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The printing industry today is in the midst of changes as dramatic and revolutionary as any since the days of Gutenberg. In the not too distant future it is possible that an intelligence article will go from the analyst's keyboard to a printed volume all in electronic form, unseen except on the face of cathode ray tube editing consoles. But before that day comes there will have to be pressing requirements both in speed and volume to justify the enormous costs of fully automated systems.

"Automatic printing" is as yet a misnomer. The chief advances so far have been in automatic composition where machines have been developed that will take a corrected paper tape or magnetic tape input and produce a photograph of the finished page ready for cold plate making. Printing Services Division has developed the EPIC system which uses a computer and various tape making machines to input an automatic composer (Photon 513), eliminating considerable keyboarding in the preparation of NIS's. The next advance in EPIC is the installing of a Photon 713 autocomposer in PSD in June of 1968. This new machine is some three times as fast as the Photon 513 and will decrease the throughput time necessary on many jobs. Many technical improvements have also been

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made in quick platemaking, such as the Itek Platemaster or the Addressograph-Multigraph 705, which are ideal for the limited number of runs of most CIA documents. Eastman-Kodak has developed a plate material to be used instead of film in automatic composers, which under some conditions will eliminate the platemaking step, entirely.

Still, the greatest improvement has been in automatic composing. Granddaddy of them all is the Linotron 1010, jointly developed by Mergenthaler and CBS Labs for the Government Printing Office. Its great expense is justified by its speed in doing the large jobs GPO handles. The Photon 713 which will be installed in PSD in June was first developed in the late 50's. By the latest standards it is a slow machine, but PSD has no requirement for the greater speed and expense of the newer Photon ZIP 901 or RCA Videocomp 70 (\$350K up). IBM has two different automatic composing systems to offer: its own less expensive Selectromatic system now being used by OCI; and a system developed by Alphanumeric, Inc. before its absorption by IBM, an advanced system more like the Linotron and Photon machines in design (and expense). Fairchild has marketed a Photo Text Setter line similar to, but cheaper than the others, but it suffers in being a Japanese machine. Generally speaking each of these companies offers a varied line of automatic composers,

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with the price rising sharply as the speed of composing rises to match the output of high speed computers. But because of the limited number of copies of most Agency documents, PSD will probably never have a need for the most expensive automatic composers, nor for the extremely high speed fully automatic presses and binders usually described in the more fanciful descriptions of future printing developments.

Within the Agency PSD should get their first Photon 713 in June, with perhaps one other programmed, depending on steps taken by [] to automate publication of their [] NPIC would also like to purchase a 713 as an integral part of their IIS (Integrated Information System). OCI has begun work with their IBM Selectromatic Composer. There are no other hard plans for autocomposing equipment purchase in the near future. Most improvements will be system improvements in procedures, such as in EPIC and [] in preparing material for the 713 and taking advantage of material already keyed.

Because of the large data files already in machine language at NSA, they have procured a Photon ZIP 901 as part of their TIPS System. Since the analyst could update his files remotely, it was hoped to put many of these files on mats and publish them as working aids (about 1500 copies). The high degree of automation on

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the steps through platemaking has produced a serious backup in the printing process, however, with waits up to six weeks. NSA has assembled a committee to find means of speeding up this publication cycle, and PSD is alerted to possible difficulties in their own post-composing area.

Another area in the printing cycle which will probably need more development is the production of graphics--half tones and map illustrations. This year OBGI will attempt the first step in this direction. OBGI presently has an AUTOMAP program which automatically plots maps to various scales and projections through the use of a plotting table in combination with digitalized line and point descriptions of the earth's surface. The plotter will scribe on a mylar material which will act as a negative for making the map plates for reproduction. In the more distant future, however, a much faster system will probably be devised to project these computer stored digitalized points onto a cathode ray tube from which film strips will be produced for cold plate making, in a fashion similar to the way the CRT now images individual type characters in an automatic composing system. In fact, it is the versatile cathode ray tube

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with its wide variety of applications which offers the greatest future possibilities in all phases of automatic printing.

Automated techniques also exist in the preparation of manuscripts prior to the composing step. Tape-driven typewriters and cathode ray tube editing devices can drastically cut down the amount of retyping now necessary in preparing material to be printed. In the EPIC system, for example, edited pages are retyped by a tape-driven typewriter and only the changes must be rekeyboarded.

The most intriguing prospect for automating the preparation of material for printing exists where this material is already in machine language as, for example, in electrical communications systems.

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The problem is this:

1. Their input into headquarters is entirely by teletype, and constitutes the largest volume of machine language input in the Agency. However, at the present time nothing is done to take advantage

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of this already keyed input; it is printed on teletype paper, edited, and manually retyped on mats for reproduction.

2. The volume of words monitored, and words received into headquarters is constantly rising.

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[] would like to publish more words a day to keep up with the rising input. They state they have consumer requirements to justify increasing the number of words they publish. However because of equipment limitations PSD feels that they cannot increase the number of pages which can be printed in the limited time required for a current intelligence document. Consequently to publish more will have to increase the number of positions devoted to this program or print more words to a page (now averaging 425 words a page) with equal or better resolution.

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3. The [] is the biggest daily print job by far in the Agency and constitutes a high proportion of PSD impressions annually. Any changes in the production manner or timing of these publications will have very large repercussions in PSD.

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In 1966 OCS, the [] and [] undertook a series of experiments

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and a survey of the feasibility of automating the production of the [] The OCS survey, published 30 September 1966 pointed to three areas-- pre-editing, editing, and post-editing, in which a computer and other devices such as CRT's, could aid in the publication cycle; with three options in both editing and post-editing, of increasing equipment complexity and costs. The Director of Computer Services pointed out at the time that under any of the alternatives the graphic quality of the product might be improved, but there would be no improvement over the present manual system in accuracy or timeliness. Also, while under the simplest alternative there might be some overall savings, in the more elaborate system any savings in manpower would be more than offset by increased equipment costs.

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PSD has recommended that [] use CRT's to edit the machine language input and prepare clean edited magnetic tapes which could be used for automatic composition on the Photon 713 to be installed in PSD in June 1968. The volume of the [] is such that at least one more 713 would have to be purchased for about \$80K (\$59K for the machine and the rest for peripheral equipment). Faster and more versatile auto composers are available,

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but cost around \$350K up. Under such a program PSD could get up to 800 words to a page with good legibility, thereby nearly doubling [] output without increasing the number of page impressions.

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[] is presently considering several fields for automation including automation of []
The first step was an implementation of their AUTODIN communications system. The change from a five level code to an eight level ASCII code as their standard commo code will give them a better machine language input, simplify compatibility with computers, and allow the field bureaus to make progress in formatting far beyond the mere capitalization possible with the old code.

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The second step would be a pre-editing program where all non-publishable information such as cables would be removed from the information input which would be corrected on some machine such as a Friden Flexowriter (the machine presently being used experimentally) from an edited teletype printout. The Flexowriter would thus use the machine language for a speedier preparation of mats for PSD reproduction. When this much of the program had proven itself successfully, it is hoped to take the machine language from Commo to computer to CRT devices where the editors will edit the machine

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