdotal; I'll have to have another look at it). Anyway we will soon be in a position to be fairly quantitative about this.

I want to have a think about your message before getting back in detail, but the question of real vs apparent effects is obviously crucial. For instance, one of the big problems for flip-flop models was the idea that there usually were fairly compact hotspots in both lobes. The more I look at maps the more likely it seems that the jet ejection mechanism is fairly episodic, so maybe some of those ideas were not so far off. Then it's really interesting to ask about whether hotspots are present or not. My feeling is that hotspots are genuinely absent, not just hidden, on the jet sides of the objects I call JDs (which include 3C9 and also the SSC in Virgo A), although it might be hard to make a watertight case for all of them. Then you have to ask: is the jet significantly beamed? If so, is the counterjet also (invisibly) disrupted? Look to the CJ hotspots for clues (results seem mixed in our cases!). If the jets are asymmetric and beamed, then something pointing the other way would look like 3C319.

cheers,

Paddy

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Alan Bridle <abridle@NRAO.EDU>
Subject: Re: Peculiar doubles and 3C319
Date: Mon, 25 Nov 1996 18:02:20 +0000 (GMT)

On Fri, 22 Nov 1996, Alan Bridle wrote:

> I've therefore tended to bin the FRII's into
>
> a) "classical doubles" - ones where the lobes are pretty classical -
> edge-brightened, more or less symmetric, and the visible hot spots,
> whether one or two and whatever their relative brightness, are
> indeed in the outer halves. In this context I'm quite happy still
> to have CygA and 3C319 both in the same bin!

I'm not too unhappy with this. Although you emphasise the lobes, you are still relying on hotspots to distinguish these from Fat Doubles, and it looks like the distinction between this class and PDs also depends on where the hotspots are. So then only real difference with my usage is that you allow objects with just one hotspot to be CDs. This only affects 3C319 and perhaps 4C12.03.

On the other hand, I'd prefer to make the role of the hotspots more obvious, consistent with traditional usage (see below). For instance, what exactly do you mean by edge-brightened? When George Miley used this term in his ARAA review, it seemed pretty well synonymous with having hotspots at the ends. I have been looking for the origin of the term classical double. The earliest paper I found that uses it is Longair (1975, MN, 173, 309) who defines it obliquely in two slightly different ways:

"...the components have compact heads with trailing structure of lower brightness"

and "...with high brightness heads and extended tails of lower surface brightness".

In those days "head" was used at MRAO for what we now call hotspots.

The next reference I found was Burns, Owen & Rudnick (1978, AJ, 83, 312) who also emphasised the hotspots: "...classical double morphology (i.e. structure dominated by two hotspots which lie near the extremities of the source, such as 3C 33 and 3C 390.3)."

I guess "classical double" must have been used informally for quite a while before it found its way into print, since no-one is very careful about defining it (or have I missed a crucial early reference?).

>
> b) "plumed doubles" - ones where the outer halves of the lobes have
> extensions that wander off in "odd directions", i.e. away
> from the nucleus.

This needs tightening up: where is the starting point that the extensions are wandering off from, if not the hotspot? On your definition you could turn any plumed object classical by defining the starting point as the point furthest from the nucleus (and vice-versa).

Questions: (i) which objects in our sample

would you classify as plumed.

(ii) Do they all have hotspots on the plumed side?

>

> c) "fat doubles" - the usual case of "wooffly lobed", no sign
> of hot spots, but also not enough collimation in the extended
> stuff to describe it as a "plume".

>

The danger of emphasising the Fat/wooffly lobes is that the lobes of low-power classical doubles like 3C382 and 3C285 are pretty well identical to those of fat doubles. That's what persuaded me to switch back to George Miley's "relaxed double" name: the really distinctive thing about RDs is the lack of compact internal structure (hotspots & jets), not the overall axial ratio (There are also quite slender objects without true hotspots: 3C16). I assume you don't have any criteria which would distinguish wooffly from non-wooffly lobes of similar overall shape! Again, would you mind compiling an independent list of your FD's so we can cross check?

> When we add extra ingredients to describe jets, it seems to me there
> are three basic observables to capture: jet sidedness, "prominence" of
> the brighter jet relative to the lobes, and straightness/kinkiness.
> As both sidedness and prominence are likely to be
> orientation-dependent properties (rather than one the source knows
> about) I've been happy to keep track of them separately, and not make
> them a feature of a morphological classification at all. The ones
> that scream "no, jet prominence can matter when classifying
> morphology" are the 3C9's where one jet is so bright that you can't
> even be sure it has a lobe. I would have called these the "jetted
> doubles", i.e. held that term for where the jets dominate the overall
> morphology. I agree that where one might draw that dividing line is a
> bit arbitrary, however. Perhaps we need a term "jet-dominated double"
> to handle this case?

>

> The ones with "kinky" jets like 3C401 are definitely worth hanging a
> label on, whether or not they are a transient unstable phase, however.

I agree we shouldn't worry too much about sidedness. For instance it would probably make sense to include in the JD category objects with two bright "strong-flavor" jets and bridges, like Her A. The Atlas definition was written that way mainly to clearly distinguish JD's from FRI twin-jets, since Her-A types are pretty rare (if there are any others at all!).

Prominence I'm not so sure about. Obviously it can be affected by orientation, but there must also be a big intrinsic effect. This gets back to the point in my last message about the JD's lacking any sign of hotspots on the jet side. I'm not sure you could come up with a clear morphological separation between 3C401 and 3C9. The jet in 401 does make up a good fraction of the total flux of its lobe; the 3C9 is pretty kinky at high resolution. Anyway, for definiteness, which objects would you include as 401-like, and which, if any, as 3C9-like?

> The bottom line is that I'd be happier if the symmetry and number of
> hotspots got less attention, provided the source has enough signs of
> hotspottery somewhere in the outer half of at least one of its lobes
> that we're happy it's not a "fat double" or a WAT. CD would then be a
> rather bigger class than yours, but I think with some justification,
> and I'd use CDpec for the "plumed double".

Did I say anything about symmetry? Historically it hasn't been a factor, and I wasn't intending to change this. Or do you mean that if you start counting hotspots, you get the wrong number if the asymmetry is big enough?

>
> Perhaps we should have a subclass, quite rare, of "symmetric classical
> double", where the lobes resemble one another in brightness, shape,
> hot spot prominence and location, etc particularly well (well enough
> that Cygnus would be the archetype)? This would recognise the basic
> point that "classical" symmetry in powerful sources is unusual,
> rather than the norm. Entry into this sub-class should be through
> quantitative criteria, based on the structural summary you are working
> on.

I don't think this is a very useful idea! Of course we'll present the symmetry statistics when we have them. Unless your hints about coercion are hiding something pretty radical, I have a hard time believing that the most symmetric few objects are qualitatively different, which is a condition I think your PD's DO satisfy.

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Peculiar doubles and 3C319
Date: Tue, 26 Nov 1996 12:14:51 -0500

Hi Paddy, here's my next iteration on the classification business. My stream-of-consciousness message the other day may have given the impression that I was asking for bigger changes than I really meant, so let me start off this time with my bottom line:

I don't want to rename the existing classes. (I mentioned alternate names just to clarify what I would prefer to emphasize via the present classification). My main suggestions are:

1. open the CD class to sources whose only misdemeanour is to have only one hot spot (but that one in the "classical" place near the edge of a "well-behaved" lobe). I favor this because I think there are several reasons why the relative prominence of the two hot spots may vary in any given source over time without major changes in the intrinsic behaviour of the source.

2. the Pec in the CDpec class should reflect peculiarities that are likely to correspond to some long-term behaviour, such as "outer pluming" of one or both lobes

3. the RD class should reflect a general lack of small-scale structure in both lobes, especially a deficiency of such structure towards the outer edges, where hot spots would be present in "classical" doubles.

I don't sense that we're far apart on these goals, or that much needs to be changed in what's in the table now.

So now to the details:

Patrick Leahy writes:

> On Fri, 22 Nov 1996, Alan Bridle wrote:
>
>> I've therefore tended to bin the FRII's into
>>
>> a) "classical doubles" - ones where the lobes are pretty classical -
>> edge-brightened, more or less symmetric, and the visible hot spots,
>> whether one or two and whatever their relative brightness, are
>> indeed in the outer halves. In this context I'm quite happy still
>> to have CygA and 3C319 both in the same bin!
>
> I'm not too unhappy with this. Although you emphasise the lobes, you
> are still relying on hotspots to distinguish these from Fat Doubles, and
> it looks like the distinction between this class and PDs also depends on
> where the hotspots are. So then only real difference with my usage is that
> you allow objects with just one hotspot to be CDs. This only affects 3C319
> and perhaps 4C12.03.

I agree that this is the nub of the issue re the CD category. I also agree that 3C319 and 4C12.03 should be classified together, as we are not (yet) attempting to count "inner wings" in the classification scheme. (Should we be -- they are a striking feature and the concept of a "winged DRAGN" certainly has its charm!) In the current draft, 3C319 is CDpec and 4C12.03 is RD. But each has one lobe that I would

be willing to leave in the straight "classical" category, while the other lobe has no hot spot and is also center-brightened. I'm uneasy with the Pec category for 3C319 as I think its peculiarity is a minor and possibly transient one. I'm uneasy with a simple RD classification for 4C12.03 because the north lobe has enhanced substructure right where you'd expect the hot spot in a CD lobe. If we were using my "must be compact and high brightness contrast" criterion for a hot spot, we might put 4C12.03's North lobe into a quantitatively different category (because it has a multiple "bright" feature at the edge with no clearly dominant component). But in the spirit of being more generous in the use of hot spot, I don't think we have a strong reason to argue that the N lobe is non-classical.

It's almost as if we need a CD/RD category for these two (one class for each lobe)!

> I guess "classical double" must have been used informally for quite a while
> before it found its way into print, since no-one is very careful about
> defining it (or have I missed a crucial early reference?).
>

I think the term originated with Malcolm Longair and meant "lobes brighter towards the outer edge at moderate resolution", much the same as "FR II". In many cases, this general edge-brightening wasn't due solely to what we now consider "hot spots", but included an extended region of enhanced emission in the outer half of the lobe. This region often contains ridges and filaments at higher resolution, some of which, but not all, connect to the hot spot(s). It's always been a problem to make clear distinctions between structures in this region, one or more "hot spots", and the "rest of the lobe". But "classical double" seemed to me to have implied an overall outward brightening and "sharp" outer edges (strong brightness gradients), consistent with the emission was running into an obstacle of some kind. Actual hot spots (by my definition) near the outer edge are then icing on the cake. More recent colloquial use of "classical double" seems to ask for hot spots as well, and the "relaxed double" class emphasizes the alternative.

For the Atlas, I'm happy to settle for use of "classical" if either of the two lobes has a hot spot near the outer edge, while the other lobe is simply edge brightened, whether or not it has a compact hot spot.

It may be useful to use a split category for sources, typified by 3C319 and 4C12.03, where the category would clearly change if the source consisted of one lobe and its replicate, versus the other lobe and its replicate. I.e. 3C319E + 3C319E would be a CD, but 3C319W + 3C319W would be an RD. Thus 3C319 earns a split category: CD/RD. 4C12.03N + 4C12.03N would be a CD (I think), but 4C12.03S + 4C12.03S would be an RD. Thus 4C12.03 is also a CD/RD.

If we did that, it may be worth checking all the CD's for comparable ambiguities. 3C268.3? 3C16?

> >
> > b) "plumed doubles" - ones where the outer halves of the lobes have
> > extensions that wander off in "odd directions", i.e. away
> > from the nucleus.
>

> This needs tightening up: where is the starting point that the extensions
> are wandering off from, if not the hotspot? On your definition you could
> turn any plumed object classical by defining the starting point as the point
> furthest from the nucleus (and vice-versa).

I meant only to imply that these plumed fellows are the bunch I would identify with CDpec group, my main concern with the present definition being the same as with the CD's: I don't want to require a hot spot in both lobes to qualify a source for this group. I agree that we would need either a hot spot (or a prominent, straight jet, not currently available in this catalog), in the lobe that is considered "peculiar", to define the "hinge" location for the plume. So I agree with you that in this sample, all the clear candidates do have hot spots in the plumed lobe. The least convincing hot spot is in 3C382, which is currently classified CD but may merit some consideration for CD(Pec?).

>
> Questions: (i) which objects in our sample would you classify as plumed.
> (ii) Do they all have hotspots on the plumed side?

Definitely CDpec: 3C123, 3C215, 3C249.1, 3C388

Less sure CD(Pec?): 3C326, 3C351, 3C382

While on this point, is it absolutely clear that 3C171 is a WAT? To be devil's advocate, one might point out the East lobe is double-plumed (not a terribly WAT-like feature) and that the "flare" features are both rather small and bright, so it could be seen as a transition case between WAT and a CDpec with somewhat-recessed hot spots.

>> c) "fat doubles" - the usual case of "wooffly lobed", no sign
>> of hot spots, but also not enough collimation in the extended
>> stuff to describe it as a "plume".
>>
>
> The danger of emphasising the Fat/wooffly lobes is that the lobes of
> low-power classical doubles like 3C382 and 3C285 are pretty well identical
> to those of fat doubles. That's what persuaded me to switch back to George
> Miley's "relaxed double" name: the really distinctive thing about RDs is
> the lack of compact internal structure (hotspots & jets), not the overall
> axial ratio (There are also quite slender objects without true hotspots:
> 3C16). I assume you don't have any criteria which would distinguish
> wooffly from non-wooffly lobes of similar overall shape! Again, would you
> mind compiling an independent list of your FD's so we can cross check?

It's o.k. by me to stay with George's term and definition, so the class is not required to have round lobes. I agree that the key is the structure function of the lobe as a whole rather than its shape. I would not include the jets in the definition, however, I would base it entirely on the appearance of all the other extended structure. By "not a plume" I really meant not obviously conical or coreward-brightened.

Definitely: 3C16, 3C28, 3C274, 3C310, 3C314.1, 3C315, 3C386, 3C442A

Ones you have as RD that I'm not so sure about are: 4C12.03 (see above), 3C84 (no strong evidence for anything double on the large

scale, but might be an RD end-on -- you have covered this with use of the word halo, I'd be happier to have this visible in the classification: H+SSC), and 3C438 (there's quite a bit of fine structure near both outer edges, I don't think it has hot spots by my definition but it would a kinder, gentler, definition; with the current ground rules: I'm not sure why 3C438 is not a CD).

Ones that might merit a "jettted relaxed double" (JRD) category: 3C346, 3C401.

Ones that almost defy description: 3C433. How about "Starship Enterprise after nasty accident"? Seriously though, if we are ever going to use the word "peculiar", this should be it, so how about JD_{Pec}? The North lobe is as close to being a "plumed lobe without a clear hot spot" as we could get, the South lobe has a quasi-hot spot down near the bottom edge. I agree with the "jettted" language on your terms, but this one is really "peculiar"!

>
> I agree we shouldn't worry too much about sidedness. For instance it would
> probably make sense to include in the JD category objects with two bright
> "strong-flavor" jets and bridges, like Her A. The Atlas definition was
> written that way mainly to clearly distinguish JD's from FRI twin-jets,
> since Her-A types are pretty rare (if there are any others at all!).
>
> Prominence I'm not so sure about. Obviously it can be affected by
> orientation, but there must also be a big intrinsic effect. This gets back
> to the point in my last message about the JD's lacking any sign of
> hotspots on the jet side. I'm not sure you could come up with a clear
> morphological separation between 3C401 and 3C9. The jet in 401 does make
> up a good fraction of the total flux of its lobe; the 3C9 is pretty kinky
> at high resolution. Anyway, for definiteness, which objects would you
> include as 401-like, and which, if any, as 3C9-like?

I think this last question tugs me in the direction opposite to where I wanted to head. It is part of my dilemma that I don't think one can draw a clear dividing line between the 3C9's and the others, (and it is also quite possible that the problem is purely orientational). In 3C9's case it's hard to tell whether there's a deeply recessed hot spot at what we called "F" (making it a CD_{Pec} with an unusually bright plume) or a very prominent jet (making it a JD), largely because it's so hard to figure out what is and is not lobe on the jettted side. The closest example here is 3C200, but this does have enough lobe (and beams across the source) to get sorted out.

On going through the list again, I'm happy to identify the JD's somehow but in the spirit of not being too sure about whether jet proinence is apparent or intrinsic, I'd prefer to add the J in front of something that otherwise classifies the D, as in JRD, JD_{Pec}.

Doing that would bring up 3C200 as another "interesting" case. It's not terribly "classical". And its North hot spot is deeply recessed. Is it another JD_{Pec}? Or another JRD?

I hope this is not too divergent.

A.

From: abridle (Alan Bridle)
To: jpl@jb.man.ac.uk
Subject: Atlas: what is it with 4's and 8's?
Date: Tue, 26 Nov 1996 13:39:19 -0500

I mentioned that I was bothered by referring to 3C84's large scale structure as a double, but even more so is 3C48. Calling it a jetted double seems quite a stretch, when all the emission is on one side of the core. I suppose the logical thing to call it would be JS - "jetted single"? Or just J. (I thought of one-sided jet, or OJ, but those are initials I'm trying to avoid at the moment!).

A.

To: Alan Bridle <abridle@NRAO.EDU>
Subject: Re: Atlas: what is it with 4's and 8's?
Date: Tue, 26 Nov 1996 19:35:14 +0000 (GMT)

The JD name for 3C48 is based on an apparent detection of a counterjet component to the south of the core by Craig Walker and Dan Briggs. I've only had a brief glimpse at their map (a triumph for NLSQ) but it looked convincing. We haven't managed to get a very high dynamic range image of 3C48 with MERLIN to confirm this yet, unfortunately.

Of course I was rather please by this, since it means we don't have any OJ sources in this sample to worry about.

cheers,

Paddy

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Atlas: what is it with 4's and 8's?
Date: Tue, 26 Nov 1996 14:59:54 -0500

Patrick Leahy writes:

>
> The JD name for 3C48 is based on an apparent detection of a counterjet
> component to the south of the core by Craig Walker and Dan Briggs.
> I've only had a brief glimpse at their map (a triumph for NNLSQ) but
> it looked convincing. We haven't managed to get a very high dynamic
> range image of 3C48 with MERLIN to confirm this yet, unfortunately.
>
> Of course I was rather please by this, since it means we don't have
> any OJ sources in this sample to worry about.
>

Aha, that's good. Are we allowed to mention that in the notes to the
3C48, however?

And was it convincing that the "new" component wasn't the core?

A.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Alan Bridle <abridle@NRAO.EDU>
Subject: Re: Peculiar doubles and 3C319
Date: Tue, 26 Nov 1996 22:51:41 +0000 (GMT)

Dear Alan,

Another long message, I'm afraid. We are converging, but I think we may have to toss coins over some of the points listed towards the end of this!

> 1. open the CD class to sources whose only misdemeanour is to have
> only one hot spot (but that one in the "classical" place near the edge
> of a "well-behaved" lobe). I favor this because I think there are
> several reasons why the relative prominence of the two hot spots may
> vary in any given source over time without major changes in the
> intrinsic behaviour of the source.

Well, actually for the two disputed objects you suggest CD/RD. Let's go with that (now the class has >1 member!). But see below, we probably disagree more about hotspots than CDs!

> 2. the Pec in the CDpec class should reflect peculiarities that are
> likely to correspond to some long-term behaviour, such as "outer
> pluming" of one or both lobes

Good point, I'm happy with this. To reflect it, let's change the name to Plumed double, PD. (CD Pec grades as classical & peculiar have opposite connotations).

> But "classical
> double" seemed to me to have implied an overall outward brightening
> and "sharp" outer edges (strong brightness gradients), consistent with
> the emission was running into an obstacle of some kind. Actual hot
> spots (by my definition) near the outer edge are then icing on the
> cake.

Perhaps we're mainly arguing about the definition of hotspot (though you have the advantage that you probably talked to Malcolm at the time). My looser definition would probably rope in a lot of the "ridges and filaments" you mentioned. This goes back to the late 70's when Jenkins & McEllin explicitly identified "hotspots" with the "heads" of earlier MRAO papers and defined them operationally as a 15 kpc region around the peak in each lobe. Meanwhile Kapahi was talking about sub-kpc components as hotspots. The 15 kpc definition is unsatisfactory, but it influenced our definition of a hotspot or a "hotspot complex" as a region which has a clear brightness contrast with the rest of the lobe and a size less than 10% of LAS (this is what we went with for our X-band hotspots project, resulting in most hotspot complexes being several kpc across).

CD/RDs:

> If we did that, it may be worth checking all the CD's for comparable
> ambiguities. 3C268.3? 3C16?

This needs to be done quantitatively eventually. Those two cases can probably be left where they are for now.

PD/CDpec

> I meant only to imply that these plumed fellows are the bunch I would
> identify with CD Pec group, my main concern with the present definition
> being the same as with the CD's: I don't want to require a hot spot in
> both lobes to qualify a source for this group.
>
> Definitely CD Pec: 3C123, 3C215, 3C249.1, 3C388
>
> Less sure CD (Pec?): 3C326, 3C351, 3C382
>

I see 3C326 as having a very weak leading hotspot on the NE side, as if
3C79 had suddenly lost power. The very faint stuff in this image is not
to be believed, to be honest it's only half-cleaned (I ran out of time
when I was visiting Dwingeloo!).

I agree 351 and 382 are marginal, and go together. Both have hotspots near
the outer edges of their lobes (low contrast for 3C382, true), which is
why I left them out. If these are Pec, what about 3C79? Where do we stop?
But I object to CD (Pec?) if you're suggesting we CALL them that: it implies
we can't make up our minds what "peculiar" means, which, while true at
present, is not helpful to anyone else.

> While on this point, is it absolutely clear that 3C171 is a WAT?

The WAT thing is a weakness of this class. What do you see as the
difference between WATs and PD's? PD's obviously include "Semi-WATs" i.e.
CD/WAT in the same sense as CD/RD. But if there are plumes on both sides,
on my definition there's no real difference. Perhaps splitting of the
plume is a criterion, in which case 3C305 is PD as well as 3C171. But then
3C123 is a WAT (NB I would certainly include Hydra A as a WAT; I don't
think C- vs. S- symmetry is significant). At the moment we're using the
luminosity to decide, which is cheating.

RD:

> I agree that the key is
> the structure function of the lobe as a whole rather than its shape.
> I would not include the jets in the definition, however, I would base
> it entirely on the appearance of all the other extended structure. By
> "not a plume" I really meant not obviously conical or
> coreward-brightened.

But if you leave the jets out, wouldn't that make 3C296, NGC5127, etc, RD's?

Problem cases:

> 3C84 (no strong evidence for anything double on the large
> scale, but might be an RD end-on -- you have covered this with use
> of the word halo, I'd be happier to have this visible in the
> classification: H+SSC),

I didn't do this because this because then we start getting into probably
pointless arguments about whether the structure of 3C274 (say) is a halo
or a double.

> and 3C438 (there's quite a bit of fine
> structure near both outer edges, I don't think it has hot spots by
> my definition but it would a kinder, gentler, definition; with the
> current ground rules: I'm not sure why 3C438 is not a CD).

Actually the lobes are very flat. Notice that this is displayed with a linear LUT: the bumps are at the tens of percent level rather than a factor of several.

> Ones that almost defy description: 3C433. How about "Starship
> Enterprise after nasty accident"? Seriously though, if we are ever
> going to use the word "peculiar", this should be it, so how about
> JDpec?

I had certainly considered that! Or JPD on my revised nomenclature.

> The North lobe is as close to being a "plumed lobe without a
> clear hot spot" as we could get, the South lobe has a quasi-hot spot
> down near the bottom edge.

(Or the top edge, at higher resolution! Actually now you mention it I'm beginning to notice several similarities with 3C200; on the other hand the N lobe of 3C200 is quite similar to 3C263, for instance; the recession could mainly be projection).

NB: 3C9: I can't buy the jet=plume from F idea! Have you seen Jane D-T's MERLIN map? The jet is much too collimated and knobbly to pass for a plume in my dictionary! I think the analogy is with M87 at knot A: something happens, but the jet survives at least until J.

Can I try to summarise. I don't think the following have been resolved:

- 1) Does 3C48 deserve a class of its own, or will J(R)D do?
- 2) You want to separate 3C200 from 3C346 & 401, I'm not so sure (200 and 346 have optical jets, whatever that tells us).
- 3) 3C288 has slipped through undiscussed. I think I'd like to revert this to PD, or possibly RD(Pec) especially if we're removing the necessity for hotspots.
- 4) What about 3C338? Same thing? (i.e. what it is at present).
- 5) Do you really want 3C303 as a CD?
- 6) We disagree on whether haloes are worth distinguishing.
- 7) and on 3C438.
- 9) Your CD(Pec?) objects. I'd rather leave them CD.
- 10) What about 3C171 & 305? I vote for PD, defined explicitly as close to WAT.
- 11) Is J a qualifier or a basic type?

We have the following FRII-ish types (those in brackets we're not sure are worthwhile):

Me: CD, CD/RD, RD, [RD(Pec)], PD, JD, [JD(Pec)]
You: CD, CD/RD, RD, , H, PD, JRD, [JD(Pec)]

with Lots 2 8-9, 2? , 1, 4-6, 2-4, 1-2?

DRAGNs per type. I was hoping to avoid types with less than about four objects, as the objects will inevitably get cast as prototypes and there will be confusion about which are the true distinguishing features (no matter what you say in words). CD/RD seems clear enough; the possible RD(Pec) is a potential disaster, as 3C338 and 288 are very different (help me out here!).

This would allow us to use "peculiar" for objects which we decide really don't fit in anywhere. This could imply that the peculiars differed as much amongst themselves as from other classes; each would merit a bit of discussion on its atlas page. If you want a "halo" class for 3C84, I think we need to list a few more objects in the class from outside the atlas; otherwise, if you think it's really different from RD's, it should go down as peculiar.

regards,

Paddy

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: abridle@NRAO.EDU
Subject: Re: 3C48 counterjet (fwd)
Date: Tue, 26 Nov 1996 22:53:18 +0000 (GMT)

----- Forwarded message -----
Date: Tue, 26 Nov 1996 15:35:42 -0700 (MST)
From: Craig Walker <cwalker@aoc.nrao.edu>
To: jpl@jb.man.ac.uk
Subject: Re: 3C48 counterjet

I'm not doing too well on publishing that stuff - sigh! I could give you a picture. I really need to get it out. Feel free to quote me.

Craig.

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Peculiar doubles and 3C319
Date: Wed, 27 Nov 1996 12:55:03 -0500

Patrick Leahy writes:

> > 1. open the CD class to sources whose only misdemeanour is to have
> > only one hot spot (but that one in the "classical" place near the edge
> > of a "well-behaved" lobe). I favor this because I think there are
> > several reasons why the relative prominence of the two hot spots may
> > vary in any given source over time without major changes in the
> > intrinsic behaviour of the source.
>
> Well, actually for the two disputed objects you suggest CD/RD. Let's go
> with that (now the class has >1 member!). But see below, we probably
> disagree more about hotspots than CDs!

Yes, my final vernier shift on this pair was to go back to the Rudnick argument of sawing the source in half and seeing how I would classify the lobes if they had been paired differently. You convinced me that there are RD qualities in the spotless lobes of these two (in that I would be happy to call them RD's if those lobes occurred in pairs). My final shift allows us to call CD a source that does not actually exist in this sample: a 3C319 with an outward-brightening Western lobe but no hot spot. But this part started with wondering why 3C319 was CDpec, so I think it was a path worth walking down (then partly back!)

>
> Perhaps we're mainly arguing about the definition of hotspot (though you
> have the advantage that you probably talked to Malcolm at the time). My
> looser definition would probably rope in a lot of the "ridges and
> filaments" you mentioned. This goes back to the late 70's when Jenkins &
> McEllin explicitly identified "hotspots" with the "heads" of earlier MRAO
> papers and defined them operationally as a 15 kpc region around the peak
> in each lobe. Meanwhile Kapahi was talking about sub-kpc components as
> hotspots. The 15 kpc definition is unsatisfactory, but it influenced our
> definition of a hotspot or a "hotspot complex" as a region which has a
> clear brightness contrast with the rest of the lobe and a size less than
> 10% of LAS (this is what we went with for our X-band hotspots project,
> resulting in most hotspot complexes being several kpc across).

Yes. I agree that this is one of the biggest problems. "Hot spot" has come to mean so many different things to different people that it's getting hard to understand what anyone is actually saying. This was why we (Ron Ekers and I) tried to give "jets" an early quantitative, if arbitrary, definition. "Hot spot" is actually harder to define, and in some sense more in need of definition for that reason! I think definitions tend to stick when there is some consensus that useful correlations come out of them, it will be interesting to see whether that holds up with the "compact hot spot" definition outside samples like the 3CR quasars.

>
> CD/RDs:
>
> > If we did that, it may be worth checking all the CD's for comparable
> > ambiguities. 3C268.3? 3C16?

>
> This needs to be done quantitatively eventually. Those two cases can probably
> be left where they are for now.

Agreed.

>
> PD/CDPec
>
> > I meant only to imply that these plumed fellows are the bunch I would
> > identify with CDPec group, my main concern with the present definition
> > being the same as with the CD's: I don't want to require a hot spot in
> > both lobes to qualify a source for this group.
> >
> > Definitely CDPec: 3C123, 3C215, 3C249.1, 3C388
> >
> > Less sure CD(Pec?): 3C326, 3C351, 3C382
> >
>
> I see 3C326 as having a very weak leading hotspot on the NE side, as if
> 3C79 had suddenly lost power. The very faint stuff in this image is not
> to be believed, to be honest it's only half-cleaned (I ran out of time
> when I was visiting Dwingeloo!).

OK, let's leave it as CD, then.

> I agree 351 and 382 are marginal, and go together. Both have hotspots near
> the outer edges of their lobes (low contrast for 3C382, true), which is
> why I left them out. If these are Pec, what about 3C79? Where do we stop?

I was keying on your concept of using the "hot/warm" spot in the lobe as a "marker". To consider the asymmetric feature a "plume" I'm asking (a) that it connect to the hot spot and (b) that its brightness ridge or mid-curve point toward the hot spot. Essentially, that the putative plume appear to "hinge" at the hot spot. 3C388 definitely qualifies on this score, 3C351 is trickier as there isn't much of ridge to trace and the asymmetric feature is also very wide. I was really keying on the system of filaments near to the "secondary" hot spot, some of which do point into the putative "plume".

I agree that 3C79 is a transition case to worry about when drawing a divider between "plumed lobes" and "winged lobes". But in 3C79 there is no sign that the extension connects to the hot spot. There's a well defined "empty region" just south-east of the hot spot that tips the scale away from the "plume" classification for me. In this case, the putative plume doesn't connect to the hot spot (because of the dark region) and there's no brightness level at which it could be construed as "pointing toward" the hot spot, either. There's no clear ridge line to help this, the brightest levels aren't very elongated in any direction, and the lowest level actually "point" back toward the nucleus rather than toward the hot spot. So I'm fairly confident about it not being a "plumed double", but wonder whether it is a cousin of your "winged DRAGNs".

> But I object to CD(Pec?) if you're suggesting we CALL them that: it implies
> we can't make up our minds what "peculiar" means, which, while true at
> present, is not helpful to anyone else.

I agree that there should be no ?s in the published table! This was

only to mark them for our discussion here. I also agree that if we are indeed narrowing "peculiar" down to "plumed", then we should just go for it and call them PD's.

>
> > While on this point, is it absolutely clear that 3C171 is a WAT?
>
> The WAT thing is a weakness of this class. What do you see as the
> difference between WATs and PD's? PD's obviously include "Semi-WATs" i.e.
> CD/WAT in the same sense as CD/RD. But if there are plumes on both sides,
> on my definition there's no real difference. Perhaps splitting of the
> plume is a criterion, in which case 3C305 is PD as well as 3C171. But then
> 3C123 is a WAT (NB I would certainly include Hydra A as a WAT; I don't
> think C- vs. S- symmetry is significant). At the moment we're using the
> luminosity to decide, which is cheating.
>

I agree that it's "cheating" to use luminosity (ever!) when classifying structure. (It's also probably wrong, as environment must play a role in deciding how quickly a given jet decelerates.) I've been trying not to look at the order on the icon page when doing the classification!

To me, the archetypal PD's should look like a variant of the CD's, i.e. edge-brightened lobes, hot spots near emission boundaries, or both. Archetypal WAT's should look more like FR'I's that have (a) suddenly flared (brightened, decollimated) then (b) bent, at or beyond the flare. Given projection effects and the idea that bent plumes might flatten into ribbons, there could be a few blunt-looking WAT's with emission apparently going off on both sides of the original direction (wide ribbon-like plume oriented near line of sight), It could be hard to tell the difference between flattened plumes and split ones in perverse cases, except that there should not be too many perverse cases in a small sample.

3C171 is deliciously ambiguous in almost all of these respects. It's not obviously a flared FR-I (not much sign of inner jets to judge that by) but if it is really a PD there's almost no extended emission other than the two plumes to demonstrate this. The "hot spots" are very bright, but hard to distinguish from a particularly violent flare in a narrow jet. We could decide that to be a PD there has to be some evidence for the "regular" classical lobes (in addition to the plumes) in which case 3C171 is a WAT, because the "two" plumes are all we've got to classify it by and the "hot spots" are deeply enough recessed to be possible "flares" in a twin-jet. (Would be helpful to have deeper and more sensitive images, no?)

3C305 has more convincing evidence for an inner twin-jet, otherwise it's obviously a small cousin of 3C171. If we went with the "PD must have some sign of the lobes", then I agree that 3C123 also deserves to be a WAT. (I've always considered Hydra A to be one, BTW)

> RD:
>
> > I agree that the key is
> > the structure function of the lobe as a whole rather than its shape.
> > I would not include the jets in the definition, however, I would base

> > it entirely on the appearance of all the other extended structure. By
> > "not a plume" I really meant not obviously conical or
> > coreward-brightened.
>
> But if you leave the jets out, wouldn't that make 3C296, NGC5127, etc, RD's?

With 296 there's almost nothing left to classify if you leave the jets out, which is such a common attribute of twin-jetted FR'I's that I'm happy to leave it alone, with the class name saying that the source is a twin jet. I meant my comment to apply to the lobes of FR-II's, which means there has to be some distinguishable lobe emission in the first place. I agree that there are some hairy cases to worry about, but I'd not put 296 in with them.

>
> Problem cases:
> > 3C84 (no strong evidence for anything double on the large
> > scale, but might be an RD end-on -- you have covered this with use
> > of the word halo, I'd be happier to have this visible in the
> > classification: H+SSC),
>
> I didn't do this because this because then we start getting into probably
> pointless arguments about whether the structure of 3C274 (say) is a halo
> or a double.

I'd settle for a comment in 3C84's case that there's really not much duplicity evident but that this need not be surprising in the presence of projection effects.

>
> > and 3C438 (there's quite a bit of fine
> > structure near both outer edges, I don't think it has hot spots by
> > my definition but it would a kinder, gentler, definition; with the
> > current ground rules: I'm not sure why 3C438 is not a CD).
>
> Actually the lobes are very flat. Notice that this is displayed with a
> linear LUT: the bumps are at the tens of percent level rather than a
> factor of several.
>
> > Ones that almost defy description: 3C433. How about "Starship
> > Enterprise after nasty accident"? Seriously though, if we are ever
> > going to use the word "peculiar", this should be it, so how about
> > JDPec?
>
> I had certainly considered that! Or JPD on my revised nomenclature.

OK.

>
> > The North lobe is as close to being a "plumed lobe without a
> > clear hot spot" as we could get, the South lobe has a quasi-hot spot
> > down near the bottom edge.
>
> (Or the top edge, at higher resolution! Actually now you mention it I'm
> beginning to notice several similarities with 3C200; on the other hand the
> N lobe of 3C200 is quite similar to 3C263, for instance; the recession
> could mainly be projection).
>
> NB: 3C9: I can't buy the jet=plume from F idea! Have you seen Jane D-T's

> MERLIN map? The jet is much too collimated and knobbly to pass for a plume
> in my dictionary! I think the analogy is with M87 at knot A: something
> happens, but the jet survives at least until J.

No, Jane hasn't shown me that one. An MEM of the VLA data showed F to have some very compact substructure, which gave us some reason for concern. The analogy with M87 Knot A is probably fair enough, however.

> Can I try to summarise. I don't think the following have been resolved:
>
> 1) Does 3C48 deserve a class of its own, or will J(R)D do?

JD will do if we can refer to evidence for the "other side"; I'm just a bit worried about the historical (and ongoing!) problem of core misidentification, i.e. how convincing is the evidence that the new extreme southern thingy is the other side and not the real core?

> 2) You want to separate 3C200 from 3C346 & 401, I'm not so sure (200 and
> 346 have optical jets, whatever that tells us).

Interesting, but perhaps an improper ingredient in classifying the radio structure?

I'm inclined to put 3C433 and 3C200 together as JPD. And 3C346 and 401 together as JRD. We are implying some similarities among these four by giving them all the J prefix, could we emphasize that adequately in the explanation of the prefix?

>
> 3) 3C288 has slipped through undiscussed. I think I'd like to revert this
> to PD, or possibly RD(Pec) especially if we're removing the necessity for
> hotspots.
>

I agree. I had both of these alternatives pencilled in against it, in fact, had overlooked it in my last message. I think PD is better, now.

> 4) What about 3C338? Same thing? (i.e. what it is at present).

Yes, it was in my list of definite PD's.

>
> 5) Do you really want 3C303 as a CD?
>

No, it should have been in my list of PD's.

> 6) We disagree on whether haloes are worth distinguishing.

"Footnote status" for 3C84 and haloes would satisfy me at this point.

>
> 7) and on 3C438.
>

I'll settle for RD there, with a footnote that the lobe structure is a weaker perturbation than expected in CD.

> 9) Your CD(Pec?) objects. I'd rather leave them CD.

I'll settle for 3C326 as CD, 351 and 388 as PD, on the basis of everything above.....

>
> 10) What about 3C171 & 305? I vote for PD, defined explicitly as close to
> WAT.

I'd just talked myself into WAT for these, with 3C123 joining them! Whichever way we cut this, we have exposed the need for some discussion of how hard it is to separate WAT from PD. I agree that we should keep 3C123, 3C171 and 3C305 together, and agonize publically over the difficulty of telling some WAT's from some PD's. That said, I do not feel strongly about whether these three are all PD or all WAT.

>
> 11) Is J a qualifier or a basic type?

I'm thinking of it as a qualifier among the FR'IIs, taking 3C9 as an exceptional limiting case. Among FR'I's, there are many cases where the jet is the source for all practical classification purposes, so I'm happy for the FR-I classes to take "jet" as part of the class but the FRII classes to use it as a qualifier. Matches the way that jet prominence actually behaves across the whole collection, without explicitly using jet prominence as a classifier.

>
> We have the following FRII-ish types (those in brackets we're not sure
> are worthwhile):
>
> Me: CD, CD/RD, RD, [RD(Pec)], PD, JD, [JD(Pec)]
> You: CD, CD/RD, RD, , H, PD, JRD, [JD(Pec)]
>
> with Lots 2 8-9, 2? , 1, 4-6, 2-4, 1-2?
>
> DRAGNs per type. I was hoping to avoid types with less than about four
> objects, as the objects will inevitably get cast as prototypes and there
> will be confusion about which are the true distinguishing features (no
> matter what you say in words). CD/RD seems clear enough; the possible
> RD(Pec) is a potential disaster, as 3C338 and 288 are very different (help
> me out here!).

Done. 288 is PD and the J is a modifier to two bigger groups: they are JRDs or JPDs.

I agree that we're left with 3C338 as RD Pec, and this suggests a possible way to use "peculiar". There is something genuinely peculiar about 3C338 in that there are two bright ridges across the central region -- when you look at the radio structure you wonder immediately if it isn't a superposition of two source-forming epochs with different active centers. Another source with similar complications across the middle is 3C442A, and we could lump these

both together as RDPec to draw attention to that.

(Note also that the image of 3C219 contains what is almost certainly another, but unrelated, source -- the smaller, accidentally parallel, source to the West, identified with a fainter galaxy. If we were to define "two ridges across the center" as a strictly morphological "peculiarity", then 3C219 would be CDpec; however, in this case, it may make more sense just to note that there is more than one radio source in the image!)

Howzat? We have "J" and "Pec" as qualifiers, only CP, PD and RD as "real" FR II groups. And nothing used only once. Not even "peculiar".

A.

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Your Q.4, I misread 338 as
388
Date: Wed, 27 Nov 1996 13:08:55 -0500

Hi Paddy,

Just realized that I misread the Q.4 in your last message as "What about 388" when it was "What about 338"? Caught this only when I printed my reply (larger font, I was responding you your message on-screen where 3's and 8's look much more like each other).

So to avoid confusion,

It was 3C388 that was in my list as a definite PD.

It was 3C338 that you were asking me about.

Thus, disregard my answer to your Q.4.

My answer re 3C338 is the text at the end of my message -- and it is RDpec!

Sigh.

A.

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Problems
Date: Wed, 27 Nov 1996 13:19:48 -0500

Paddy,

Two problems at my end.

1) E-mail gateway went flaky right after I sent a long message with answers to yours of Tuesday evening. I think this message went out, but a second, shorter one after it probably didn't. This may repeat the second message, which was about

2) I misread your Q.4 (which was about 3C338) as saying 3C388 (answering on-screen, I need larger font or better eyeglasses!). To clarify, I am agreeing that 3C388 is PD, and now suggesting 3C338 as RD(Pec) for new reasons at the end of longer message.

Hope this is clear and that you now have received either 2 or 3 messages from me! (They are bringing up our Intranet today and several wierdnesses are present in the connections in addition to my usual ones).

A.

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Problems
Date: Wed, 27 Nov 1996 14:28:52 -0500

Patrick Leahy writes:

>
> but now it's off to the Pub so no reply till tomorrow!
>

Good idea! I'm taking advantage of an official NRAO holiday (Thanksgiving) so won't be in the office again til Monday, but will check my E-mail from home.

I think we're close to converging in fact, and I've certainly gotten a lot out of us going over the classification in detail. Reinforces the feeling that having this many 3CRR sources together on one "interactive page" is well worth the investment!

Cheers, A.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: abridle@NRAO.EDU
Subject: 3C288
Date: Fri, 6 Dec 1996 17:05:58 +0000 (GMT)

I've just been having a look at your paper on this object. I forgot that it shows a very strong Laing-Garrington effect, which suggests that there are serious projection effects here. Do your new data allow you to follow the polarization into the plumes? My other question: have you sorted out the jet polarization yet? Are these strong- or weak-flavour jets?

cheers,

Paddy

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: abridle@NRAO.EDU
Subject: Classification, FR types
Date: Mon, 9 Dec 1996 00:22:58 +0000 (GMT)
Dear Alan,

I thought last week that we'd more or less got the classification system straight, so I tried writing it up for the atlas classification page. Unfortunately it all seemed very unsystematic when I tried to write it down: in particular, we sometimes try to classify the two lobes independently, and other times not. There is a fairly obvious single-lobe classification scheme which is now outlined on the classification page, giving seven basic lobe types. The main bit of woolyness left is the distinction between "bridges" and "plumes" which could be quantified, for instance, by how much lobe (in terms of either flux or length) is in front of the end of the jet/hotspot, or perhaps in terms of the angle at which the lobes wanders off from the hotspot (more below on this).

Probably the most interesting result of doing a thorough lobe-by-lobe classification is finding that actually there are very few objects with different types of lobes on the two sides. The rather overspecified descriptions of "Peculiar Doubles" and "Jetted Doubles" that you originally objected to were because these labels were intended to cope with mixed types; but if we are having things like CD/RD (actually C/RD would make more sense) then we might as well do the same for things like 3C215 (C/PD etc).

This would mean that 3C171 becomes something like the archetypical "Plumed Double" (because it's plumed on both sides). A neat solution to the PD/WAT problem would be to take in WATs as a subclass of PDs; then we can leave it to Frazer to define exactly what he means by WAT.

Having got bogged down with all that, I have been measuring more sizes and fluxes from the images. One thing this allows us to do is to measure the Fanaroff-Riley ratio (called F below) from the C20 maps.

One result is a few wrong types in the tables:

3C28 and 442A (just!) should be FR II
3C215 (just!), 288, 314.1, and 315 should be FRI

These will get corrected next time the tables are regenerated.

Not surprisingly, most of the objects we have been discussing have "intermediate" FR ratios: just about everything with $F > 0.75$ is a fairly normal FR II (e.g. 3C219 has $F = 0.76$, and has more recessed hotspots than most others). Conversely everything with $0.35 < F < 0.75$ is fairly strange. All the RDs are in this range except 3C16 and 438 (high) and 3C84 and 338 (low).

3C351 ($F=0.82$) and 382 ($F=0.84$) are pretty normal in this respect, although a one-lobe test might pick them out. Can you suggest a quantitative criterion that would include the relevant lobes of these two among the "Plumes"? Your arguments about continuity from hotspots to plumes rely on quite high-resolution images, so I'd prefer something simpler if possible. One way would be to give a recipe for extracting a single core-hotspot-lobe angle, and a cutoff angle between bridges and plumes.

Cheers, Paddy

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: 3C288
Date: Mon, 9 Dec 1996 08:52:28 -0500

Patrick Leahy writes:

>
> I've just been having a look at your paper on this object. I forgot that
> it shows a very strong Laing-Garrington effect, which suggests that there
> are serious projection effects here. Do your new data allow you to follow
> the polarization into the plumes? My other question: have you sorted out
> the jet polarization yet? Are these strong- or weak-flavour jets?
>

The magnetic field in the jet is parallel to the axis wherever there
is adequate signal-to-noise. And we definitely confirm that the
polarization asymmetry is a Faraday effect. The integrated jet:
counterjet intensity ratio
at 8 GHz is only a little over 2.6:1 at
8 GHz, however. Strictly by structures and symmetry, the source
still seems to be in the transition between strong and weak flavors.

A.

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Classification, FR types
Date: Mon, 9 Dec 1996 12:03:50 -0500

Patrick Leahy writes:

>
> Dear Alan,
> I thought last week that we'd more or less got the classification
> system straight, so I tried writing it up for the atlas classification
> page. Unfortunately it all seemed very unsystematic when I tried to write
> it down: in particular, we sometimes try to classify the two lobes
> independently, and other times not. There is a fairly obvious single-lobe
> classification scheme which is now outlined on the classification page,
> giving seven basic lobe types. The main bit of woolyness left is the
> distinction between "bridges" and "plumes" which could be quantified, for
> instance, by how much lobe (in terms of either flux or length) is in front
> of the end of the jet/hotspot, or perhaps in terms of the angle at which
> the lobes wanders off from the hotspot (more below on this).
>
> Probably the most interesting result of doing a thorough lobe-by-lobe
> classification is finding that actually there are very few objects with
> different types of lobes on the two sides. The rather overspecified
> descriptions of "Peculiar Doubles" and "Jetted Doubles" that you
> originally objected to were because these labels were intended to cope
> with mixed types; but if we are having things like CD/RD (actually C/RD
> would make more sense) then we might as well do the same for things
> like 3C215 (C/PD etc).

I agree, this is a happy outcome of our whole discussion. I've looked at the new classification 'construction zone' on the Web page and I'm happy with the direction you've just given it. I think the only logistical problem for the general WWW reader is that when looking at the table of lobe-classification types she may want quick access to a definition of the distinction between weak-flavo(u)r and strong-flavor jets. If that could be added, I think this page is shaping up well. The point that after classifying each lobe separately we then discover than only relatively few sources have differently_classified_lobes (as opposed to non-mirror symmetric lobes) is a good one.

BTW, I do believe that our first use of the two "flavors" terminology for the jets was one review earlier than Robert's 1993 HST symposium piece: I think it was in my review "Jets on Large Scales" in "Testing the AGN Paradigm", AIP Conf. Proc. #254, ed. S.S.Holt, S.G.Neff & C.M.Urry, 386-397 (1992).

>
> This would mean that 3C171 becomes something like the archetypical
> "Plumed Double" (because it's plumed on both sides). A neat solution to
> the PD/WAT problem would be to take in WATs as a subclass of PDs; then
> we can leave it to Frazer to define exactly what he means by WAT.
>

I like this.

> Having got bogged down with all that, I have been measuring more
> sizes and fluxes from the images. One thing this allows us to do is to
> measure the Fanaroff-Riley ratio (called F below) from the C20 maps.

>
> One result is a few wrong types in the tables:
>
> 3C28 and 442A (just!) should be FR II
> 3C215 (just!), 288, 314.1, and 315 should be FRI
>
> These will get corrected next time the tables are regenerated.
>
> Not surprisingly, most of the objects we have been discussing have
> "intermediate" FR ratios: just about everything with $F > 0.75$ is a fairly
> normal FR II (e.g. 3C219 has $F = 0.76$, and has more recessed hotspots than
> most others). Conversely everything with $0.35 < F < 0.75$ is fairly
> strange. All the RDs are in this range except 3C16 and 438 (high) and 3C84
> and 338 (low).
>
> 3C351 ($F=0.82$) and 382 ($F=0.84$) are pretty normal in this respect,
> although a one-lobe test might pick them out. Can you suggest a
> quantitative criterion that would include the relevant lobes of these two
> among the "Plumes"? Your arguments about continuity from hotspots to
> plumes rely on quite high-resolution images, so I'd prefer something
> simpler if possible. One way would be to give a recipe for extracting
> a single core-hotspot-lobe angle, and a cutoff angle between bridges and
> plumes.
>

I'll give this some thought. Wanted to get back to you quickly re
overall agreement on the new direction.

Cheers, A.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: abridle@NRAO.EDU
Subject: Atlas classification
Date: Mon, 13 Jan 1997 04:55:48 +0000 (GMT)

Dear Alan,

I've had another bash at the text on classification. There is a new "anatomy" page which tells more than anyone would want to know about weak and strong jets, plumes vs. bridges etc. I have also rationalised the classification page. Please let me know what you think, particularly on the following:

- * Criteria for deciding if a jet is weak or strong. (Numbers off the top of my head, I'd be happy to revise).
- * Criteria for deciding if a lobe is a bridge or a plume. (Ditto).
- * Whether to dump JD and the variants we discussed in November (JRD etc) as I now suggest. Maybe we should retain JD for 3C48 and its ilk.
- * Revised definition of hotspot. I know it's painful, but it does allow you to count the number of components in each hotspot complex unambiguously, which is a surprisingly difficult achievement!

I have yet to slog through the maps checking these definitions!

You might be interested in the following results of the C20 hotspot flux exercise. I haven't yet corrected for spectral index effects.

Relaxed Doubles: typical compactness, ie. C20 peak to total ratio, is 5-10%, with 1.2% for 3C310 and 22% for 3C16 (if that's really a RD).

The highest compactnesses are for 3C299 (70%), 3C321 (62%), 3C33 (56%) and 3C244.1 (55%); nothing else was more than 50%.

The lowest compactness for a classical double is 3C285 (4.8%); the next up is 3C98 (8.4%). In between come 3C433 (5.9%), 3C401 (7%, including a contribution from the jet), and 3C288 (7.2%).

The large majority of CDs have values between 10% and 40%.

I haven't yet tried correlating these values with luminosity, but I'd be surprised if there was a significant effect!

Compactnesses for FRIs are reassuringly low, (around 10%) except for 3C449 which is 34%, contributed by the two mini-lobes at the ends of the weak-flavour jets.

cheers,

Paddy

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: Atlas classification
Date: Fri, 17 Jan 1997 11:15:37 -0500

Patrick Leahy writes:

>
> Dear Alan,
> I've had another bash at the text on classification. There is
> a new "anatomy" page which tells more than anyone would want to know about
> weak and strong jets, plumes vs. bridges etc. I have also rationalised
> the classification page. Please let me know what you think,

The "anatomy" pages read very well indeed.

particularly
> on the following:
>
> * Criteria for deciding if a jet is weak or strong. (Numbers off the top of
> my head, I'd be happy to revise).

The top of your head was very close to what I thought at the time of the AGN Paradigm conference, all the strong jets >10 kpc in length spread at < 4 deg, (the others may contain a few that apparently spread faster just due to foreshortening, and some that are flaring and disrupting). A division at 5 deg spreading full-angle seems perfectly fair when it is accompanied by an apparent-field criterion. For the field criterion it is fair to emphasize that it really applies to the field on the jet axis (rather than at the edges, where one may get either "bending-effect" B-parallel or glimpses of what we are now interpreting as shear-layer B-parallel in FRI jets. The "at least near the jet axis" part of the criterion is fine, but we might want to note quite explicitly somewhere that weak-flavour jets often start out as strong-flavour jets in their inner few kpc or so, and this is an effect than can be fairly convincingly ascribed to jet deceleration I think we both believe that, don't we?

> * Criteria for deciding if a lobe is a bridge or a plume. (Ditto).

"Area-weighted centroid" takes a bit of understanding, but I think this is o.k. How are you computing these?

> * Whether to dump JD and the variants we discussed in November (JRD etc)
> as I now suggest. Maybe we should retain JD for 3C48 and its ilk.

I think the classification scheme as you have now written it down is so logical that it's hard to see what was ever argued about before ... having the JD's as "scheme previously used but now subsumed in the lobe/lobe classification" is just fine by me. 3C48 is well taken care of as a case where the lobe classification is "difficult" because the source is so jet-dominated.

> * Revised definition of hotspot. I know it's painful, but it does allow
> you to count the number of components in each hotspot complex
> unambiguously, which is a surprisingly difficult achievement!

I think this is fine. It handles the contentious points very nicely.

>

> I have yet to slog through the maps checking these definitions!
>
> You might be interested in the following results of the C20 hotspot flux
> exercise. I haven't yet corrected for spectral index effects.
>
> Relaxed Doubles: typical compactness, ie. C20 peak to total ratio, is 5-10%,
> with 1.2% for 3C310 and 22% for 3C16 (if that's really a RD).
>
> The highest compactnesses are for 3C299 (70%), 3C321 (62%), 3C33 (56%)
> and 3C244.1 (55%); nothing else was more than 50%.
>
> The lowest compactness for a classical double is 3C285 (4.8%); the next
> up is 3C98 (8.4%). In between come 3C433 (5.9%), 3C401 (7%, including
> a contribution from the jet), and 3C288 (7.2%).
>
> The large majority of CDs have values between 10% and 40%.
> I haven't yet tried correlating these values with luminosity, but I'd be
> surprised if there was a significant effect!
>
> Compactnesses for FRIs are reassuringly low, (around 10%) except for
> 3C449 which is 34%, contributed by the two mini-lobes at the ends of
> the weak-flavour jets.
>
> cheers,
> Paddy
>

I would say this is now in great shape, a happy outcome of our previous thrashing (or at least mine, you have probably thrashed a lot less owing to having thought about it all more carefully to begin with). In retrospect, classifying the two lobes independently and then seeing what emerges is an important step, which really helps.

I just hope plenty of people read this now! Did you get much in the way of reponses from the contributors, by the way?

A.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: abridle@NRAO.EDU
Subject: image at last (fwd)
Date: Thu, 2 Jan 1997 15:43:24 +0000 (GMT)

Some good new year news:

----- Forwarded message -----
Date: Tue, 31 Dec 1996 18:05:18 +0100 (MET)
From: Richard Strom <strom@nfra.nl>
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: image at last

Hi Paddy,

Should have gotten onto you sometime ago. The atlas on the web is EXQUISITE!
You have really created a work of art, in the sense that it's a true pleasure
just to look at. And then there's the potential science; just looking at the
morphological classes vs. luminosity suggests... something.

In any event, I actually have made some progress (not as quickly as I would
have liked to, admittedly):

- I have just put a fits image of 3C 31 on our ftp server (ftp.nfra.nl). Under
/pub/outgoing/strom you will find a file FIT31.000001. It's a 256 x 256
(section of the full map) 49 cm map, Stokes I. Particulars: f=608.5 MHz, BW=
2.2 MHz, pix sep=9."84, restoring beam=29"x52" (RAXDec). Map is quite good
(can plot contours down to 2 mJy/beam, slight distortion at significantly
lower level in background due to weak gr. rings).

- I am nearly finished with an even better map of 4C73.08; by this weekend.

- Have begun on recently recovered data of 2247+11

- DA 240 is in the works.

Will come up with the other particulars you asked for shortly.

Sorry, as usual, for my slow progress.

Cheers, and Happy 1997,

Richard

PS let me know if you would like the map in a different form

--

```
----- / / / / / / / / / / -----  
Richard Strom / ##### / (Also, 1 day/week):  
NFRA Internet => # University of Amsterdam  
Postbus 2 / # # Astronomical Institute  
7990 AA Dwingeloo /_/#_/#_#_/_/ Kruislaan 403  
The Netherlands # #_/_/ 1098 SJ Amsterdam  
Phone: (31)-521-595252 # strom @ nfra.nl The Netherlands  
FAX: (31)-521-597332 / # # / (020-5925097)  
----- / / / / / / / / / -----
```

From: abridle (Alan Bridle)
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: image at last (fwd)
Date: Thu, 2 Jan 1997 10:55:40 -0500

Great! And I second Richard's comments about the fine job you're doing with the pages, Paddy.

Happy New Year!!

A.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Richard Strom <strom@nfra.nl>
Cc: abridle@NRAO.EDU
Subject: Re: provisional map of 2247+11
Date: Fri, 31 Jan 1997 13:33:38 +0000 (GMT)

Dear Richard,

Re an interim proposal: I have been toying with the idea of putting in a VLA proposal to do 2247+11 and perhaps a few more objects for which the WSRT images are marginal. This would need to be done immediately, as the deadline is Monday. With the new VLA CS config, we could do these objects in one observation, rather than waiting for D-config fill-in. What do you think? We need to discuss the target list right away.

regards,

Paddy

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Richard Strom <strom@nfra.nl>
Cc: abridle@NRAO.EDU
Subject: Re: pretty good 4C11.71 map now available
Date: Sun, 2 Feb 1997 00:44:13 +0000 (GMT)

Dear Richard,

You're working too late. I had a look at the new map, it's getting there. I'd guess it has a smaller beam than the last one, is that right?

The main problem I'm having with the VLA proposal is that the targets are spread right round the clock. To get good HA coverage for 3C35, 264, maybe 326, 1615+35 and 2247+11, we need at least LST 09:30 to 03:00, i.e. 17.5 hrs, or 3.5 hrs per target. This is rather more than we really need in terms of sensitivity, so I'm looking for objects to pad the schedule out a bit, so we don't look so greedy! Any suggestions? Or have you any other proposals we could share time with?

VLA archive search turned up the following info: Heinz Andernach had a 3 hr observation of 2247+11 in C-config at 20 cm in 1990. Virgo A has 10-hr tracks in C and C=>D array in phased array mode for VLBI, plus useful amounts of D-config time from some of Frazer Owen & JingPing Ge's work, so I guess there's not much point in repeating this. For 3C35, 264, 326, and 1615+35 there are no C-config data except the odd snapshot.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: abridle@NRAO.EDU
Subject: VLA proposal
Date: Mon, 3 Feb 1997 01:46:48 +0000 (GMT)

Dear Alan,

After talking to Richard Strom, as in the messages I cc'd you, I have written a proposal to get a few better pictures for the Atlas. I am e-mailing you the TeX files for the cover sheet and the justification, in case you want to make any changes. If you don't get this message tomorrow, I will submit the proposal as is. Sorry to do this at the last minute; I didn't want to raise the possibility of more observations while Richard was still working on the existing WSRT data, in case it made him lose interest; but in the end he brought up the idea of reobserving 4C 11.71.

regards

Paddy

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: abridle@NRAO.EDU
Subject: Postscript files
Date: Mon, 3 Feb 1997 01:54:07 +0000 (GMT)

If you need the .PS files to make the figures in the justification document, they are in our ftp area:

```
ftp jbss0.jb.man.ac.uk
```

```
cd pub/jpl/
```

```
files 3C35.PS 3C264.PS 3C326.PS 4C3540.PS 4C1171.PS
```

Just contour maps of the main Atlas images.

cheers,

Paddy

P.S. I havn't told you explicitly, but Richard's latest work means we have images for everything, although he is still trying for better images of 3C31 and 4C73.08.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Richard Strom <strom@nfra.nl>, abridle@NRAO.EDU
Subject: VLA Proposal, correction
Date: Mon, 3 Feb 1997 11:34:30 +0000 (GMT)

Oops: forgot to worry about bandwidth smearing. We can't get away with 50 MHz; 12.5 MHz is really needed for things with hotspots (especially 3C326); we can get use 25 MHz for the head-tails. This is just about OK, as we don't really need the last factor of two in sensitivity for 3C35 & 326, but its ugly having to double up the calibration.

I'm revising the proposal to reflect this; I'll send the fixed copy to Alan in a moment.

cheers,

Paddy

From: Alan Bridle <abridle@NRAO.EDU>
To: Patrick Leahy <jpl@ast.man.ac.uk>
Subject: Re: Revised Justification
Date: Mon, 3 Feb 1997 09:44:43 -0500

Hi Paddy,

I'm just pulling the Postscript files and checking a few sums right now. (I was not in the lab over the weekend so only just got your messages).

Do you want me to go ahead and give it to Joanne if it reads o.k. to me?

A.

From: Alan Bridle <abridle@NRAO.EDU>
To: Patrick Leahy <jpl@ast.man.ac.uk>
Subject: Re: Revised cover sheet (TeX)
Date: Mon, 3 Feb 1997 10:04:36 -0500

Paddy,

I have got and printed all parts of the proposal, including the figures. I have done a quick check of the sums on bandwidth and sensitivity, they look reasonable. The scientific justification also seems plausible at a first reading; the referees are a little down on "completion" projects I think but this is not asking for a lot of time.

The only small point that jarred at all was asking for "consultation" on the coversheet. Other than frequency selection, I'm not sure there's much to consult about here.....

I can give it straight to Joanne Nance if you like (she really is a lot happier to get paper versions, especially close to the wire!)

A.

From: Alan Bridle <abridle@NRAO.EDU>
To: Patrick Leahy <jpl@jb.man.ac.uk>
Subject: Re: VLA Proposal, correction
Date: Mon, 3 Feb 1997 13:30:30 -0500

Paddy,

I have given the proposal to Joanne, just to be safe,
as I won't be checking E-mail again until after the deadline

A.

From: Patrick Leahy <jpl@jb.man.ac.uk>
To: Alan Bridle <abridle@NRAO.EDU>
Subject: Re: VLA Proposal, correction
Date: Mon, 3 Feb 1997 18:40:01 +0000 (GMT)

OK, thanks. Is Joanne at the receiving end of the propsoc address? I hope she should have got an e-mail version just now as well.

cheers,

Paddy

From: Patrick Leahy <jpl@ast.man.ac.uk>
To: propsoc@NRAO.EDU
Cc: abridle@NRAO.EDU, Richard_Strom@ast.man.ac.uk
Subject: VLA proposal
Date: Mon, 3 Feb 1997 18:10:42 +0000 (GMT)

The next two messages contain the postscript files for our proposal "Five large 3CRR radio galaxies". Apologies for sending two files instead of one as requested; the first is the VLA cover sheet (2 pages), and the second is the justification, which was produced using LaTeX (4 pages including figures).

regards,

J. P. Leahy

From: Patrick Leahy <jpl@ast.man.ac.uk>
Sender: Patrick Leahy <jpl@ast.man.ac.uk>
To: propsoc@NRAO.EDU
Cc: abridle@NRAO.EDU
Subject: Multiple versions of "5 large 3CRR radio galaxies"
Date: Mon, 3 Feb 1997 19:02:45 +0000 (GMT)

Dear Propsoc (Joanne?)

I suspect that owing to time lags sending files across the net, you may have received more than one copy of the "5 large 3CRR..." proposal; one via e-mail from me dated Mon, 3 Feb 1997 18:16:39 +0000 (GMT), and one by hand from Alan Bridle. In the version I e-mailed, I had corrected a few typos in the justification; unless Alan has made some changes himself, I'd therefore be grateful if you could distribute the emailed version to the referees etc.

My apologies for this last-minute confusion.

regards,

Paddy Leahy

From: Alan Bridle <abridle@NRAO.EDU>
To: Patrick Leahy <jpl@ast.man.ac.uk>
Subject: Re: VLA proposal
Date: Tue, 4 Feb 1997 13:23:25 -0500

Patrick Leahy writes:

>
> The next two messages contain the postscript files for our proposal
> "Five large 3CRR radio galaxies". Apologies for sending two files
> instead of one as requested; the first is the VLA cover sheet (2 pages), and
> the second is the justification, which was produced using LaTeX (4 pages
> including figures).
>
> regards,
> J. P. Leahy
>

Hi Paddy, a couple of points... all of your E-mail of the final version arrived here after the deadline, the transit times must be quit a bit longer than seems reasonable, as from your timestamps they have been here mid-afternoon but in fact came during the evening...there must be some storage in a gateway between jodrell and here. The main thing is to know about it in case you send things in future that there is not already a paper backup for. Second point is that sending multiple postscript files does create a lot of work for Joanne and it's best not to do this if possible, she spends almost a whole day making sure she's joined the right bits of justification and covers together when people send them separately! Anyway all is o.k. with this proposal but I thought you might want to know that if it had been e-mail only you might now be arguing with Juan about whether it was submitted on time (best to avoid that!!)....A.