EMS Studio Report
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ABSTRACT: EMS is the main open Studio in Sweden and the working place for many of the Swedish composers of electroacoustic music. The activities at EMS can be broadly categorized into different areas: (1) composition, (2) research and development, (3) teaching, and (4) general promotion of electroacoustic music. In this paper, the current profile of activities is described, putting emphasis on those related to research. Further, new and recent acquisitions are mentioned. As EMS is in a period of transition, the directions for the future are also briefly sketched.

Introduction
EMS is mainly an open working place for composers of electroacoustic music. Most of the activities going on at EMS are under taken by composers visiting EMS or having EMS as their regular working place. The staff conduct their own projects or participate in other projects only to a lesser extent.

Facilities
The Studio has five studios of differing profiles, a small recording room, six terminal rooms and a machine room (apart from offices, etc.). The main studio, Studio 1, is equipped with a MCI 24-track recorder, and three MCI stereo recorders connected to a MCI mixing console, which is surrounded by lots of sound generating and processing equipment.

The computer facilities consist of a VAX 11/750 with attached array processor, and a number of small computers, Macintoshes and Ataris. The VAX is accessible both from the studios and the terminal rooms.

Compositional activities
Composition is one of the main activities at EMS. EMS is open both to Swedish and foreign composers, and, in addition, some of the studios are also to amateurs.

Over the last three years an average of 67 composers have been working at EMS each year. Ten of these have been foreign, 26 have been Swedish amateurs and 31 professionals.

Among recent compositions one can mention Keith Krumhansl's Interrupted Dances for tape, Lars-Gunnar Bodin's Dissonance III for tape, Vladimir Kostak's Asphodele for tape, Park Lans's Low Motion for tape and tape+video, Julien Mignot's C'est moi — ça va? for tape, Paul Pignolet's multimedia piece NachtLicht, Jon-Olof Hellström's Flugan II for tape, Åke Börjesson's Krippa med borta och i mörk for tape, Anders Blomqvist's Acrobat 0.1 for voice and tape and Acrobat 0.2 for slides and tape, and Jon Ch. Nelson's Six Etudes Brèves for cello and tape.

The compositional projects are often directed related to developmental projects and many compositions are created partly or wholly using software or equipment constructed at EMS.

Research and development
A number of projects on different scales are undertaken at EMS. The main areas are DSP, sound synthesis and programming languages for music.

Paul Pignolet is working on several related projects concerned with sound processing on a large scale. The SW package enables Fourier transforms and convolution of "unlimited" size to be performed. The FPM program allows the user to carry out time-varying pitch shifting and time-dilation on any sound in arbitrary combinations. RUNCON is a program which performs a running convolution between any two soundsfiles with arbitrary time-varying rate of advance and window size in both the files. SRCT is a

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Tanaz Ungvary is conducting projects based on the communicative aspects of dance and music viewed as abstract movement structures. This concept is applied to computerized support of dance notation and animation; computer aided composition; auditive sonologic analysis, and sonograms. These projects are carried out by the KACOR group in collaboration with several other institutions, both Swedish and international.

Peter Lundin is working on one project on granular synthesis, and another dealing with composition on a higher level. His CPL, Composer’s Programming Language, is an object-oriented shell on top of Lisp.

A combined hardware/software project is related to the newly acquired Studer Daxis system (see below). It has as its goal to develop the hardware and software needed to let the VAX system and the Daxis system to be used together in a convenient way.

Teaching and general promotion

A few shorter courses are given at EMS in cooperation with the Institute for Extra-Mural Studies at the University of Stockholm. These courses are given in Swedish and are mainly directed towards beginners and people with limited experience.

An advanced one-year course is given every second year aimed at those who wish to work seriously with electroacoustic music.

The staff at EMS is involved in the organisation of several festivals for electroacoustic music in Sweden. The two main festivals are the Skönskauteberg-Ölandshof Festival in early June, and the Stockholm Electronic Music Festival in late September each year.

New equipment

During the last year several important additions has been made to EMS' equipment. One more studio was put into operation in October 1989. This studio is an Aarset-based MIDI-studio of semi-professional kind primarily intended for EMS’ education. Its heart is a Soundcraft 6000 console, with an attached MCI 8-track tape recorder and two Studer B67 stereo recorders.

A Studer Daxis harddisk recorder system with a Macintosh IIci computer and Sony DAT recorder has been obtained to make work conveniently within the digital domain possible.

A Macintosh IIx computer is the latest addition. It is intended as a machine for program development and as a target machine for software period from the older VAX system.

Directions for the future

EMS is currently undergoing rapid change both as regards its equipment and the profile of its activities.

The old main computer systems are being abandoned in favour for small work stations. This will be pursued in the years to come and a network will be set up. As most Swedish composers have Macintosh computers at home the computer will have a strong position at EMS. In addition, NeXT and Sun work stations are on top of the "wants list".

Digital sound equipment will be favoured, as software development efforts directed towards DSP.

Contacts are beginning to be built up with universities, conservatories, technical institutes and research institutes in the region.

Courses of more advanced contents are on their way. Also, courses with international audience are planned.

New collaborative software projects are planned with conservatories and electroacoustic music studios in the Nordic countries.

EMS will be the host for the First Nordic Computer Music Festival, to be held in August/September 1991.

The immediate future thus holds many new things in store.

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