



DATA CAPTURE APPLICATIONS

3075A APPLICATION
HP 1000

AEROSPACE INDUSTRY
REPAIR TRACKING



SUMMARY

SABENA is the national Belgium airline. The repair center, located on a custom-built plant at Brussels airport, employs 300 people. Each year the center spends 450,000 direct labor-hours repairing and maintaining some 40,000 aircraft accessories, comprising between 4,000 and 5,000 different types; from mechanical assemblies (e.g. hydraulic and pneumatic systems) to electronic assemblies (e.g. gyroscopes, radionavigation equipment and autopilots).

The center repairs accessories belonging both to SABENA and other airlines – these units having been returned for testing and/or repair after performing a considerable number of hours in operational use. The accessories pass through the repair center from one workshop to another up to the final test. Therefore at any one time there are a large number of different high technology/high cost accessories in the workshops, each in a different stage of repair, which must spend the minimum of time being repaired/tested in order to reduce their investment costs.

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THE PROBLEM

The problem was to improve the control and monitoring of aircraft accessory repair in order to improve productivity and quality control, and reduce the maintenance/repair turn-around time so as to provide a quicker service for SABENA and third parties. To do this, information was required in real-time on the components and personnel in the workshop, namely:

- 1) The location of each component.
- 2) The repair state of each component.
- 3) The available labor and test bench resources.

Previously, the information was gathered using mark sense cards, which were manually up-dated (in pencil) by the workshop personnel. This information was batch processed by the EDP center and was both difficult to keep up to date and subject to errors, which reduced its effectiveness.

THE SOLUTION

The solution was to rigorously account for all work done in the repair center in real-time, and consequently improve repair tracking, planning and productivity. SABENA decided to do this by tracking all components using bar codes.

After evaluating various systems, including an HP application in Italy, SABENA chose a Data Capture system based on a HP 1000 model 45 computer and 16 x HP 3075A terminals on a 400 m long Data Link. The HP 1000 was chosen because of its DATACAP software. The 3075A terminals were chosen because of their optional bar code reader, and customizable prompting lights and special function keys. The Data Link was chosen because of its resistance to electrical noise, ease of installation and expansion capabilities.



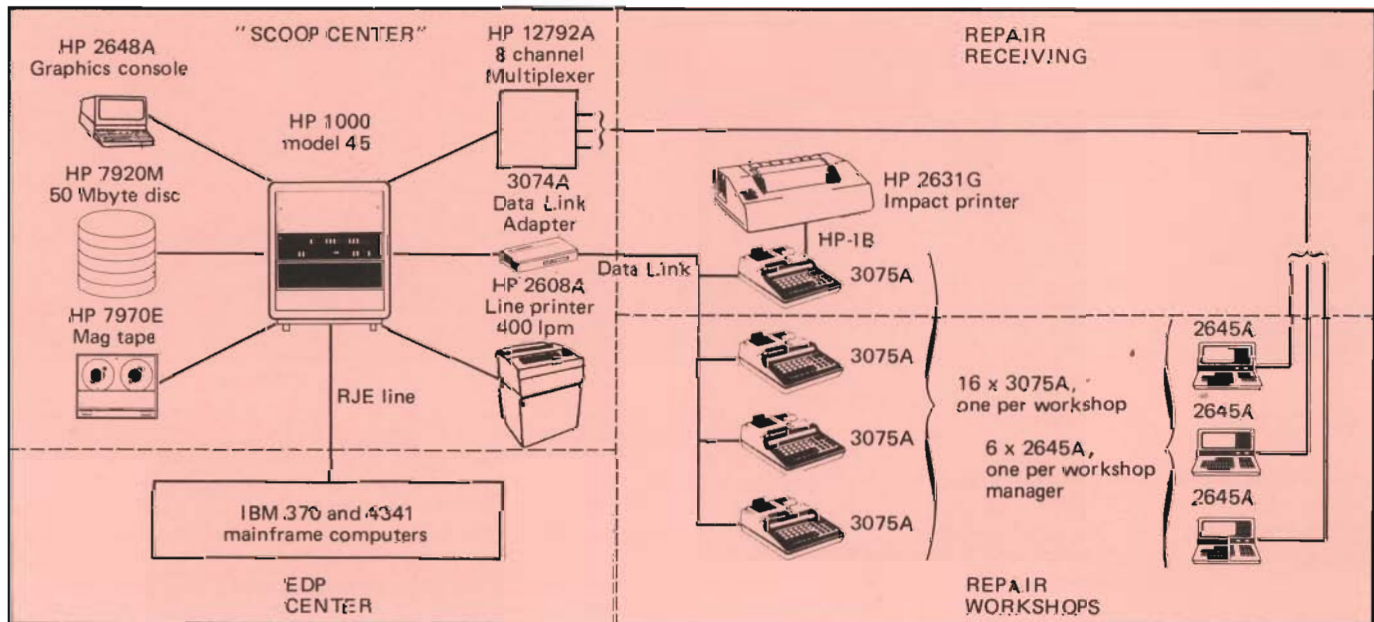
A Cockpit Trainer

THE CONFIGURATION

16 x 3075A Data Capture Terminals equipped with bar code reader, alphanumeric display and alphanumeric keyboard are installed on the Data Link. In addition, one of these terminals is equipped with a HP-IB Controller, to which is connected a HP 2631G impact printer.

The system configuration is as follows:

- HP 1000 model 45 (2177C) with 800 Kbytes of main memory, plus an auxiliary 50 Mbyte disc and tape deck.
- DATACAP/1000-II software to configure/manage the terminals.
- IMAGE/1000 software to manage the data base.
- GRAPHICS 1000 software for graphics data output.
- SCOOP, a set of production control software routines developed by SABENA.
- HP 2608A line printer for listings and graphics.
- HP 2631G (option 200) impact printer for generating work orders printed with a 3 of 9 bar code.
- HP 2648A graphics terminal, used as the system console and for program development.
- 6 x HP 2645A's CRT terminals for repair inventory, connected via a HP 12792A 8-Channel Multiplexer.
- 16 x HP 3075A's for repair tracking.

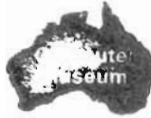


Repair Center Installation



Repair Receiving

This system is housed in the "SCOOP Center" and is connected via a RJE (Remote Job Entry) line to the EDP Center's IBM mainframe computer. This computer provides the data base for all accessories either in store or operational use.



SYSTEM OPERATION

As each accessory enters the repair center, all operational information concerning it is down-loaded from the mainframe computer to the HP 1000. The repair center receiving department then adds complementary repair/test information (interactively using a screen menu on a 2645A terminal). This includes the type of work to be done, job priority, expected work time, required completion date, etc. The SCOOP program processes this information, and subsequently prints a work order on the 2631G. This consists of a dossier listing the repairs/tests to be performed, where each separate job is identified by a unique alphanumeric 3 of 9 bar code.

The work order accompanies the component as it passes through the workshop. When an employee receives a component, he uses the 3075A's bar code reader to read the order's bar code, and then enters his personal identification code on the keyboard. As the job progresses, the employee informs the system of the job state (e.g. completed, additional work required, delayed, etc.) using the 3075A's special function keys. Consequently, the system is informed of which employee is doing which job and the time spent doing it, and therefore knows the component's repair/test state in real-time.

The workshop management can access the system at any time in order to know the "state" of a component and reset job priorities when required. Workshop planning can readily obtain statistical information on the work, and also know immediately when the work is completed so that all the administrative work can be arranged before the component leaves the workshop.

System information:

System implementation time – six months.

System loading – 500 transactions a day, of which 300 are due to 150 new jobs/day.

System response time – 1 second (at full loading).

Back-up system – if the system goes "down", data is collected by hand, and loaded via a 2645A terminal when the system resumes operations.

THE BENEFITS

Improved productivity and customer satisfaction:

Production data that previously took 50 labor-hours to collect is now available in 0.5 labor-hours, which has improved planning. Consequently, bottlenecks are reduced as workshop managers can readily modify work schedules in response to workload and job priority changes. This has reduced the job turn-around time, and has increased productivity and customer satisfaction.

Improved repair tracking and customer relations:

The repair state of all components is known in real-time. Consequently, customer queries that previously took three days to answer can now be answered in seconds, which has improved customer relations. In fact SABENA now publish a job status report, which was not possible previously.

Improved quality control:

The analysis of the repair/test data allows component problems to be immediately pin-pointed.

Cost saving:

On-line data capture in real-time has improved management control and reduced administrative costs.

FUTURE DEVELOPMENTS

SABENA plan to introduce:

- Automatic job scheduling, i.e. the system calculates the work time-tables.
- Bar coded employee identification badges that may be used when the employee identifies himself to the system.

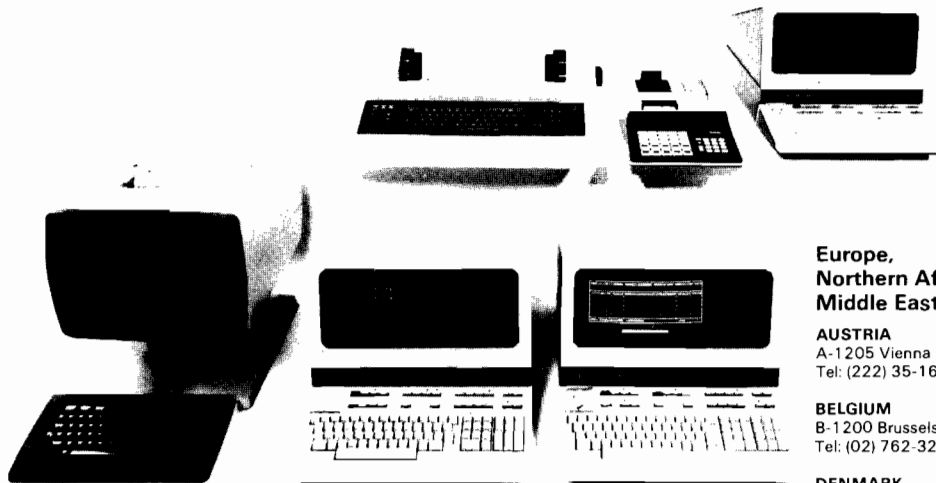
For further details on the 307X range of Data Capture Terminals, see your local HP sales office. A list of the major offices is included on the back page of this note.



A Repair Workshop

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