

OPEN HOUSE

SCIENTIFIC CENTER WATERGRAAFSMEER

(WCW)

FRIDAY, SEPTEMBER 7, 1990

Photo cover: KLM Aerocarto

OPEN HOUSE

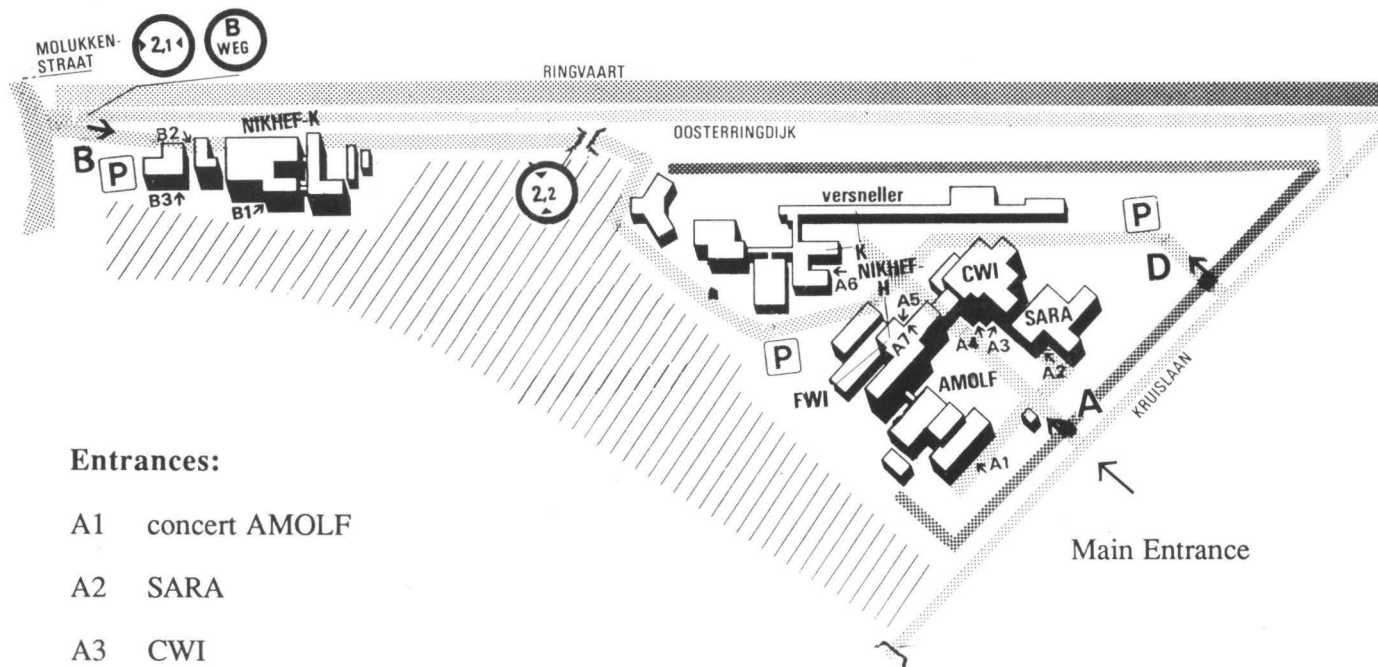
SCIENTIFIC CENTER WATERGRAAFSMEER

(WCW)

FRIDAY, SEPTEMBER 7, 1990

Institutes open from 17.00 - 18.30 hrs

Party from 18.30 - 21.30 hrs



Entrances:

- A1 concert AMOLF
- A2 SARA
- A3 CWI
- A4 Film
- A5 CERN exhibition (NIKHEF)
- A6 NIKHEF and MEA
- A7 FWI

OPEN HOUSE

SCIENTIFIC CENTER WATERGRAAFSMEER (WCW)

FRIDAY, SEPTEMBER 7, 1990

INVITATION

All participants and accompanying persons are invited to come and see the Institutes of the Scientific Center Watergraafsmeer.

PROGRAM

The institutes are open from 17.00-18.30 hrs

Visits can be made to (see number on map):

- A1. The FOM-Institute for Atomic and Molecular Physics (AMOLF), where a special concert will be given by Frances-Marie Uitti (concert for cello and two accelerators) and Michel Waisvisz (computer music). Tickets can be obtained at the Conference registration desk (limited seats, no charge). The Institute's scientific program is described in the enclosed leaflet.
- A2. Academic Computing Services Amsterdam (SARA) with tours and demonstrations.
- A3. Centre for Mathematics and Computer Science (CWI) with demonstrations.
- A4. In the Auditorium a film by Louis van Gasteren "A Matter of Level" will be shown. This film gives a unique impression of 1000 years waterworks in the Netherlands. The film received the Gold Camera Award and the Sony Video Award.
- A5. The special CERN exhibition from Geneva at NIKHEF and an exposition of research at DESY.
- A6. Dutch National Institute for Nuclear Physics and High Energy Physics Research (NIKHEF). Explanatory tour of the 200 m long linear accelerator (MEA).
- A7. Department of Computer Systems of the University of Amsterdam (FWI) with demonstrations of data processing and robot simulations.

Entertainment from 18.30-21.30 hrs

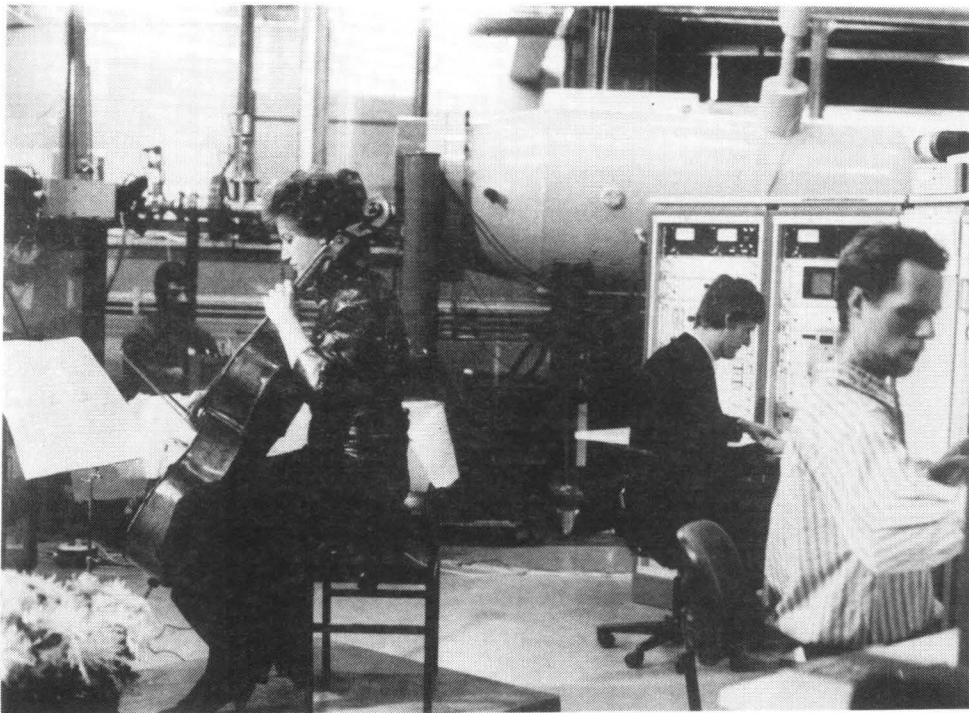
Beer, other drinks, herring and a light meal are served in the cafeteria of CWI and the tent starting 18.30 hrs. Music by a typical Dutch street organ.

Transportation

Take public transportation (tram no. 9 or bus no. 8) to Middenweg, corner Kruislaan. There will be special buses at these stops to take you to the WCW center, starting 16.50 hrs.

Some of the delegates will be dropped at the WCW center at the end of their afternoon excursion.

Buses will leave the WCW ground starting 21.00 hrs and take delegates to the nearest public transportation stops.



Concert at AMOLF

photo: Hans Alberda

SARA: ACADEMIC COMPUTING SERVICES AMSTERDAM

SARA is the computing centre founded by the Centre for Mathematics and Computer Science and the two Amsterdam universities (the Free University and the University of Amsterdam). For these three founding members SARA manages and administers a series of computers with hundreds of software packages and a terminal network of over a thousand units. Our services for users include computer courses, computer documentation in the Dutch language and counselling, all on subjects ranging from micro computer usage to optimizing code for supercomputers. The networking possibilities at SARA are excellent: an extensive number of network gateways enable our users to contact virtually every other academic computer user in the world.

Recently SARA has become part of IBM's "European Academic Supercomputer Initiative" (EASI), a network of eighteen European centres of expertise in supercomputing, cooperating with IBM in the development of applications for very large computer systems.



Control room at SARA

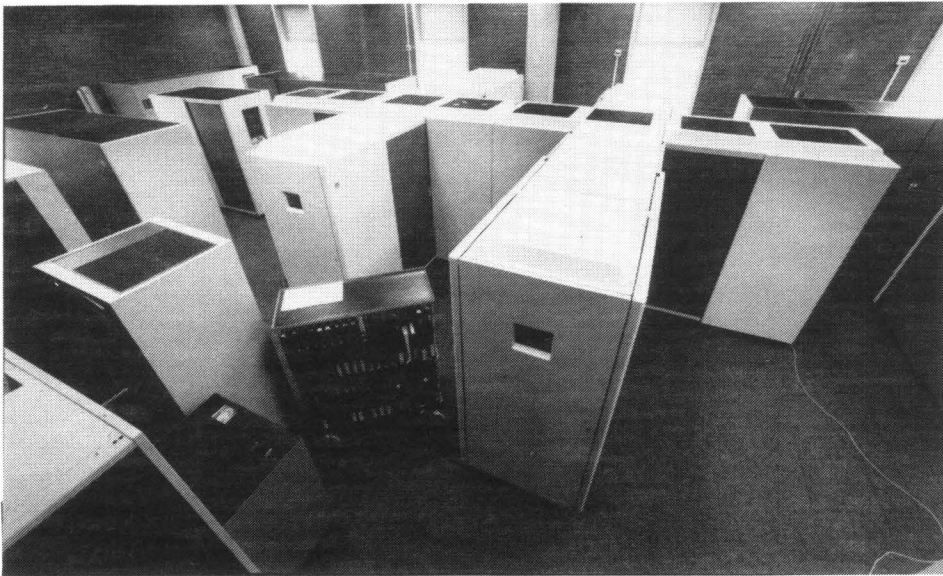
photo: Bram de Hollander

Guided tour

A tour of SARA shows you the climatized areas with the main computers and data control units. Among others there is an IBM 3090/600J-6VF (currently IBM's largest model on offer), a Cyber 995E and a Cyber 205 (five years ago one of the largest supercomputers, now on the verge of being replaced by a new top of the line model). You will observe the control room where the operators are monitoring computer performance or handling tape requests and where many thousands of tape reels are kept in a heavily protected safe. In the basement of the building you can inspect the impressive cooling machinery necessary for keeping the computers in operating condition.

Computer demonstrations

Before and after the guided tour there will be plenty of opportunity for trying our computers. In our terminal room you will find a large choice in (micro) computer applications, such as word processing (mail merge), data processing, desk top publishing, statistical analysis and electronic mail. Any questions you might have will be answered by our experts. But perhaps you would prefer watching to working. In that case, why not try the comfortable chairs that go with our video setup, and let yourself be informed on some aspects of advanced supercomputing.



IBM 3090/600 J-6VF

photo: Bram de Hollander

CWI: CENTRE FOR MATHEMATICS AND COMPUTER SCIENCE

Image analysis

Satellites, airplanes, scanners, video cameras, radar equipment, and microscopes gather and send information in the form of images. A digital image is a computer-recorded image, that has been divided in a very fine grid of separate points. The digital image is made up out of a tremendous amount of numbers, reflecting the brightness or the colour of every single point on the grid.

Even for supercomputers, displaying and manipulating these images is very difficult. Even more difficult is the interpretation of digital images, for the geometry of the displayed objects has to be taken into account as well. Contributions from both mathematics and computer science are required for the effective tackling of these problems. These contributions range from computer graphics to geometry, mathematical analysis and mathematical statistics. This evening's presentation will be primarily concerned with the use of mathematical statistics in image analysis.

Computer algebra software

In computer algebra keyboard and pencil replace the traditional pencil and paper in doing mathematics. Computer algebra software allows its user to compute with mathematical objects like polynomials, powerseries, equations and other formulas. Many mathematical operations, e.g. differentiation and integration of functions or solving differential equations, can be carried out quickly, with emphasis on exactness of results, and without much human effort. Computer algebra software is a powerful tool in the hands of mathematicians, physicists and engineers. Examples of the use of computer algebra software in physics will be shown by a member of the Foundation Computer Algebra Nederland (CAN). Information about this foundation, which stimulates and coordinates the use of computer algebra in research and education, and its coordination centre called the CAN Expertise Centre will be available.

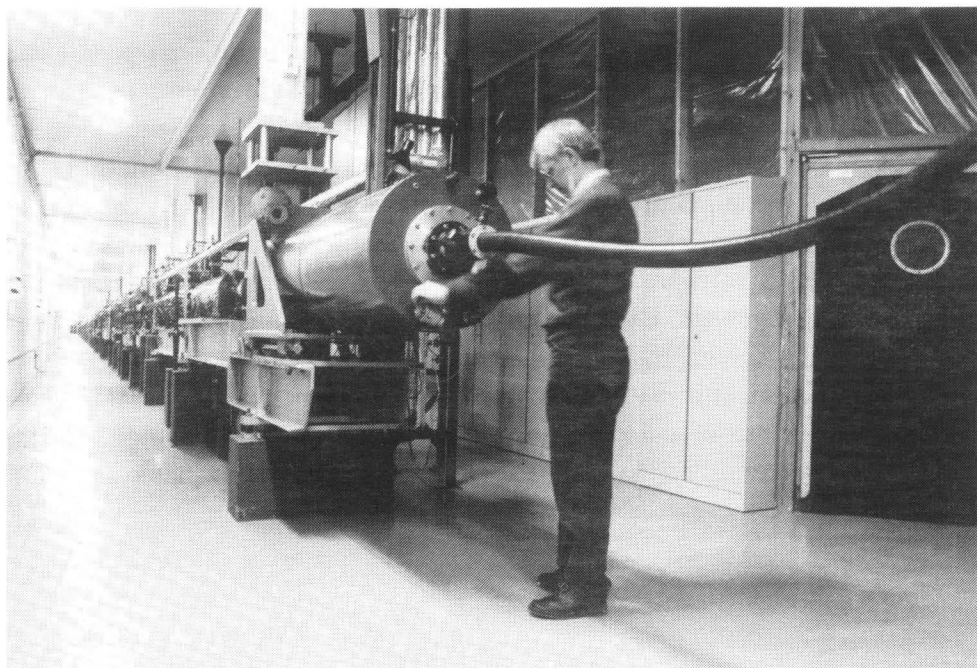
NIKHEF WITH CERN AND DESY EXHIBITIONS

At NIKHEF many aspects of its research programme will be shown. Scientists and technicians will be present to explain their work, which differs from computer analyses of the data to the theoretical background of the performed and proposed experiments.

A highly skilled and experienced staff of technicians is specialized in electronics, mechanical design and construction, and computer science. The departments where various types of detectors are being designed and constructed can be visited.

There are some special topics to be seen at NIKHEF. For the first time in ten years the CERN exhibition from Geneva can be visited at the Mechanical Department of NIKHEF. Adjacent to this exhibition there will be a small exposition of the lay-out and research at DESY (Hamburg).

Finally NIKHEF's own twohundred meter long electron accelerator MEA with its control room and experimental hall can be visited.



The 200 m electron accelerator MEA

NIKHEF: DUTCH NATIONAL INSTITUTE FOR NUCLEAR PHYSICS AND HIGH-ENERGY PHYSICS RESEARCH

NIKHEF

The research programme of NIKHEF is focused on the study of atomic nuclei and elementary particles. For the study of atomic nuclei the electron accelerator MEA at NIKHEF is used by the scientists; for the study of elementary particles the accelerators at CERN in Geneva and at DESY in Hamburg are used.

NIKHEF-K

The NIKHEF Medium Energy Accelerator (MEA) provides electrons with an energy of up to 600 MeV (Million electron-Volts). The electrons scatter off atomic nuclei in a target material and may cause the nuclei to break up into fragments. Magnetic spectrometers measure accurately the momentum of the scattered electron and of the nuclear fragments. From these measurements, the microscopic structure of nuclei can be reconstructed and compared with theoretical models. The accelerator and spectrometers constitute a gigantic electron microscope with a very high precision and revolving power.

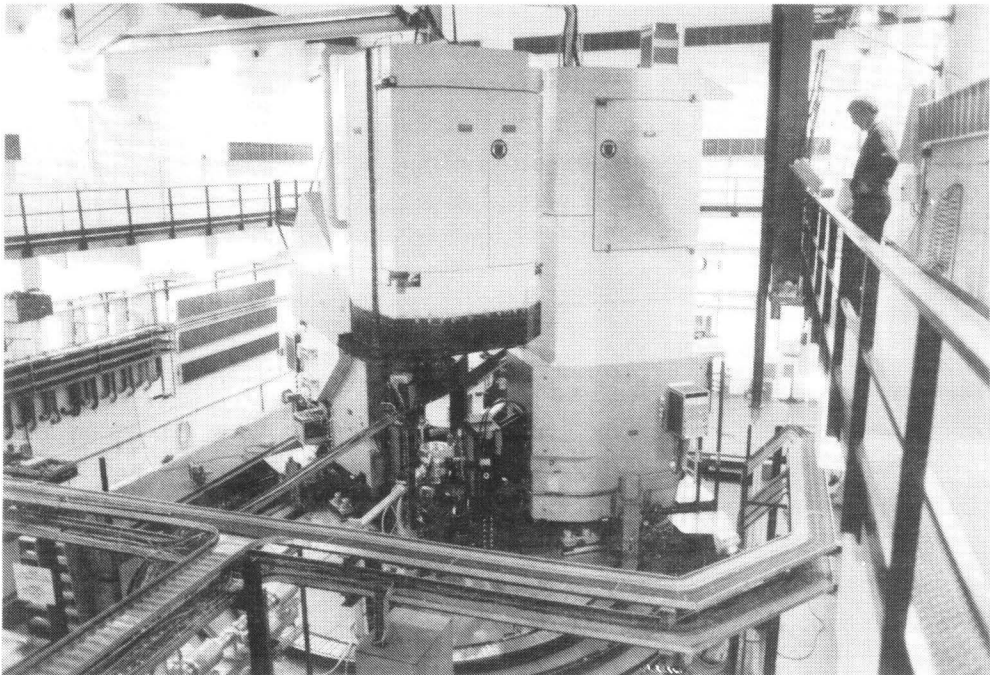
The distribution of the scattered electrons as measured by the detectors allows the accurate determination of the sizes and shapes of atomic nuclei. By simultaneously measuring the scattered electron and the fragments emerging from the collision, it is possible to determine the detailed structure of atomic nuclei. The full exploitation of these experiments is hampered by the discontinuity of the MEA beam: it arrives in short bursts. A project, AmPS (Amsterdam Pulse Stretcher) is underway to produce a continuous electron beam.

NIKHEF-H

Much larger accelerators are used to study in detail the properties of what physicists consider to be the basic constituents of matter: the quarks which comprise e.g. the proton and the neutron, and the leptons, of which the electron is the best known example. NIKHEF scientists participate in experiments at the European research centre CERN in Geneva. In one of the CERN accelerators, the SPS collider, protons, each consisting of three quarks, collide head-on with the anti-particles, the antiprotons which consist of three antiquarks. The total energy in the collision is 600,000 MeV.

A new collider, LEP (Large Electron Positron collider), began operation at CERN in July 1989; it has been under construction since 1982. In a tunnel with 27 km circumference, electrons collide with their antiparticles, the positrons. Another new collider, HERA (Hadron Electron Ring Accelerator), is under construction at the accelerator laboratory DESY in Hamburg. In the HERA collider electrons and positrons are to collide head-on with protons. NIKHEF takes part in the construction of detectors for the HERA collider at the research centre DESY in Hamburg. The 1000 magnets of the proton ring will be superconducting.

Dutch industry has, in cooperation with NIKHEF, produced some of the superconducting magnets. NIKHEF has also constructed many detector components for two LEP detectors, e.g. various types of wire chambers.



Two 250 ton heavy detectors

FWI: EXAMPLES OF RESEARCH AT THE FACULTY OF MATHEMATICS AND COMPUTER SCIENCE, DEPARTMENT OF COMPUTER SYSTEMS

Simulation of sounds and images

Computer science not only offers tools to tackle technical and administrative problems. In this demonstration we show how it also offers new possibilities for artistic expression using a combination of images and sounds.

Image processing

Image processing is an important area of computer science. In our department image processing is studied for various applications, including robot sensing. We partake in the development of a powerful image processing package that can be used both for interactive image processing as used as a tool in many sciences, and as a prototyping tool for stand-alone image processing applications.

Simulation of various robotic systems

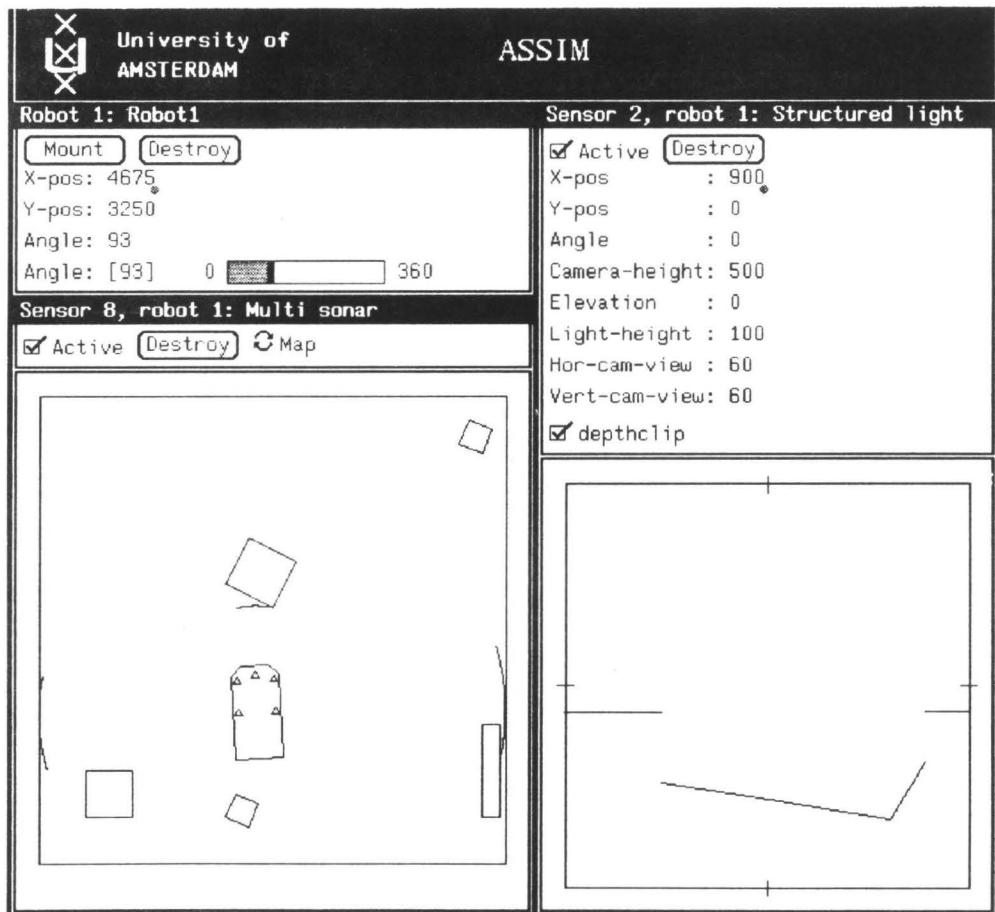
Robot control programs can advantageously be developed initially on simulated systems. At our department we have developed various such programs both for stationary robot arms and mobile robots. They can be used to study the kinematics and dynamics of such systems as well as the interaction with the environment through the sensory systems of the robot.

Modelling biological objects with fractal techniques

Many objects in nature, in contrast with man-made objects, show a high degree of irregularity, non-smoothness and fragmentation. These objects cannot easily be described with traditional modelling techniques using spheres, lines, circles etc. Fractals have been applied widely in computer graphics for generating objects with a resemblance to biological objects. Especially fractal models where the generation procedure is based on the actual growth process, might be very useful for biological research. The topic of this presentation will be how fractal modelling techniques can be applied to simulate the growth process of organisms, demonstrating a relatively simple growth process, such as that of sponges and corals.

The representation of large amounts of data

Experiments and simulations, such as used e.g. in physics, can generate huge amounts of complex data. If the user is to extract useful information from these data, he must be able to present them in a meaningful manner. To make such presentation techniques easily accessible, standardization of both data structures (HDF-format) and user environment (X under UNIX) is essential. Three applications demonstrating these aspects of data processing will be presented.



ASSIM, a program simulating sensor data for a robot cart

WCW WETENSCHAPPELIJK CENTRUM WATERGRAAFSMEER. AMSTERDAM



Met welke lijn/Connections

Centraalstation tram 9
 Station Sloterdijk tram 14
 Stations RAI, Amstel en Muiderpoort bus 8