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# NASA TECH BRIEF

*NASA Pasadena Office*



## Automated Drug Identification System

### The problem:

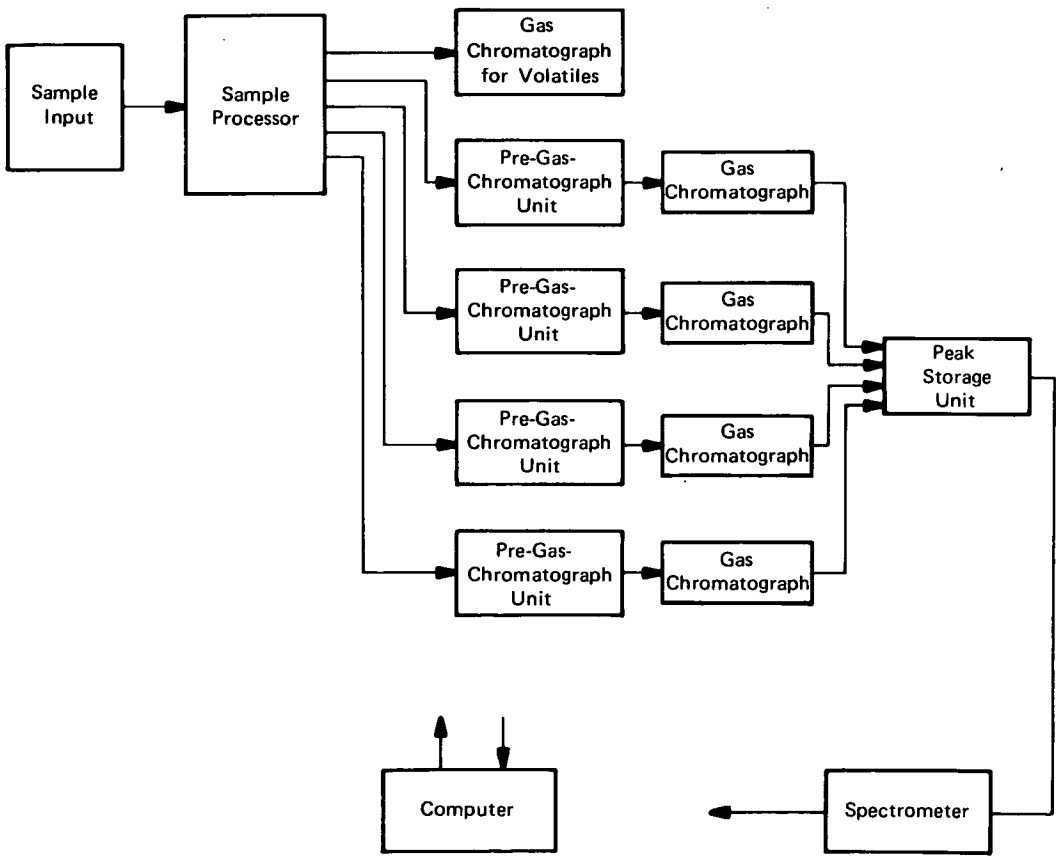
With the high incidence of drug abuse, the development of a rapid method for the treatment of people suffering from drug overdosage is urgent. Since many of these people are in a coma when they are hospitalized, the only way to find out what drugs they used is by analyzing their blood or urine. Unfortunately this takes time, and time in emergencies is critical. Yet it is equally dangerous to treat such patients without knowing what drugs have been taken.

### The solution:

An automated drug identification (AUDRI) system has been developed to speed up the analysis of blood and urine. The system is capable of identifying 100 commonly abused drugs.

### How it's done:

The system, as shown in the simplified block diagram, includes a computer that controls the entire analytical process by ordering various steps in specific sequences.




Automated Drug Identification System

(continued overleaf)

The computer also processes data output and has a readout of identified drugs. Drugs are identified using a drug identification system which includes the following units: a sample input, a sample processor, a number (four shown) of pre-gas-chromatograph units connected to their respective chromatographs, a peak storage unit, and a spectrometer.

Blood or urine samples are introduced into the system in separate extractor tubes. The blood samples are warmed in the processor reactor chamber to drive off volatile drugs directly to one of the gas chromatographs. The urine samples, on the other hand, are hydrolized for further processing. At that point, both blood and urine are treated with acidic, basic, and neutral processing through a sequence of steps.

Throughout the processing, the extractor tubes containing the samples are mechanically transported to different pre-gas-chromatograph units. Each pre-gas-chromatograph unit collects part of the sample and prepares it for its respective chromatograph by vaporizing the processing chemicals used in the prior steps. Each chromatograph in the system processes a different drug family. For example, one chromatograph processes barbituates, aspirin, diazepam, and meprobamate. Another processes amphetamines, phentermine, cocaine, and Darvon.

The samples in each chromatograph are separated into different fractions. These fractions are monitored by a detector which measures the concentration of every component as a function of time to indicate its relative quantity. The time of the maximum electrical output of each detector, i.e., the elution time of every component, is sent to the computer for comparison with that of the standard drugs. When the comparison is positive, the gas is fed to the peak storage unit and then to the spectrometer for spectral analysis. The results of the analysis are fed to the computer which provides a printout of identified drugs.

## Notes:

1. Besides its significance to drug analysis, the system can also be programed for other uses, for example, testing the constituents of pollution in the environment.
2. Requests for further information may be directed to:
   Technology Utilization Officer
   NASA Pasadena Office
   4800 Oak Grove Drive
   Pasadena, California 91103
   Reference: TSP74-10213

## Patent status:

Title to this invention has been waived under the provisions of the National Aeronautics and Space Act [42 U.S.C. 2457(f)], to the California Institute of Technology, Pasadena, California 91109.

Source: Charles F. Campen, Jr., of
Caltech/JPL
under contract to
NASA Pasadena Office
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