

# **Post Mortem of the Electronic Publication of the EPAC'96 Proceedings**

**J. Poole**

## **Abstract**

The proceedings of the Fifth European Particle Accelerator Conference (EPAC'96) were published electronically. This note describes the preparations for this endeavour and the work associated with processing the contributions. There was a high percentage of contributions which were processed without problems but many man-months were required to fix the remaining contributions. The report analyses the problems and the methods used to repair them and makes recommendations for future conferences.

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# POST MORTEM OF THE ELECTRONIC PUBLICATION OF THE EPAC'96 PROCEEDINGS

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## 1 INTRODUCTION

This report describes the work associated with the production of the Proceedings of the Fifth European Particle Accelerator Conference (EPAC'96). It covers the preparations before the conference (which was held from 10-14th June 1996 in Barcelona) and the work at the conference, as well as the processing of the contributions to produce the CD-ROM and book versions.

For many years the organisers of accelerator conferences have felt the need to publish electronically and the first major conference to do so, last year's Particle Accelerator Conference (PAC'95), published its CD-ROM in the spring of 1996. In late 1994 the organisers of EPAC agreed that they too would publish electronically. It was decided to use Adobe Acrobat Software as the basis for preparing CD-ROM's and these would be offered as an alternative to the kilos of paper conventionally produced.

In preparation for this venture, the proceedings of the 1995 LEP Performance Workshop (13 - 18 January, Chamonix) were published electronically, although not on CD-ROM. One of the primary goals of the electronic publication process is to produce a highly performant 'document' which is also attractive to users. To achieve this, authors have had to follow strict guidelines and learn new techniques. The finished CD-ROM contains all papers, but more importantly provides powerful search facilities based on keywords as well as the text. Boolean searches of the type 'heavy- ion' AND 'optics' AND 'collective-effects' BUT NOT 'linac' will very rapidly return a list of relevant papers. These features, combined with convenient size and low cost, make the CD-ROM a very attractive proposition.

Experience with Chamonix and PAC'95 demonstrated the need for a programme of author education. In the year leading up to EPAC'96, 'volunteer' co-ordinators were located in all major laboratories and instructions and guidelines, published via the World Wide Web (WWW), were tested and improved. Following the educative theme, it was decided to try to process all contributions at the conference in Sitges. This was to enable discussion of the problems with the authors so that there would be fewer difficulties in the future.

The whole process worked very well but the cost in manpower and resources was quite high. It is hoped that in future years the manpower requirements will diminish as authors become more proficient and the software matures.

## 2 BEFORE THE CONFERENCE

Some basic decisions were made at the beginning of 1995:

- To have a page layout which would permit printing on either US letter or A4 paper.
- To require electronic submission of abstracts and papers.
- To establish a network of support personnel.
- To make extensive use of the WWW.

These ideas determined much of the work which was to follow. The whole process was analysed (rather crudely) and Appendix 1 shows the resulting data flow diagrams which were used to draw up the overall strategy.

### 2.1 Paper Size

POSTSCRIPT and PDF files do not behave in the same way when they are printed. This is a complex issue but the bottom line is that text can be lost from the printed page when US letter and A4 paper are mixed up. The solution which was adopted was to define the same bottom and left margin widths for both paper sizes so that when the POSTSCRIPT was 'distilled' to make the A4 PDF document, the text should always appear at the same place on the page and would therefore give consistent and acceptable results when printing. This solution did not, however, solve all of the problems as is explained below (Section 7.3).

### 2.2 FTP Server

An old workstation with sufficient disk space was available and this was set up on the network by CERN-CN and the CERN-SL controls group. Great care was taken over security, since anonymous FTP servers are notorious as entry points for hackers. It was necessary to write some software which would allocate a unique reference number to each submitting author. This was implemented in a C program which updated a file in the /ftp directory each time a connection was made. This was similar to the method used by PAC'95 and was implemented as a script which subsequently launched the FTP process.

This system worked well for everyone apart from some Netscape users. This bug was never fully understood but could be circumvented by using FTP directly. Contributors often had problems when submitting from Macintosh machines and it was necessary to make very explicit instructions available on the WWW pages.

## 2.3 WWW

The WWW is available to almost all of the potential authors for EPAC and most of them are quite familiar with its use. The aim with the pages was to make tutorial information available as well as the factual information concerning the conference itself and the rules for submission. The factual information was derived from the ‘Announcement and First Call for Papers’, whilst the tutorial information was based on the experience of Chamonix, PAC’95 and ICALEPCS’95.

The tutorial information started with some background information about electronic processing and its difficulties. It then led the reader through issues concerning the use of  $\LaTeX$  and WORD and explained how to prepare illustrations and graphics (which was the area in which we expected most of the problems). It also gave advice on the use of scanners, preparation of the diskettes, trouble shooting and finally, the list of support personnel was given.

## 2.4 Templates

Template documents were prepared for both abstracts and papers for various versions of WORD and  $\LaTeX$ . We found that the layout of a WORD document changes when it is moved from PC to Mac, even when the same version of the application is being used on both platforms. For this reason we were obliged to have 8 different templates for WORD (US and A4 paper and 2 versions of WORD for each platform).

The support volunteers were asked to test the templates and a few modifications were introduced as a result of their comments and suggestions.

## 3 ABSTRACT PROCESSING

Requiring the abstracts to be submitted in POSTSCRIPT was aimed at getting authors into the way of preparing POSTSCRIPT and for us to learn what kind of problems were to be expected. It proved to be an invaluable experience because it enabled us to eliminate bugs and refine our advice and guidelines.

From an analysis of more than 1000 abstracts received, it immediately became clear that about two thirds of the contributions would come in WORD and one third in  $\LaTeX$ , with only a smattering of other document processing applications.

About 6 man-months went into the abstract processing which was much more than usual. However, this was not wasted effort as we were able to contact authors and eliminate a number of problems at this early stage. More than 10% had to be re-typed and about 25% used the wrong fonts. There were indications of problems to come concerning the US letter and A4 paper, as mentioned above. We also concluded that accepting abstracts when CERN was closed was not a good idea because when authors were having problems, they were unable to contact anyone. Also more than

half of the contributions arrived during the Christmas holidays, making a very heavy work load on the return to work which coincided with a period of computer and network maintenance.

## 4 PRODUCTION OF THE ABSTRACT BROCHURE

Initially it had been hoped that we would be able to convert the POSTSCRIPT files into WORD files with the help of Acrobat Capture. The idea was to convert POSTSCRIPT to TIFF which could then be read by Capture which can convert to WORD format. This was not possible, so for most abstracts the text was stripped from the POSTSCRIPT and placed in WORD manually. The individual files were strung together and appropriate titles and codes inserted using a Visual Basic program driven from Excel.

FileMaker has always been used for managing the EPAC data (mailing lists, institutes, delegate and proceedings information). It was again at the heart of the production process in 1996 as can be seen from the data flow diagrams in Appendix I. Publication of the abstracts on the WWW was achieved by making PDF files from the WORD documents once again using a Visual Basic program driven from Excel which, in this case, created a POSTSCRIPT file which was automatically distilled. The HTML to provide the links was generated automatically using scripts and the data from the EPAC FileMaker data.

The major part of the manpower was spent creating the WORD files; the automated procedures were rapidly developed and took only tens of minutes to run.

## 5 AT THE CONFERENCE

As was stated in the introduction, our main aim at the conference as far as electronic publication was concerned, was to feed information back to the authors so that they could understand what the problems were and how to avoid them in the future. The starting point in the planning was the data flow diagram (Fig. 4) and based on this, the work flow and resources requirements were determined.

### 5.1 Plan of Work

There were three main activities at the conference: receiving the contributions from the delegates, checking the details and updating the database and finally, electronically processing the POSTSCRIPT. The first stage ensured that the delegates were supplying all of the requested materials and that the information was complete. Following this, the details were cross-checked with the information already in the FILEMAKER database and the new information like keywords and number of pages was inserted.

A second team then processed the files and awarded a green or a red sticker according to the success or otherwise of the distillation process. The stickers were displayed on large posters outside the proceedings office and delegates were asked to contact the office when their paper got a red

sticker. During the feedback sessions with the authors it was hoped that it would be possible to help authors to repair their documents.

## 5.2 Resources

It was clear from the plan of work that the resources required to receive and process up to 1000 papers would be considerable. Three rooms were allocated: the first for reception of contributions and database maintenance, the second for electronic processing and network management and the third split between E-mail facilities (with access from the conference) and document repair (with access by passing through the other rooms only).

Macintosh, PC and UNIX platforms were required to cover the range of user platforms and these were networked to facilitate file transfer. Large screens were specified for the electronic processing work and initially 2 PC's, 4 Mac's and 2 Unix stations were installed. 2 Mac's were reserved for the database and 1 of the UNIX stations was for the networking. In addition, we required CD-ROM readers on all machines and some backup capability, which turned out to be a DAT driver on the SGI UNIX station. Finally, high speed printers were needed for both the electronic processing and for the proceedings reception office. The networking was through a telephone line (ISDN) to the Universitat Autònoma Barcelona (UAB) and internally through twisted pair. It became obvious that the bottleneck in electronic processing was on the Mac's and to alleviate the problem a 5th one was installed half way through the conference.

The software which was installed was the following:

### PC

- Microsoft WORD6
- Excel
- L<sup>A</sup>T<sub>E</sub>X
- Acrobat Reader, Distiller and Exchange
- WinZip

### Mac

- Microsoft WORD5.1
- Microsoft WORD6
- Netscape
- Stuffit
- FileMaker Pro
- Acrobat Reader, Distiller and Exchange

### UNIX

- L<sup>A</sup>T<sub>E</sub>X2e
- emacs
- Ghostview
- XV
- Netscape
- Acrobat Reader

The other essential resource at the conference was the manpower. 6 people were concerned with the reception of contributions and update of the database and at times, up to 2 of them helped with the electronic processing. 4 people were permanently assigned to electronic processing with help from 2 UAB staff when they were free from conference duties and network management.

## 6 POST CONFERENCE ACTIVITIES

Following the conference it was necessary to solve the remaining problems and collect the outstanding contributions. Once all of the contributions had been processed, a final check of page numbers and quality was made. This was done by working through all of the folders taking one paper at a time and carefully examining it, both on the screen and on paper. Once this had been completed it was possible to produce the final complete book and insert the title, authors, page numbers and keywords in the PDF files using automated procedures. The electronic index was then generated and the electronic files transferred to CD-ROM for delivery to the publisher.

A proceedings office was set up at CERN where all of this work was done. It was decided that it was important to work in the same office when solving the problems to ensure good communication amongst the team. The office was equipped with plenty of tables for laying out paperwork, 2 PC's, 1 Mac, 1 UNIX station and a 600dpi high speed printer. One of the PC's was running under Windows 3.11 and the other Windows95.

Work started on 24th June, once all of the paperwork and diskettes had been shipped back to CERN and the office set up. By the end of July only a few problems were outstanding and there was a quiet period whilst we waited for final re-submissions etc. The last three weeks before going to the publishers were spent printing and cross-checking and producing the Table of Contents, Author Index etc. The worst job was the manual introduction of about 5000 links in the PDF documents using Acrobat Exchange.

The Novell networking was of fundamental importance in the efficient processing of the documents following the conference. The PDF and other files produced in Sitges were installed on the network so that we could use the 'good' PDF files. Unfortunately we were not able to read the DAT tapes brought back from Sitges but it was possible to transfer all of the information (370 Mbytes) by FTP.

During the production phase notes were added to the submission sheet describing any difficulties and solutions associated with each paper. Once the proceedings were with the publisher this information was transferred to an Oracle database which was used for analysis and was the source for the tables in this report.

## 7 POST-CONFERENCE ANALYSIS

### 7.1 WWW and FTP Facilities

The Web provided an efficient mechanism for the distribution of template files as well as a good way to supply authors with instructions and help. All of the information (with the exception of the templates) was also distributed to authors by mail. The FTP server was an essential alternative to the Web server as a means of supplying templates and was the only way of receiving documents other than on diskette.

The amount of time spent creating and maintaining these facilities was of the order of 5 man months. This included development of the templates as well as the Web pages.

### 7.2 At the Conference

The procedure at the conference was an unqualified success: every paper which was handed in was processed. There was a high success rate, measured as papers which successfully distilled at the first attempt. The hours worked by the staff concerned with electronic processing were extraordinary - the 4 'full time' staff put in a total of about 250 man-hours between Sunday and Friday lunch time. Add to this time that from those who helped when they were free from other duties and the total comes to something in excess of 320 man-hours to process the papers and deal with the author feedback. The success of the venture in Sitges was due to the dedication of those involved.

The feedback mechanism using red and green spots was one of the highlights of the conference! It certainly provoked a lot of discussion and even competitiveness amongst the delegates as well as serving a very useful purpose.

There are several areas where the performance could be improved for the future, most notably, the number of computers available for processing and number of people to man them should be increased.

A few authors came to repair/finish (or even prepare) their papers and they prevented us using computers for processing. In the early part of the week it was very easy to get stuck with one paper trying to fix a problem; once we realised this we would either put it to one side for repair back at CERN after the conference, or give it back to the author to solve.

The paper management techniques - submission sheet and plastic folders - were good. Perhaps a slightly wider plastic folder would have made it easier (and it would accept US letter paper). We did not lose or overlook any papers or diskettes.

### 7.3 Production Phase

Once we had returned from Sitges we were faced with the problem papers and about 6 man-months was consumed fixing them and completing the preparations for publication. We soon discovered that treating documents on a different platform from the original can lead to problems. In addition we already knew that moving between different versions of the software can lead to problems. Table 1 shows

Table 1: Breakdown of platforms used for preparation of the papers

Platform	No. of Papers
IBM/VM	2
OS2	4
VMS	21
UNIX	153
MAC	258
PC	402

Table 2: Breakdown of software used for preparation of the papers

Software	No. of Papers
ApplixWare	1
Publisher	2
Ventura	4
WordPerfect	4
WORD4	4
PageMaker	8
WORD2	8
FrameMaker	13
WORD7	55
WORD5	139
LaTeX	250
WORD6	352

the breakdown of platforms used for the document preparation and Table 2 gives the software which was used. From this it is clear that 66% of the contributions were prepared using WORD and 30% using LaTeX.

We received the latest version of Acrobat Distiller for Windows95 during the production phase and noticed that it performed better than the previous version. It seemed to be more robust and we noticed at least one bug which had been fixed: lines of text having too much white space (and therefore becoming too long) were no longer generated.

The probability of encountering problems was evenly distributed across both platforms and software types. This indicated to us that our basic strategy was OK and that the problems were not related to our choices or templates.

We found that about half of the authors who were requested to re-submit were able to fix the problems themselves. The remainder required further work, once a new version had been received at CERN.

Table 3 shows the types of problem and their frequency and Table 4 shows how they were fixed. It can be seen that the most common problem encountered was 'US Letter paper'. In a sense this problem was no fault of the authors because they had followed our instructions, but the POSTSCRIPT driver which they used wrote some code in the POSTSCRIPT file which changed the default (A4) setup in the distiller. This does not happen with all drivers and in about one third of the cases it was possible to remove a few lines of code from the POSTSCRIPT and re-distill. In other cases where the default was over written (notably all of the

L<sup>A</sup>T<sub>E</sub>X jobs) it was necessary to take the original source and re-work it because it was not simple to edit the POSTSCRIPT.

Table 3: Distribution of problems encountered with the papers

Fault	No. of Papers
Figures with bad BoundingBox	2
US letter and bad margins	2
Footnote too low	3
Page numbers on	3
Asian fonts and US Letter	4
Graphics too slow or too big	7
^ Z characters in graphics files	7
Paper too long	7
PS crashes distiller	7
Diskette unreadable	8
No figure files	9
Bad fonts and margins	10
Everything possible wrong	10
Cyrillic Fonts	11
No Postscript	11
US Letter and Type3 fonts	11
Bad fonts, margins and figures too big	12
Bad PS	13
Asian Fonts	15
Figures corrupt the PDF document	28
Bad Fonts	33
Wrong Margins	36
(US Letter Paper)	83

The next most common problem was where authors had not respected the margins: correcting this type of problem was often very time consuming. The only solution was to re-work the original document and usually correcting the margins made the paper too long. In the worst cases the paper was returned to the author because we were unable to make all of the text fit. In this kind of problem WORD can be very frustrating because it re-formats in the background and after a lengthy amount of fiddling you see that you are down to 3 pages so you make the POSTSCRIPT only to find that it has gone back to 4 pages again!

Bad fonts were almost exclusively due to people using L<sup>A</sup>T<sub>E</sub>X without Times fonts. Fortunately Times is narrower than Computer Modern and therefore the papers did not grow in length once they were re-made but care was required to ensure that the distribution of text and figures remained consistent.

Asian and Cyrillic fonts caused problems in both WORD and L<sup>A</sup>T<sub>E</sub>X but fortunately WORD7 (Windows95) can convert the source files and it was sufficient to re-L<sup>A</sup>T<sub>E</sub>X the other documents.

The most difficult problems to resolve concerned the figures. In 3% of the papers the graphics files corrupted the PDF document. This was probably due to the .EPS not being well encapsulated. In two-thirds of these cases it was possible to cure the problem by extracting the original POSTSCRIPT of

Table 4: Fixes for problem papers

Cure	No. of Papers
Fix figure files and re-make	1
Re-Type	1
Re-work in FrameMaker	1
Read diskette on SUN	1
Import into WORD and re-work	2
Re-submission	2
Strip ASCII from PS and re-work	4
Hack the PS	13
Graphic ⇒ PDF ⇒ EPS, and re-introduce	21
Author re-worked and FTP	22
Scan Figures	23
Remove US Letter setup from PS	23
Author re-worked, FTP then fixed at CERN	26
Re-WORD	95
Re-LaTeX	97

the figure, making a PDF from it and then re-generating .EPS from this. Nearly half of the problems came from graphics created with KaleidaGraph where there was some bizarre mixture of portrait and landscape within the file. In these cases the default paper size for the distiller had to be put in A4 landscape and then the POSTSCRIPT which was made from the PDF was edited to remove the landscape rotation and translation. This sounds a complicated process (which took some time to develop) but once the recipe was established papers could be fixed quite rapidly.

When the graphics were too slow to display (the worst was left running for over 20 minutes on a 133 MHz Pentium and still had not finished displaying the page) the only solution was to scan. Scanning was also used for the figures which corrupted the PDF when no other solution could be found. We tried to avoid scanning wherever possible because there is always some loss in quality but it served as final solution because it gave a guaranteed result.

There were a few other interesting problems like control characters in the graphics files embedded in the POSTSCRIPT. In general, printers can handle these but the distiller stops with an error. Unfortunately the message says PostScript Error: Offending Command ||||| . Once again, when we had made the diagnosis it was a trivial matter to remove the offending characters. It appears that some software fills to an End-of-File with Ctrl-Z's and these normally pass un-noticed.

A few other files did not distill and gave messages like "helvetica: font not found" and this was traced to a case sensitivity; changing references to "helvetica" into "Helvetica" cured the problem.

In several cases we found that the POSTSCRIPT files would distill correctly on one platform but not on another. Other interesting problems encountered included one diskette formatted (and only readable) on a SUN, a PC formatted diskette containing a UNIX-compressed tar file and

three 5¼ inch floppy diskettes. The biggest POSTSCRIPT file was nearly 40 Mbytes (the specified maximum was 1.4 Mbytes) and the most efficient compression we saw with the distiller was for a POSTSCRIPT file of 13 Mbytes which reduced to a PDF of 370 kbytes. The average PDF file was 190 kbytes.

#### 7.4 Page Numbering

Unfortunately the problem of inserting page numbers was not solved until after the proceedings had gone to the publisher. In fact, the solution was found in response to the publisher's difficulty in adding the page numbers to the paper copy.

The problem to add page numbers is that the POSTSCRIPT which the authors supply is not all the same, otherwise one could imagine some automated procedure to insert the appropriate POSTSCRIPT commands to add the page numbers once they had been calculated. PDF documents cannot be edited to modify the text in any way. However, the Acrobat Reader can be used to produce POSTSCRIPT files which do all have the same format and structure. The solution is therefore to make a POSTSCRIPT file from the PDF and, using a regular expression search, locate where the page number POSTSCRIPT code should be inserted. On a UNIX station a script can be used to find the correct places in the file, insert the page numbers and place the modified file in a directory where it will be distilled automatically. The final step is to update the PDF with the hidden fields – title, author, keywords, etc. using automated procedures.

### 8 ACKNOWLEDGEMENTS

I would like to thank Christine Petit-Jean-Genaz for all her help and expertise throughout the whole process. Renaud Daures and Barbara Strasser worked throughout the summer helping to process/mend all of the papers. Andreu Pacheco did an excellent job organising the computing facilities at Sitges and I would also like to thank Josep Blanes and Marc Muñoz for their help in Sitges and for installing all of the equipment. Martin Comyn (PAC'97) and Leif Liljebj (EPAC'98) came to Sitges to learn about electronic processing – I think they learnt a lot but I am sure they did not realise that they were going to work so hard. The ladies in the proceedings reception office were a great help to us and it was a pleasure to work with them, so thanks also to: Elly Driessen, Maria Rita Ferrazza, Elisabet Oppenheimer, Pina Pozzanza and Martine Truchet. Finally, thanks to Steve Myers and Ramon Pascual for their support and help in obtaining the resources needed to get the job done.

### 9 SUMMARY AND CONCLUSIONS

I regard the whole exercise as having been very successful but the real proof will be in the acceptance of the CD-ROM by the accelerator community. Success will lead to economies in the future.

The solution to the page numbering problem removes what was perhaps the weakest feature of the electronic version. Unfortunately it was too late for EPAC'96 but it will be tested on Chamonix'97.

We recorded a 70% success rate with the distillation process, disregarding the the 'US letter paper' problem (which accounts for 10% of the papers).

A total investment of about 2 man-years was made in the electronic part of the proceedings production, much of this outside normal working hours. This does not include the time spent providing the facilities at Sitges (hardware, software installation, networks and testing). This investment therefore represents the additional work to go electronic for the first time. I would expect this to decrease in the future because much of the development has now been done BUT there will be a different set of authors for the next conference so the failure rate will only decrease slightly, keeping the time spent fixing problems at much the same level. I estimate that it will require 15 man-months next time.

There were insufficient resources at the conference (but we had all that we asked for): we should have had more people and more computers.

The idea of sitting with authors and repairing documents did not come to fruition, mainly because we did not have the time or facilities.

There were no insoluble problems with the electronic publication and we only had to resort to re-typing in one case where we were unable to contact the author.

The limit on size of the files is a delicate problem. The 1.4 Mbyte limit is a reasonable guide but we have seen that much larger files can give very acceptable performance.

We can expect some problems to improve as the authors become more experienced but those like conflicts between US letter/A4 paper and Asian/Cyrillic fonts will be around for some years.

The closing date for abstracts was not a good choice because CERN closed for 2 weeks at the critical time.

The use of the WWW and an anonymous FTP server was indispensable.

It was useful to ask for abstract submission in POSTSCRIPT for this first instance but it would serve no useful purpose to repeat the exercise.

The distribution of software used for EPAC was the reverse of that for PAC i.e. we had many more WORD users.

Being able to explain problems to authors face-to-face was much more efficient than trying to follow up problems after the conference.

### 10 PROPOSALS FOR FUTURE EPAC CONFERENCES

1. Continue with electronic publishing along the same lines as used in 1996.
2. Use of a WWW form to submit abstracts will allow careful control of completeness of the information. Then, automated procedures to fill the database and generate the abstracts brochure can be built.

3. Continue to build on the network of support personnel in the major laboratories. The programme of education and encouraging up-to-date software installations needs to continue.
4. Establish a small group of people who form a recognised part of the organising committee of EPAC who are responsible for the production of the proceedings. At the same time, this group will provide a continuing base of expertise. Members of the group should be committed to serving for a period of between 2 and 4 years and they should be involved in processing the papers and producing the CD-ROM.
5. Processing at the conference is an efficient way to communicate with authors and should therefore continue. It has even been proposed to add other colours to the author feedback spots – gold and brown, for example !
6. It is unreasonable to expect people to work as hard as they did at Sitges. Also there were times when we could have been working on papers but were prevented by lack of computers. Therefore more people and computers should be devoted to the electronic processing.



# Appendix I Data Flow Diagrams

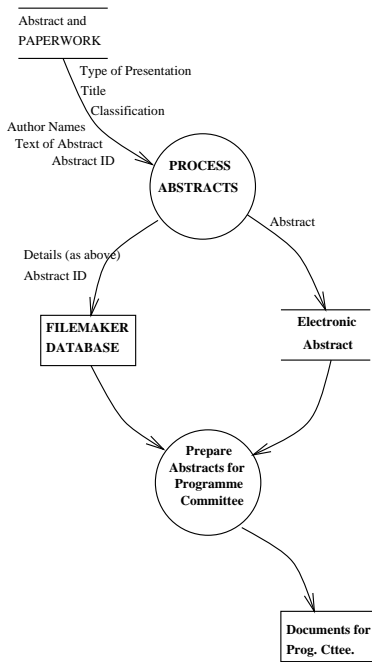


Figure 1: Data Flow Diagram for STAGE 1: Receipt of abstracts and preparation of programme committee documents.

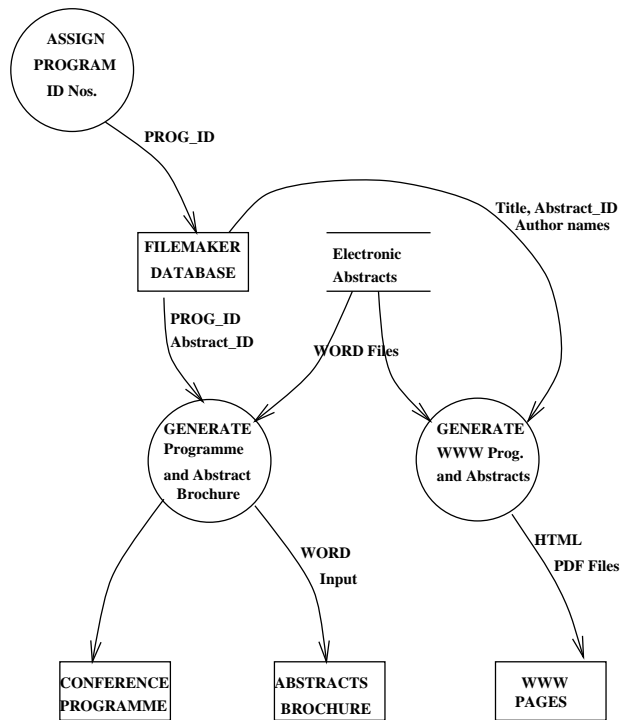


Figure 3: Data Flow Diagram for STAGE 3: Generation of Abstracts Brochures and Conference programme.

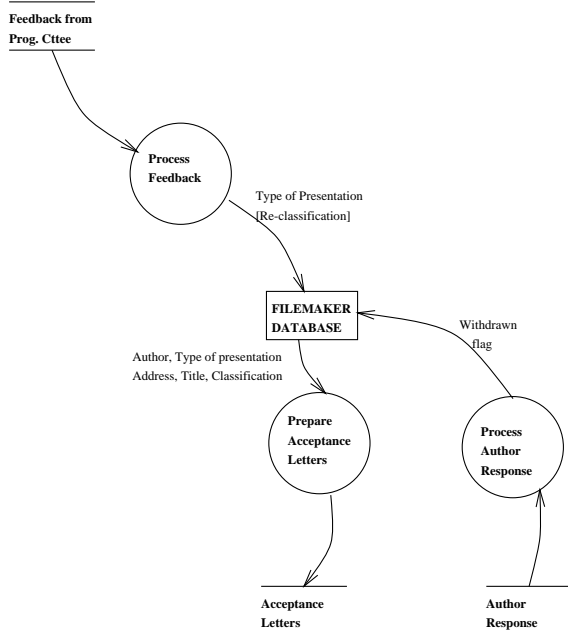


Figure 2: Data Flow Diagram for STAGE 2: Update database after programme committee and generate acceptance/refusal letters and update for papers which have been withdrawn.

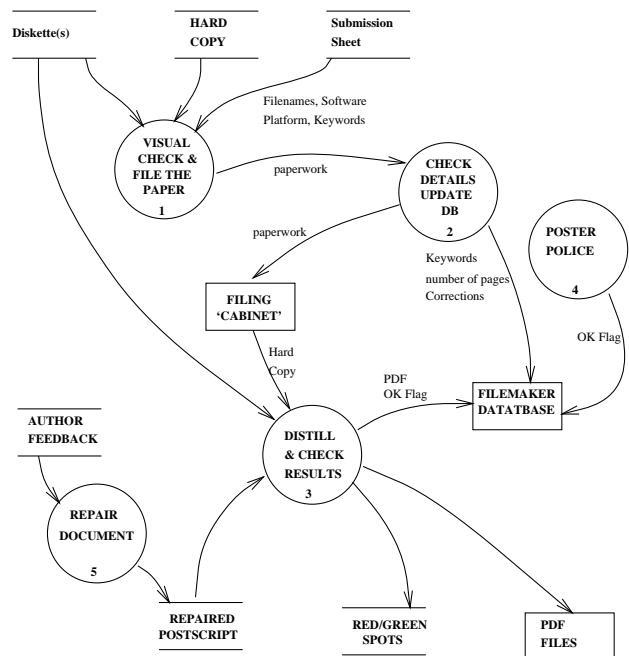


Figure 4: Data Flow Diagram for STAGE 4: At the conference, receiving the contributions and checking their completeness, updating the database, filing the paperwork and diskettes and subsequently distilling the contributions. If the distillation failed the author is informed via a red spot and hopefully the document gets repaired.

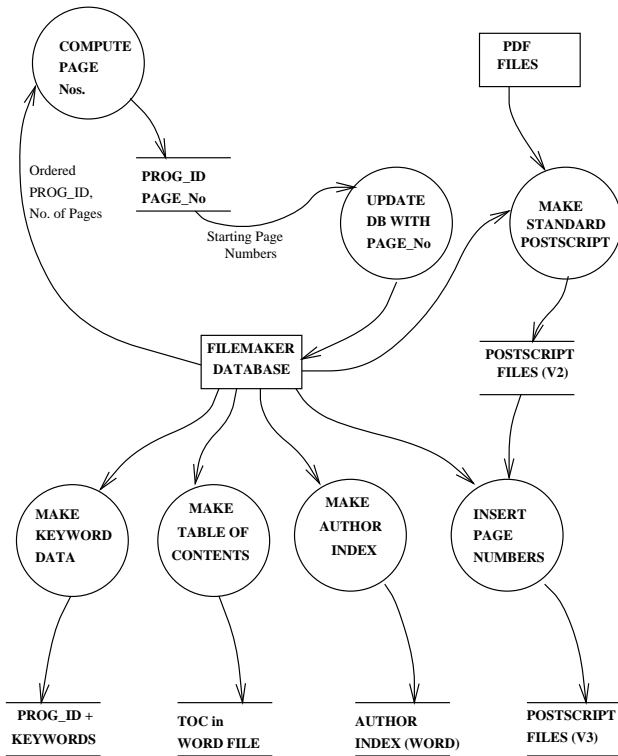


Figure 5: Data Flow Diagram for STAGE 5: Detailed work through of all papers, followed by automatic generation of the major components.

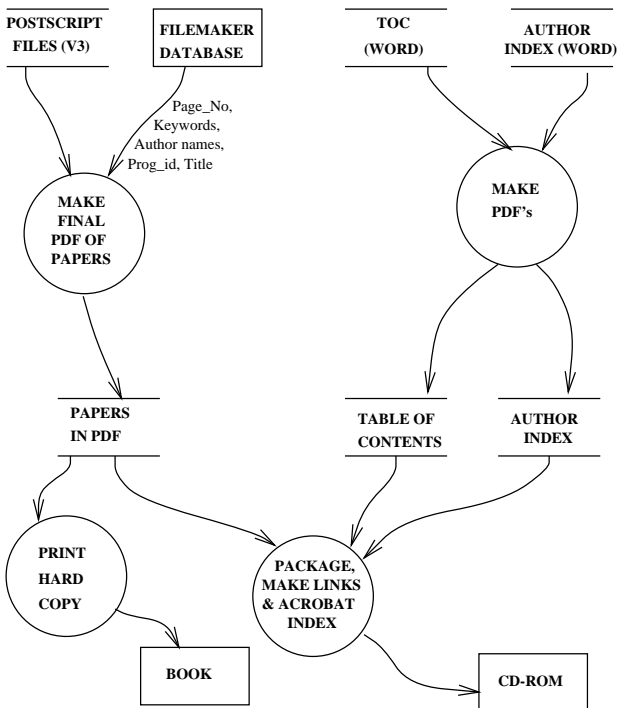


Figure 6: Data Flow Diagram for STAGE 6: Final automated production of the Book and CD-ROM.