

NEW OPPORTUNITIES FOR PRODUCTION, ON-DEMAND PRINTING/PUBLISHING, ARCHIVING, SHARING DIGITAL ORIGINALS OF HARDCOPY-MAPS AND PDF FORMAT

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Abstract

Probably, almost everybody should have attempted to use PDF for sharing documents or downloading information pages through internet. To evaluate PDF as a software only, would be misleading for cartographers because of its capabilities for printing, publishing, sharing and archiving digital or hardcopy maps. The subject of this paper is analyzing how to use a new and efficient technic for production of hardcopy maps by using professional, high-quality, “high-end” technologies and workflows and how to get some benefits for our cartographic production line from methods which is mainly aimed and developed for other industries such as prepress, publishing.

Introduction

The development of the modern computer-science technologies affects improvements of the hardware, software and method components in many disciplines either research or praxis. Digital Mapping and digital pre-press have become inseparable parts of this process. Depending on technological trends; dynamic-, temporal-, interactive-, online maps are going to behave more importance than the others have. Despite this trend of user needs; parallel to the increase of number of geo-data and digital mapping softwares; hardcopy maps are also being produced more and more, in variety kind and numbers. Hardcopy maps derived from geodatabase, can be produced using several methods such as GIS, CAD softwares’ native cartographic tools, special cartographic softwares, prepress softwares, cartographic plug-ins for prepress softwares, home-made cartographic softwares, etc. or combinations of all above.

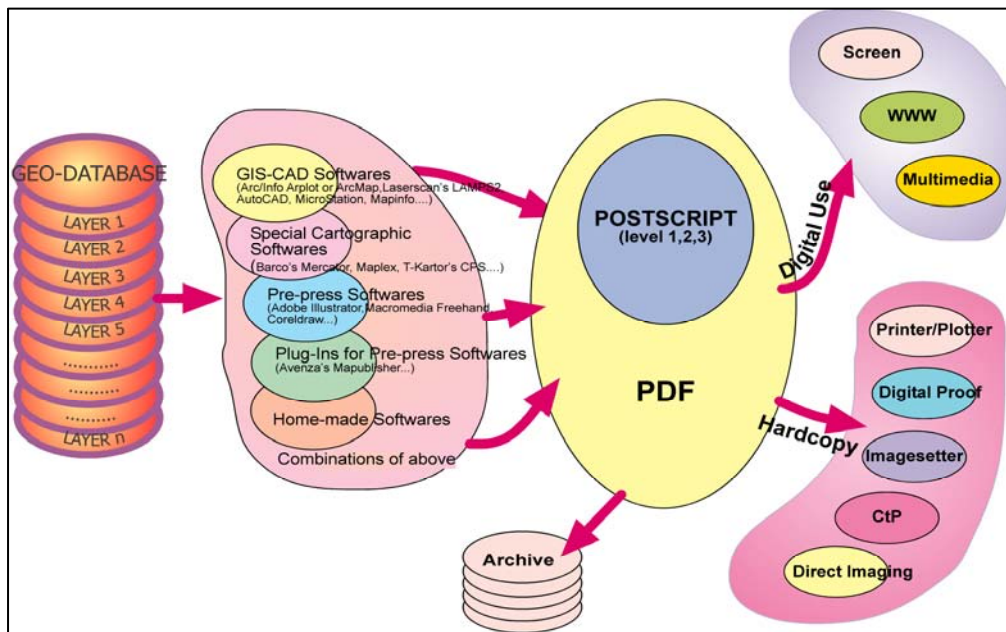


Figure 1 : An Overview Mapping-workflow for Printing&Publishing using PDF

Today, almost all cartographer use -in production workflow and for professional printing needs- Adobe’s POSTSCRIPT and POSTSCRIPT–output devices such as printers, plotters, imagesetters, CtP devices, proofing devices and direct imaging devices. POSTSCRIPT has been a standart for professional high-quality printing and publishing. Adobe introduced ‘Portable Document File’ Concept in the mid of 1990’s. PDF strategy to handle document is : All kind of fonts, images, graphics and native software features will be combined and embedded into a file. PDF has the same imaging capabilities as POSTSCRIPT because they share the same underlying architecture of imaging model. Since it is independent of platforms, applications and distribution media, it also has a wide range of use, from transferring documents electronically to multimedia, from internet to on-demand publishing and archive. PDF get standardized ever before in prepress and publishing industries from which hardcopy-maps are directly affecting and get to be a digital master, so PDF format brings ‘huge’ number of opportunities for cartographers.

Advantages of PDF Concept

General

1. Easy to distribute, share, view, print and publish
2. Free viewer and handler (Acrobat Reader)

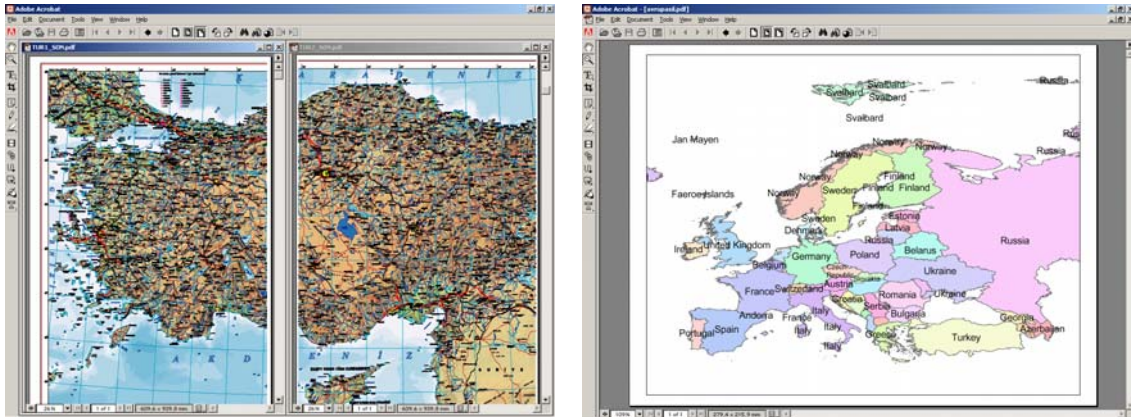


Figure 2&3 : Documents generated by several software-platforms in different pagesizes

Press&Publishing

3. High quality printing capability (Acrobat version 4.0 and later)
4. Compactness (All kind of fonts, images, color information, prepress information, graphics and texts will be embedded)
5. Same imaging&printing capabilities as Postscript owns. Full support Postscript Level 1,2,3, Adobe Extreme Technologies for PS level 3 printing.
6. Wide printer and device support for On-demand Printing&Publishing
7. Pre-flight mechanism for Postscript files, avoid of mistakes
8. Look on screen how fonts (especially cartographic fonts), patterns, textures, graphics and layout will be printing
9. Ready to RIP (Raster Image Process) (Almost all High-End printing-hardware vendors and Prepress&Graphics companies such as AGFA, AII, Barco Graphics, CreoScitex, Dainippon Screen, Heidelberg, Man Roland, KBA, Indigo etc. anoned full-support for PDF)

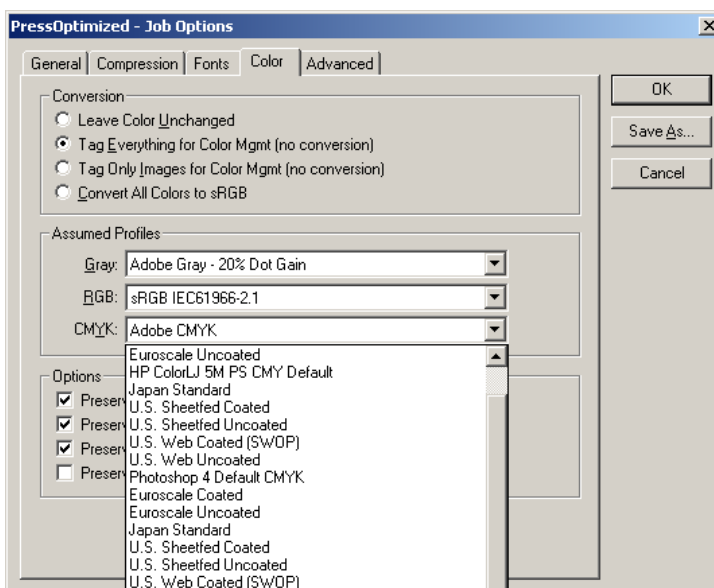


Figure 4 : Advanced color-management tools for Cartographic Needs and for High-End Devices

Manipulation, Handling, Support,Customization

10. Faster processing time than postscript files,
11. Independence of device, application and media,
12. Easily creation from any application or postscript files.
13. Preperation interactive forms
14. Open architechture for development (JAVA)
15. Extraction to text or image files (in version 5.0, save as to tiff,jpg,bmp)
16. Open system for customisation and 3rd party plug-ins for creation, conversion, extraction, markup, forms, document management and prepress
17. Creation PDF_MAPs directly or embedding powerfull GIS and GPS functionalities using 3rd party plug-ins such as PDF PLUS etc.
18. Editible in almost all prepress softwares
19. Annotations, bookmarks, thumbnails for user friendly use. (Figure 5)

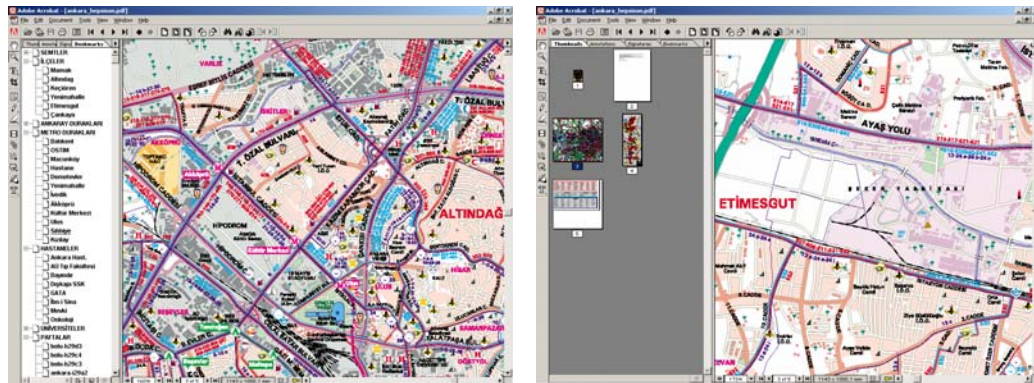


Figure 5&6 : Annotated, bookmarked and thumbnailed cartographic documents generated by several software-platforms in different pagesizes in a single-multipage PDF

Web,Multimedia

20. Full adaptation for Web (PDF files can be served through Browser pages)
21. Multipage capability for distribution and archiving
22. Multimedia support (voice, images, video, weblink etc.)
23. Conversion of Web pages and/or a whole website into a multipage PDF file
24. Sharing through internet, intranets, extranets etc.

Security, Archiving

25. Good compression ratios according to other formats such as postscript, vector or image files.
26. Highest level of protection for shared documents. (With version 5.0, 128 bit encryption will be supplied by Acrobat, so the documents will be protected for accessing, printing, modifying,changing the security level by unauthorized end-users). (Figure 7&8)

27. Capturing existing documents (hardcopy or digital) and archiving them easily

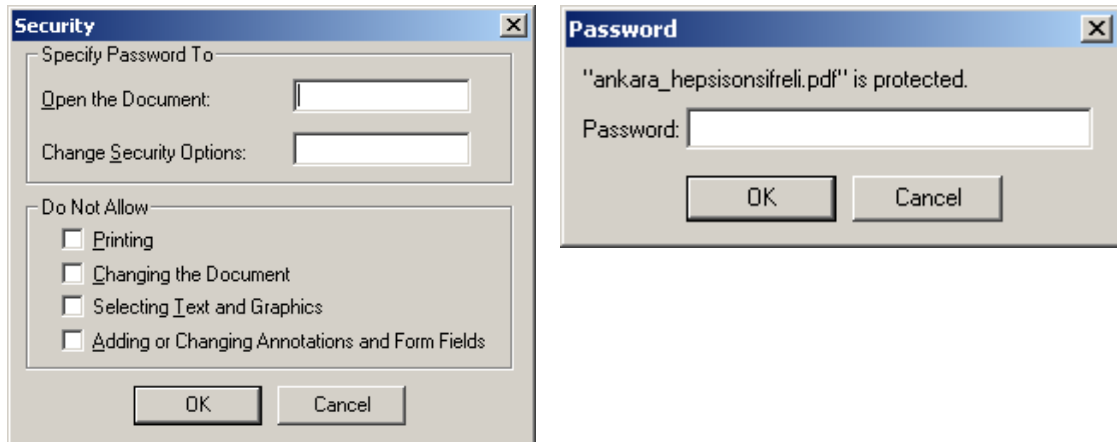


Figure 7&8 : Security options for document sharing with 128 bit encryption in Acrobat 5.0, and opening a secure document

Example approaches to put into practice

Map producers such as National Mapping Agencies (NMA's) or private companies have been used POSTSCRIPT workflow for their production up today. Map files can be printed by institution's devices (if any) or will be sent to a commercial printer, outdoor. PDF files can be generated by distilling postscript files or by mapping softwares directly. This end-PDF files can be used as a single file or it can be inserted into a multi-page PDF file which –for instance- may contains hundreds of Map-pages or maps of a geographic area or map index extent. PDF file is also easy to use with annotations and bookmarks to share, view, print, publish. For instance: 'All map sheets published in 2001' or 'All map sheets in a geographic region, extent or area', 'All map sheets for a map series such as JOG-Air or Series 1301'. On the other hand NMA's or Local Mapping Agencies which do not own or use offset printing facilities and which print maps on-demand -without stock- can easily prefer usage of PDF files rather than hpgl or rtl based photo-quality-postscript-inkjet-printings.

In Turkey, map series are indexed for several practical use of map sheets. For example a JOG Series (250K) map sheet covers a geographic extent of 1° x 1°30' which contains 6 of 100K (30' x 30') map sheets, 24 of 50K (15' x 15') map sheets and so on as similar as elsewhere (See Table 1 for more details). Hardcopy maps have been producing using digital production workflows which derives map compositions from geodatabase. (Through postscript devices and offset printing technologies). Table 1 and 2 shows that hundreds of digital map files which cover whole geographic extent of a 1° x 1°30',

can be easily stored in a single multipage PDF file even only on a single CD for storage.

SCALE	Geo.Extent	Max.Number of M.Sheet	Map Series	Postscript (size/total) MB	PDF (size/total) MB
250K	1° X 1°30'	1	JOG Air/Ground	40	5-10
100K	30' x 30'	6	K613	35/210	5/30
50K	15' x 15'	24	K716	35/840	5/120
25K	7.5' x 7.5'	96	K816	35/3360	5/480
TOTAL		127		4450MB.	635MB

Table 1 : Map Sheets and Postscript vs PDF File Size comparison

File/Sheet	EPS/PS file size in MB	PDF file size in MB	% x (PDF filesize/ PS filesize)	1 / x (PS/PDF)
Sheet a (10K)	44.700	5,320	% 11.9	1/8.4
Sheet b (25K)	52.500	7.155	% 13.6	1/7.3
Sheet c (25K)	19.163	3.713	% 19.4	1/5.2
Sheet d (25K)	53.192	9.851	% 18.5	1/5.4
City map (10K)	92.970	13.327	% 14.3	1/7.0
Orthophoto(5K)	123.118	7.316	% 5.9	1/16.8
ColorSep.(spot colors (2400dpi-150 lpi))	36.000	Color1:3.980 Color2:0.670 Color3:2.484	% 11.1 % 1.9 % 6.9	1/9.0 1/52.9 1/14.5
			% 2 - 20	1/53-1/5

Table 2 : Several testings about “Postscript vs. PDF File Size” and compression ratios comparison (Ratios may vary depending on input graphics and details (raster images, surfaces, vector graphics, textures in vector graphics, etc) and the output needs such as resolution (300-2400-...), output devices (screen, print or press optimized) color management needs etc.)

Conclusion

Compactness, easy to distribute, share, print, publish through free Acrobat Reader, high-quality printing, independence of device, application and media, all printing capabilities of POSTSCRIPT, preparation of interactive forms, wide range of hardware support for on-demand publishing, internet support, plug-ins, file compression, security,

multimedia support, and many more can be listed as a few advantages of PDF format. Almost all above are good opportunities for cartography. Map producers such as National Mapping Agencies (NMA 's) or private companies have been used POSTSCRIPT workflow for their production up today. The High-End PDF format is going to be a 'digital master' for digital viewing, printing, archiving, sharing digital files and Maps. When to think about future of hardcopy maps from digital geo-data, we should consider the huge opportunities of PDF format for our Map Production Workflows.

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