Map Producing and Publishing based on the Digital Workflow

Wu Changzhi   Su Yongxian   Zhang De   Li Hong   Tian Xiangchun

(Xi'an Research Institute of Surveying and Mapping   710054)

Abstract: Nowadays, eighty percent of human activities is connected with geographic information, and it serves us with many different kinds of media production among which the paper map is still one of the main tool and form in conveying and applying the geographic information. Because the process of paper map printing and publishing is complicated and the period is long in the simulated technique period of "handwork + film + printing", it is difficult to access the updated geographic information. As the development of compute technique, CAD technique, and map database technique, map printing and publishing is saying farewell to simulated technique period and walking toward digital period of "compute + digital printing". Some new workflow, methods and characteristics will occur in the period of digital network map printing. In this paper a kind of digital workflow, its characteristics, and work mode are discussed. Through this workflow, the on-demand-printing and publishing of paper map with rapid speed at different place can come true. Further, it can realize cross-media publishing. Namely, after processed, the document composed by text, graphic, image, sound and video can be used for many different kinds of media publishing, and form different media product, for example paper map, CD-ROM map, network map and so on.

Key Words: Map Publishing   Digital workflow

1、Preface

Today, the paper map is still the main tool for conveying and applying the geographic information. With the application of computer technique and other peripheral equipment in map publishing, the prepress digitization has basically been realized. Many kinds of map making system, map publishing system, color management system and hardware equipment have laid solid basis for the digitization of map publishing. However, because current map digital publishing fails to change radically and the computer working is limited to some local procedure, the digital electronic working only can replace some procedure in conventional process and fails to simplify the workflow. The steps of workflow is so numerous from the map design, map digitization, map editing, map making to prepress editing that the latent error of every complicated step causes a decrease in stability and efficiency of the system. On the one hand the map digital publishing heighten the efficiency of some procedures, on the other hand, because of lacking the support of the whole digital workflow, it hinders the efficiency of electronic working. Therefore, it is not enough to own digital electronic working. It must own digital workflow to heighten the efficiency and

stability of the map digital publishing.

Meanwhile, with the development of network technique and the diversity of information spreading means, it urgently needs the support of a integrate digital workflow in the map design, map making, electronic map publishing, network map, multimedia and cross-media map besides paper map.

2、Characteristics of map publishing in the period of "handwork + film + printing"

Before the computer was introduced into the map producing and publishing, "Handwork + film + printing" was the main producing means. We call that time simulated technique period. Its concrete workflow is showed as following chart 1:

Data collecting → Complied original → Photographic printing →

Fair drawing and scribing → Publishing original → Photographing copying

→ Copying → Breaking for color → Double-burning and screening

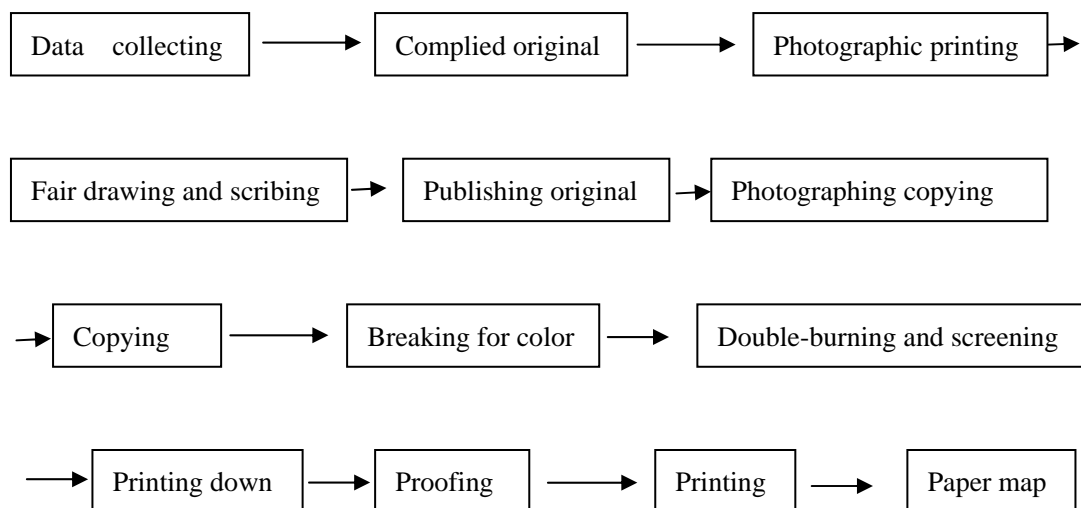→ Printing down → Proofing → Printing → Paper map

Chart 1

From above chart we can see the characteristics of map producing and publishing which include complicated process of map producing, long publishing period, few form of map production. In the process, it is the manual worker's technical ability that determines the quality of map product. Because of the long period of map producing and publishing, its representative present situation of the geographic information falls behind the time.

3. Characteristics of map publishing in the period of "computer + digital printing"

After the computer was introduced into cartography and map publishing, some revolutionary changes have taken place. Present main publishing mode is electronic publishing or digital publishing. The workflow of electronic publishing is showed as

chart 2:

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┌─────────────────┐      ┌─────────────────────────┐      ┌─────────────────────┐
│ Original and data│─────▶│ Digitizing and vector   │─────▶│ Design and compilation│
│                 │      │ tracking                │      │                     │
└─────────────────┘      └─────────────────────────┘      └─────────────────────┘

          ┌──────────────────┐                  ┌──────────────────────┐
  ───────▶│ Preprinting editing│─────────────────▶│ Proofing and checking│
          └──────────────────┘                  └──────────────────────┘

          ┌──────────────────────────────┐      ┌──────────────────┐
  ───────▶│ Outputting through laser      │─────▶│ Separation film  │
          │ mapsetter                     │      │                  │
          └──────────────────────────────┘      └──────────────────┘

              ┌─────────────────┐          ┌──────────────────────────┐
      ───────▶│ Printing down   │─────────▶│ Printing and publishing  │
              └─────────────────┘          └──────────────────────────┘
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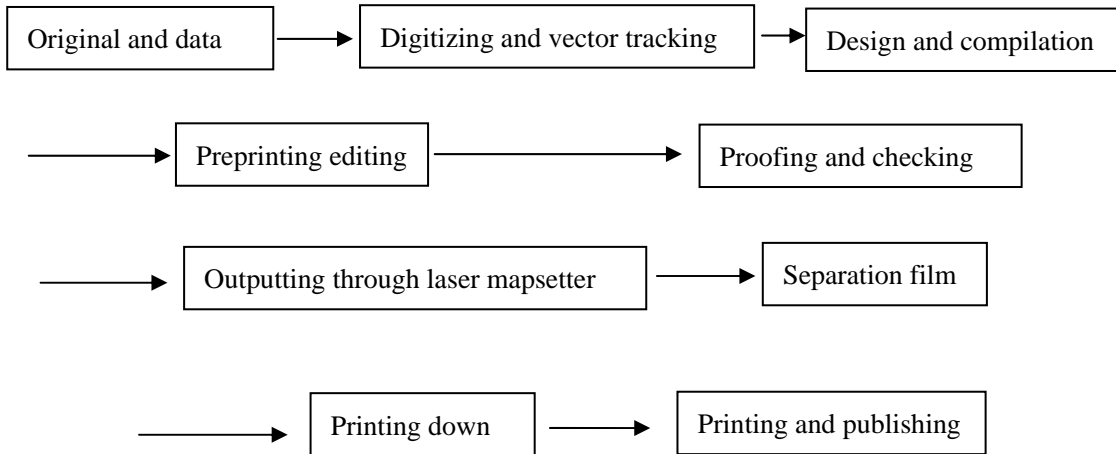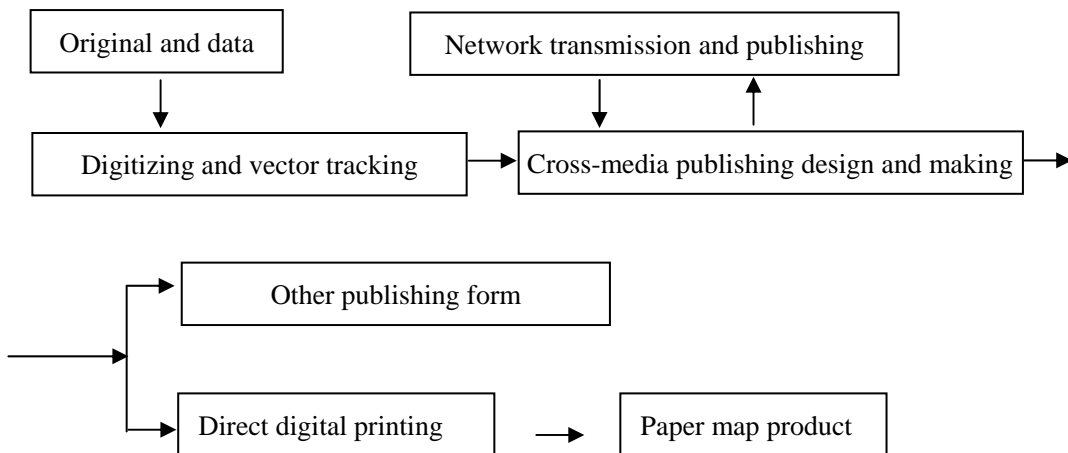
Chart 2

In this period, the prepress digitization is the main process. From the chart it can be seen that the process in electronic publishing period is simpler than that in simulated technique period. Therefore the product period is shortened and the efficiency is raised. The present situation of geographic information is enhanced. As above, because in current map digital publishing the computer working is limited to some local procedure, the digital electronic working only can replace some procedure in conventional process, and it lacks the support of the whole digital workflow, it hinders the efficiency and quality of electronic working. Printing and postpress processing is still conventional producing mode, so it can not be called digital publishing thoroughly. With the development of digital technique, the map digital publishing will develop from prepress, printing, postpress and on-demand printing to network, multimedia. Especially the application of digital printing technique makes the map producing and publishing digitizing and can realize on-demand printing. The workflow is showed as chart 3:

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┌─────────────────┐                  ┌───────────────────────────────────┐
│ Original and data│                 │ Network transmission and publishing│
└─────────────────┘                  └───────────────────────────────────┘
         │                                      │          ▲
         ▼                                      ▼          │
┌─────────────────────────┐      ┌──────────────────────────────────────┐
│ Digitizing and vector   │─────▶│ Cross-media publishing design and     │──▶
│ tracking                │      │ making                                │
└─────────────────────────┘      └──────────────────────────────────────┘

          ┌──────▶┌─────────────────────┐
          │       │ Other publishing form│
          │       └─────────────────────┘
  ───────▶│
          │       ┌─────────────────────┐      ┌─────────────────────┐
          └──────▶│ Direct digital printing│───▶│ Paper map product  │
                  └─────────────────────┘      └─────────────────────┘
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Chart   3

4. Map publishing based on PDF digital workflow

4.1 Characteristics of PDF and its digital workflow

Portable Document Format (PDF) is an open standard used for global electronic document distribution. It adopts the imaging model of Adobe PostScript page description language that can describe text, vector, graphic and image. According to the PDF page description order, its display procedure is plotting the page at the specified area, and is not confined by the display platform and resolution of the device. PDF is now applying wider and wider on the digital printing workflow, especially when the demand of preprinting information is increasing. There are some characteristics of PDF:

1) Cross -platform. The PDF file is unrelated with the operation system. Though Created by Machitosh computer or others that use Windows operation system, it can both be browsed by the PDF software on any platform, and can describe the graphics and texts in a way which is independent of the device and the resolution.

2) High fidelity. It looks the graphics, texts, images and characters as objects, and edits them. PDF file includes some printing information such as separation, color space conversion, font, overprinting, black generation, parameters of under color remove, dot gain parameter, halftone attribution and so on.

3) High efficiency. Because PDF adopts many standard compressing algorithm and OPI (Open Prepress Interface) technique, it has a higher compressing ratio, lower allocation and faster transmission speed than other formats.

4) Independence of page. Because every PDF Page is independent, a file can be divided into different independent pages easily. It is possible to correct the file at the last minute before publishing.

5) It supports sound and animation. The data can be filled into the table reciprocally, outputted, inputted, converted and received by the Web. Similarly, it can use key to protect document and prevents from operating document.

Because of the application of PDF, it is possible to standardize transferring the file. Now PDF is developing into an exchange criterion of page data in printing area, and becomes the basis of modern workflow and automatic output device. PDF has above good characteristics, so it is fit for map production workflow and printing under network circumstances.

4.2 Map publishing based on digital workflow

Digital workflow is an inevitable trend. After establishing digital workflow, every unit not only can realize integrated digital processing, but also can connect the printing house, map making unit, supplier of device and material through the distant transmission of network to proof and settle accounts distantly. In all, all activities of production and administration can be taken into the digital network.

1) The system composition based on PDF digital workflow: network system, publishing system, PDF management, RIP, and print driver.
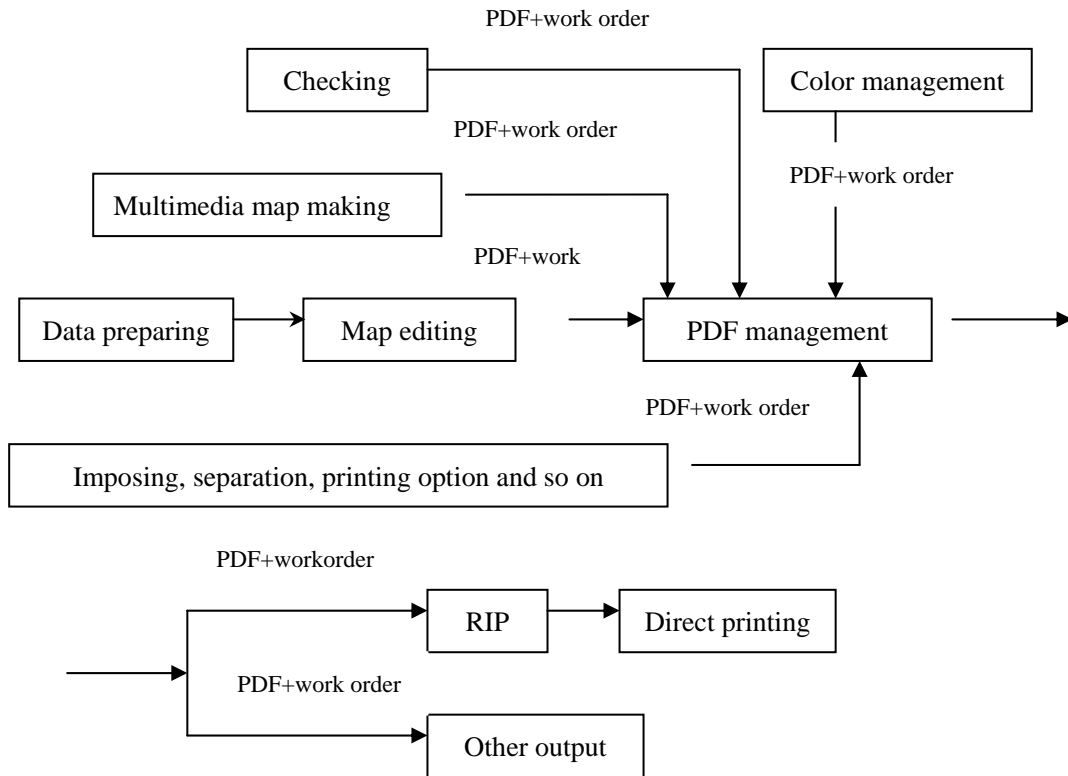
2) PDF digital workflow as chart 4:

Chart   4

After edited well, the file can be standardized through PFD management, and becomes PDF compressed digital Original with clear structure. With the support of PDF, in initial stage workers can find whether the page is normal or not, and edit, calibrate the PDF document. If necessary, it can be returned to the customs to correct. Through PDF standard management, when being outputted, the pages can be ensured that there is no error in it, and can be added additional conditions such as work order, file key. Then the PDF pages will be selected from the page archives, converted, sorted, inserted and cancelled. Next, the options of imposition, separation and special color will be selected. At last, files will be outputted by corresponding output device.

3) Characteristics of PDF digital workflow

From above analysis, after adopting PDF digital workflow, map printing and publishing is much simpler and easier, and all processes of publishing can be managed by network. So the map editing, map making, prepress processing, direct printing and outputting can be integrated, and the data transmission, data conversion have common basis. Errors can not occur when the map data are transmitted and converted ,and" what you see is what you get "can be realized. Another advantage is that it can use cross-media publishing technique. Because the PDF files includes other

data besides map data such as sound, animation and so on. Through using the technique, after processed, files composed by text, graphic, image, sound, and video can be use for multimedia publishing, and become different media products such as printed matter, CD-ROM electronic map, network map and so on.

5.conclusions

With the application and prevalence of digitization and network technique, it is the trend for the map producing and publishing to adopt the digital workflow. The development of science and technology promotes the publishing technique. After the conventional network publishing occurs, Cross-media publishing, Network publishing, a new type of publishing technique based on XML(Extensible Markup Language) data conversion mode are now advancing promptly. How to utilize the technique to promote the publishing technique is an urgent subject, and it will be bring out a new revolution to the cartography and map publishing.

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