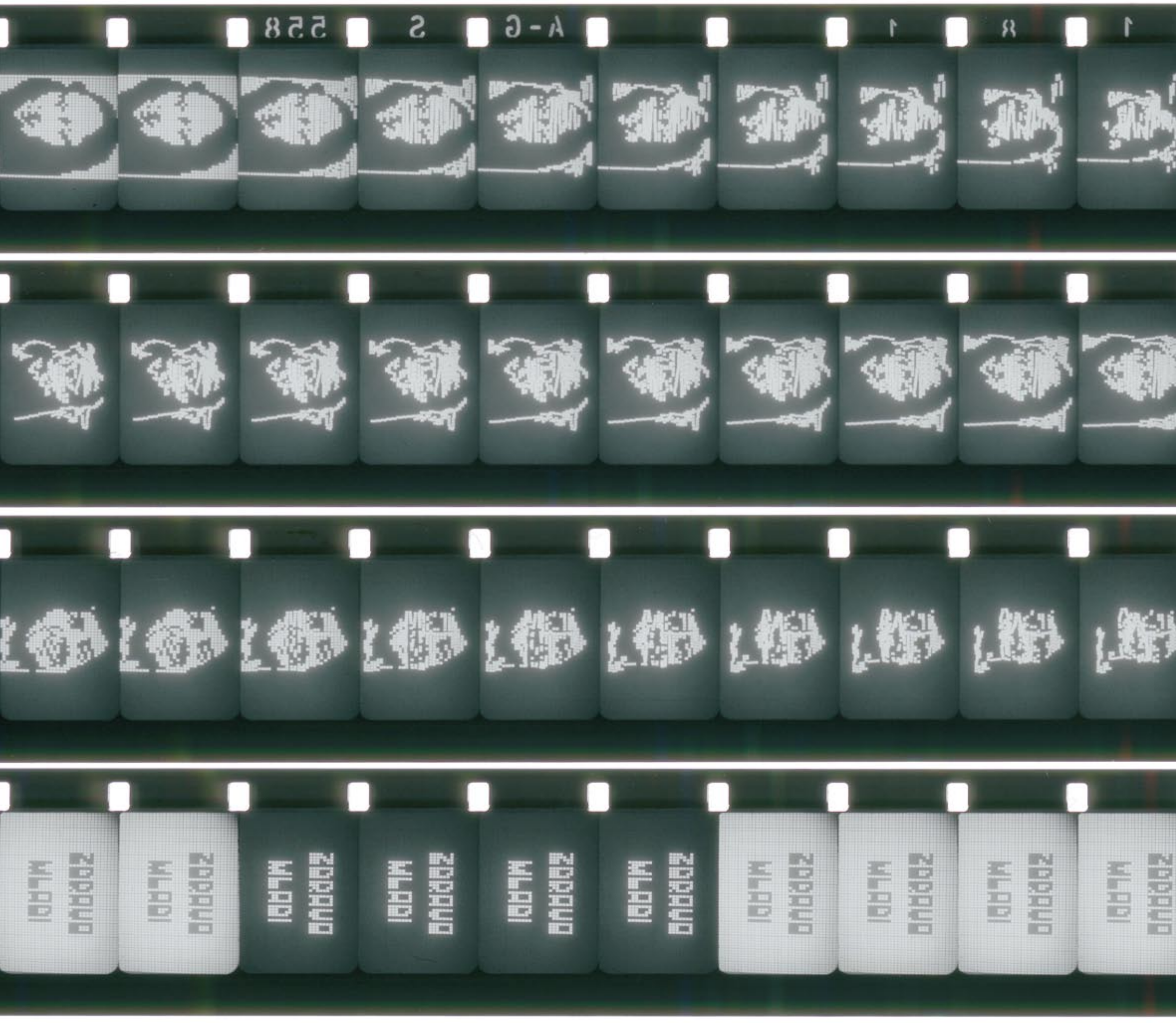

Tomislav Mikulić - COMPUTER ANIMATION 1972 - 1980

VECTOR GRAPHICS - 16MM FILM - TEKTRONIX 4012 - MMC ZAGREB

Tomislav Mikulić

COMPUTER ANIMATION 1972 - 1980

VECTOR GRAPHICS - 16MM FILM - TEKTRONIX 4012 - MMC ZAGREB

A compilation of the artist's work
made with an HP 2000F computer and a Tektronix 4012 graphics terminal
at Multimedia Centre (MMC) at University of Zagreb in Croatia.

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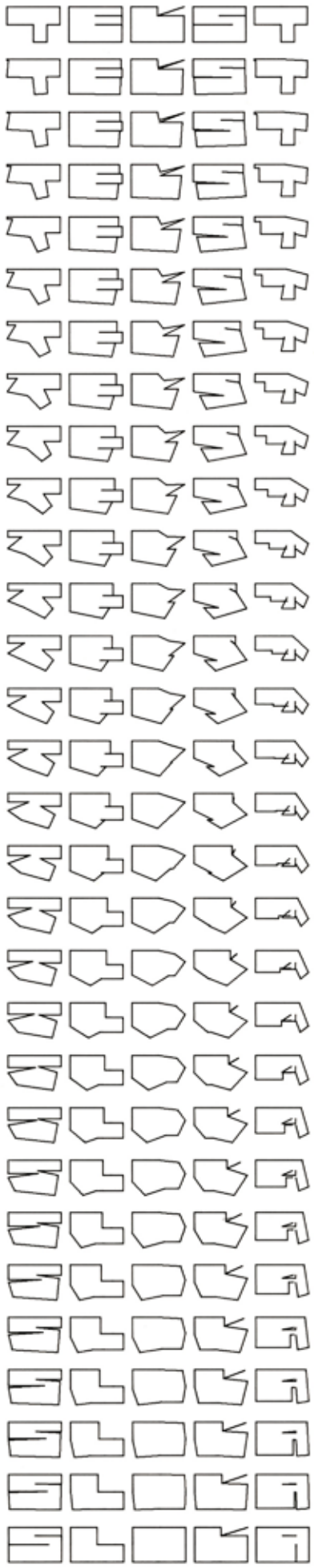
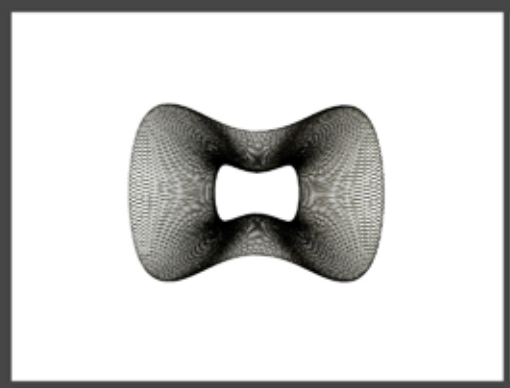
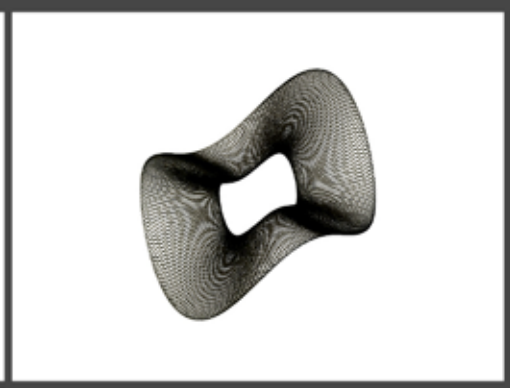
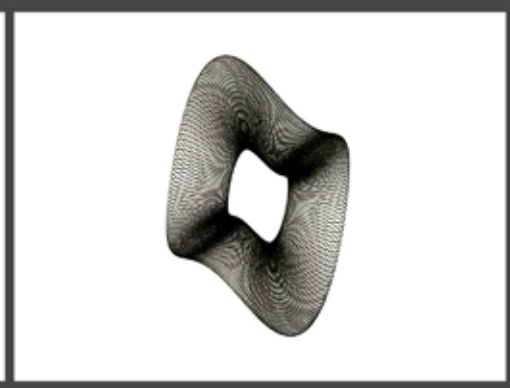
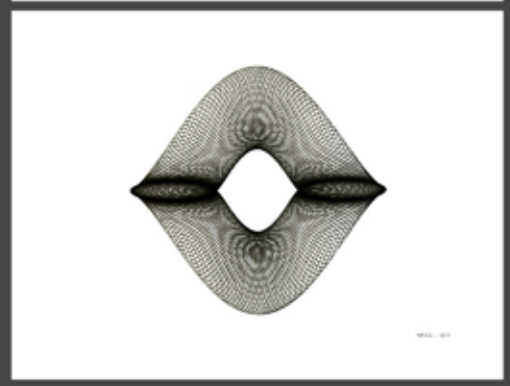








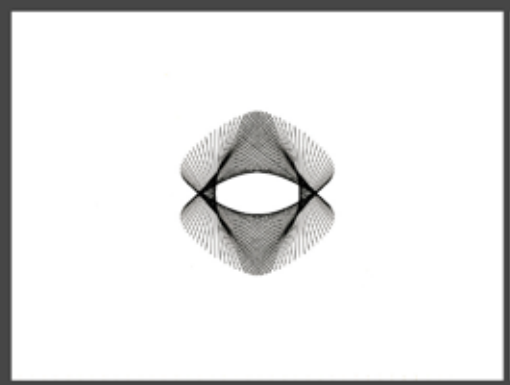


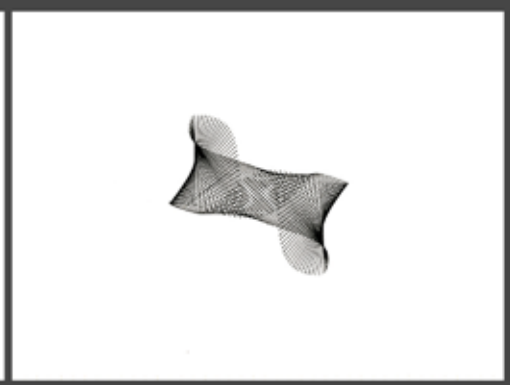
ROTACIJA
Rotation

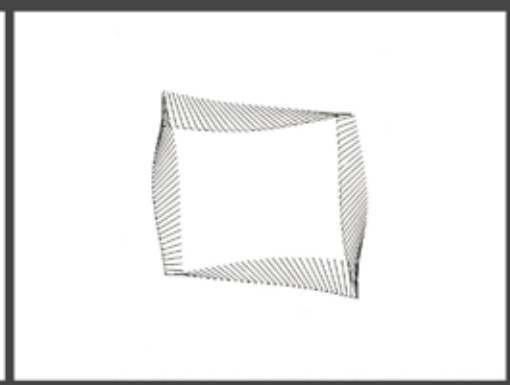
1973, 7 iterations
1948 x 308 mm
Black ink on paper

MORPHING 2
Morphing 2

1973, 8 iterations
1980 x 308 mm
Black ink on paper

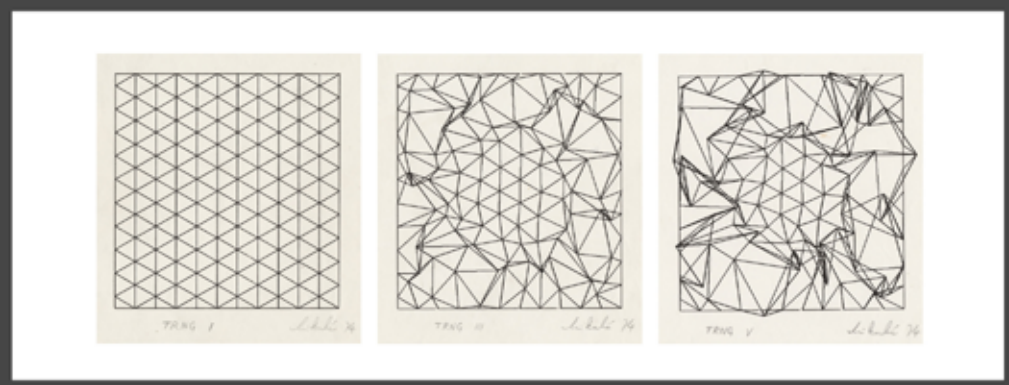


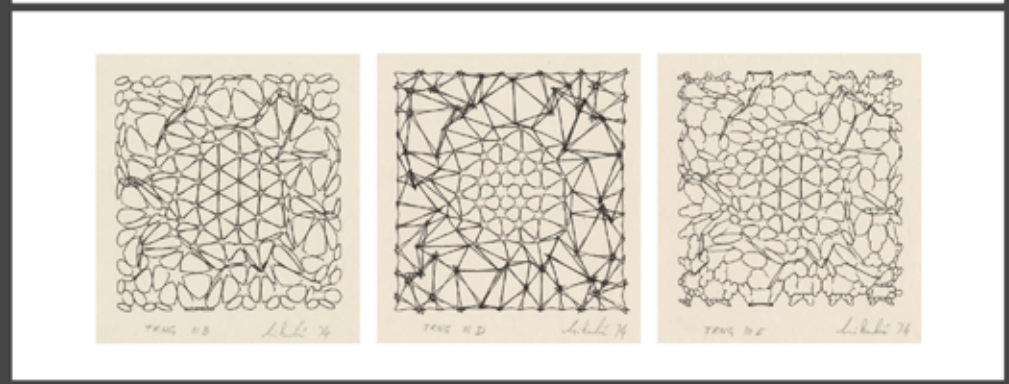




TRNG
Multilayered animation

1974, 10 keyframes
180 x 200 mm (10x)
Black ink on paper





TEKST-SLIKA
Text - Picture (Morphing)

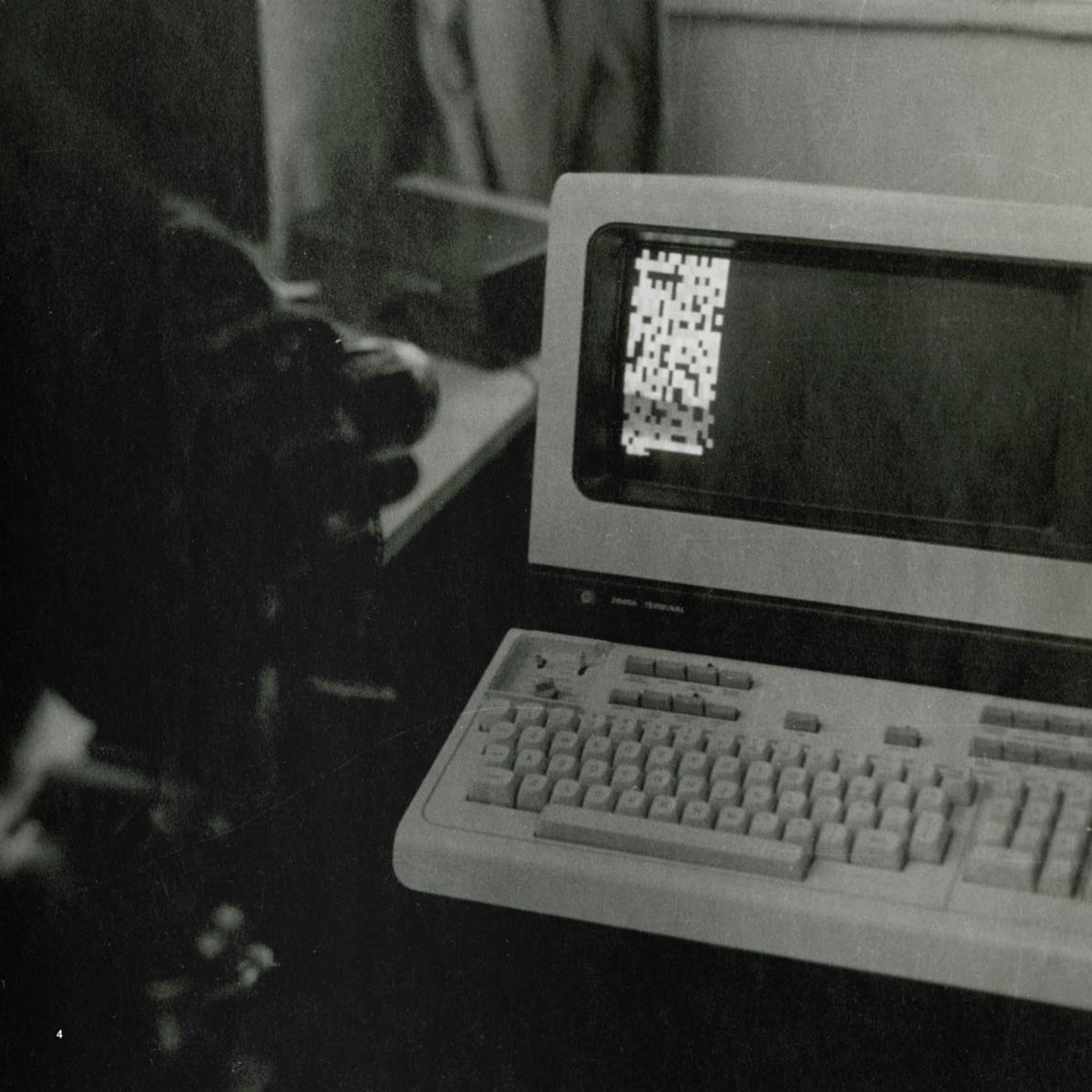
1973, 30 iterations
308 x 990 mm
Black ink on paper

Many of the early plotter drawings show an obvious concept of animation.

The "TRNG" set of drawings is an example of a rather complex multilayered animation. Each of the three shown layers is animated separately by a different algorithm while being affected by the animation of the layer on which it is placed. The resulting effect is equivalent to the motion of an animated blooming flower, which comes out from a twisting vine, which comes out from a growing branch of a tree.

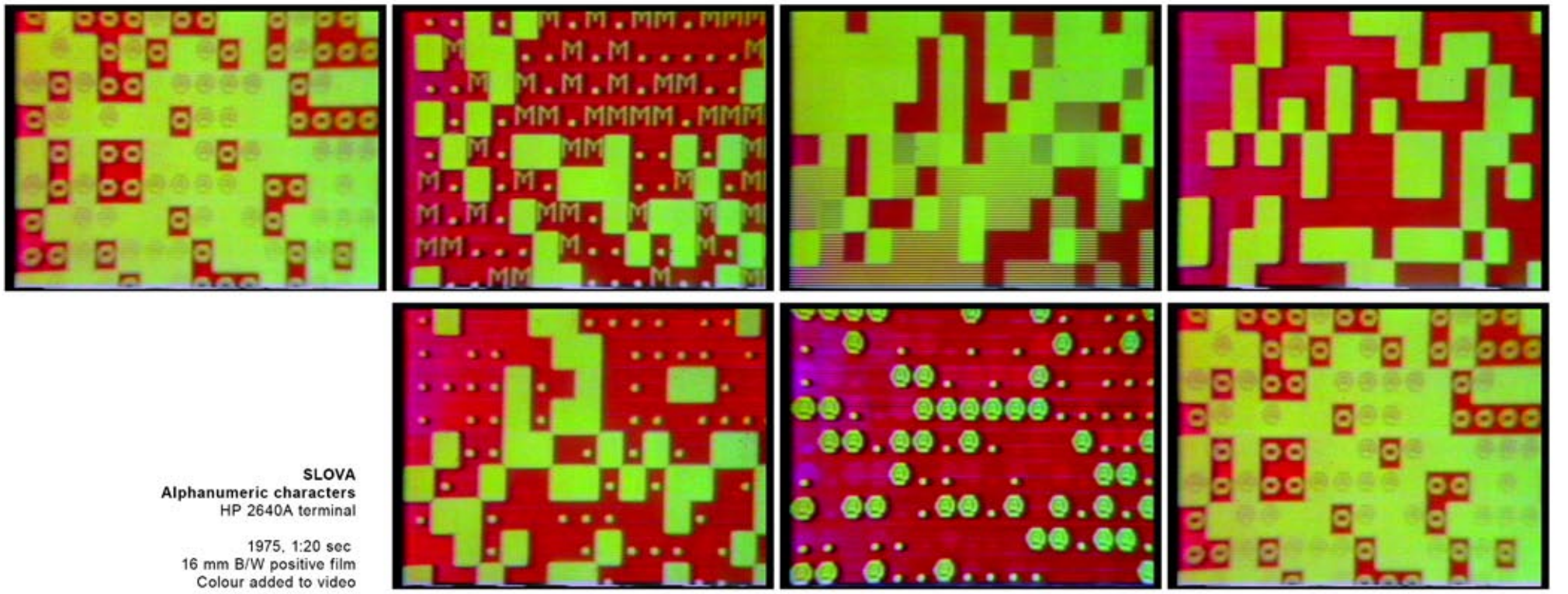
U puno crteža plotterom, čak i u onim najranijim, jasno se vidi koncept animacije.

Niz crteža "TRNG" je primjer prilično složene višeslojne animacije. Svaki pojedini sloj koji vidimo je animiran samostalno sa svojim algoritmom dok se istovremeno miče pod utjecajem animacije sloja na koji je postavljen.
Konačan efekt bi se mogao opisati kao npr. zbrojeni pokret animiranog cvijeta koji se otvara na vitici koja se savija dolazeći iz grančice koja raste.



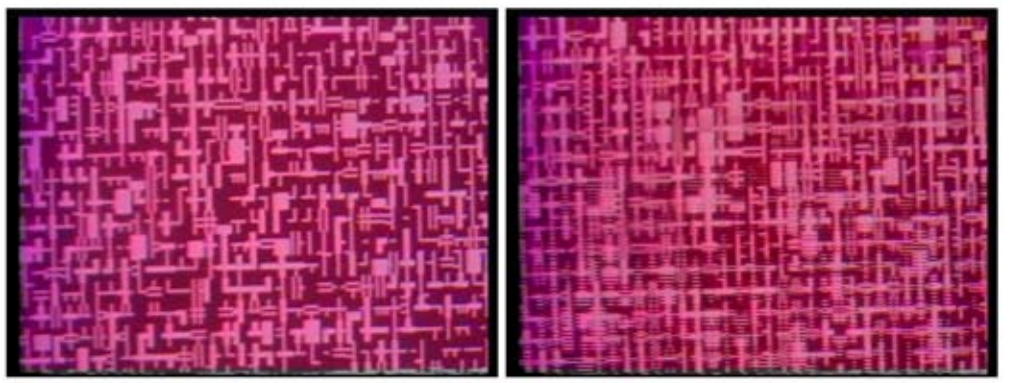
POVRATNI VIDEO
Video feedback
Video effect, used with animation

1976, 9:18 sec
B/W video, 3/4" U-matic



SLOVA
Alphanumeric characters
HP 2640A terminal

1975, 1:20 sec
16 mm B/W positive film
Colour added to video



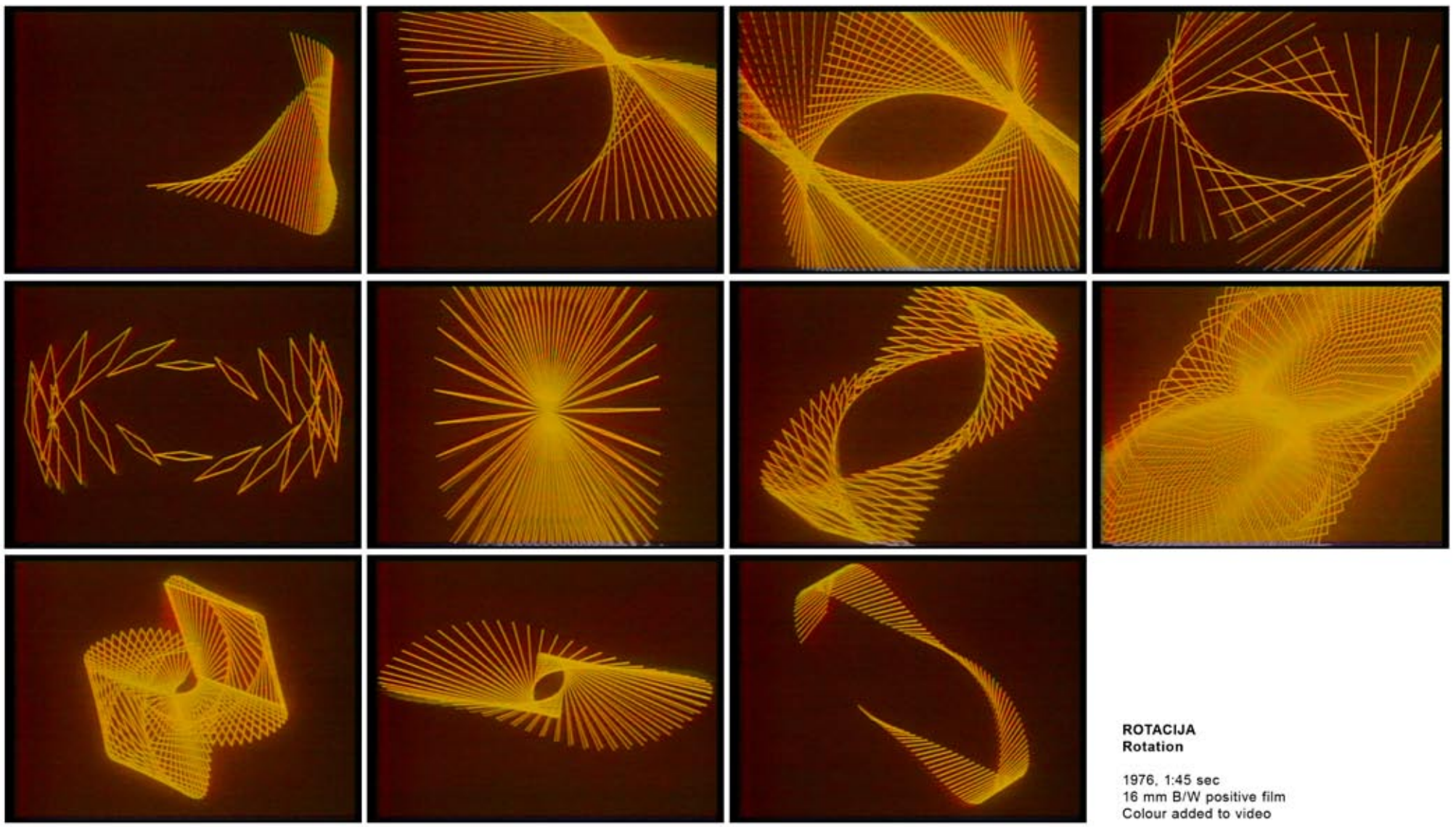
GRAFIČKI ZNAKOVI
Graphic characters
New feature on HP 2640A terminal

1975, 39 sec
16 mm B/W positive film
Colour added to video

END

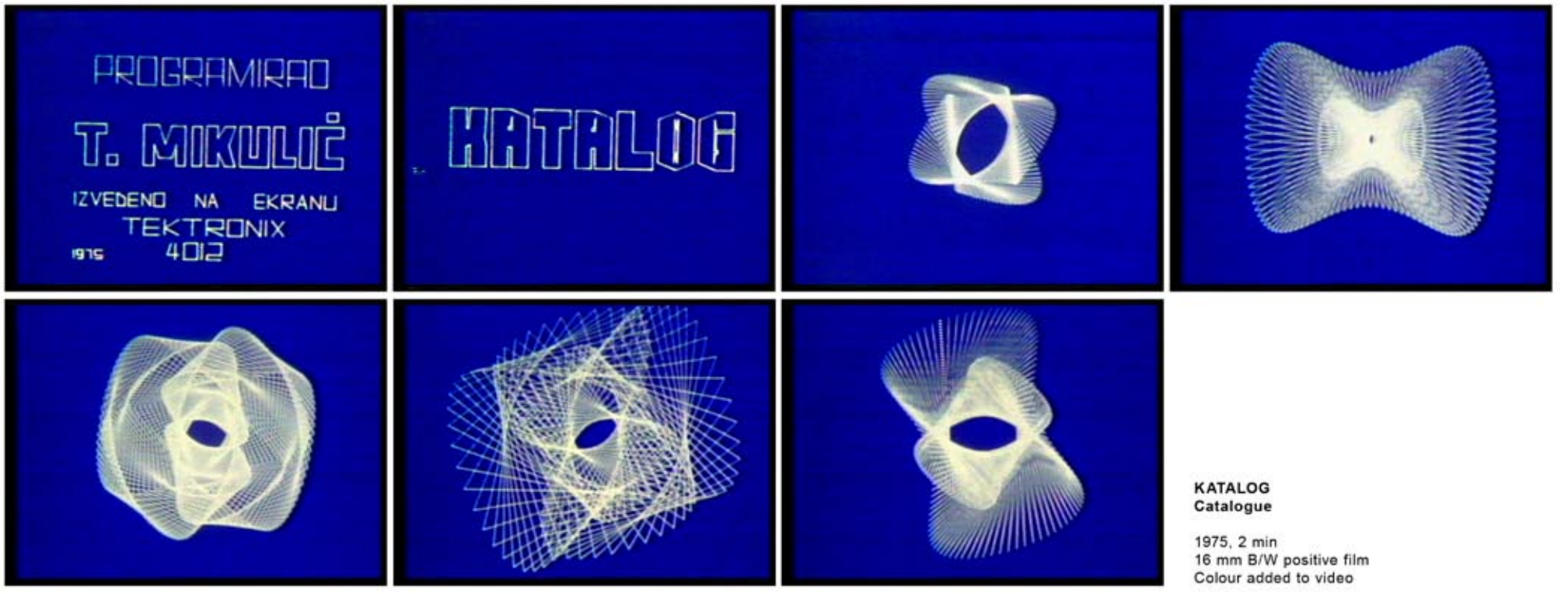
TV RAZGOVOR
TV Interview
About making a computer animated film.

1976, 1:55 sec
16 mm B/W positive film



ROTACIJA
Rotation

1976, 1:45 sec
16 mm B/W positive film
Colour added to video

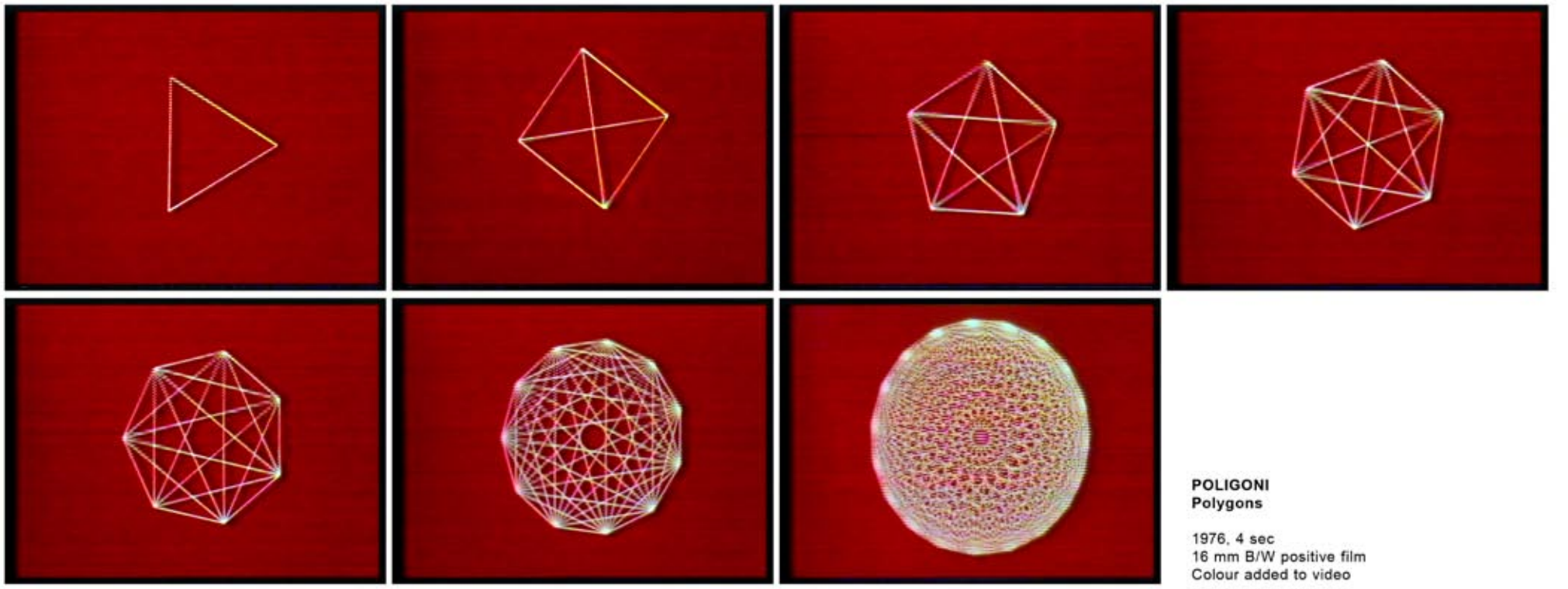


KATALOG
Catalogue

1975, 2 min
16 mm B/W positive film
Colour added to video

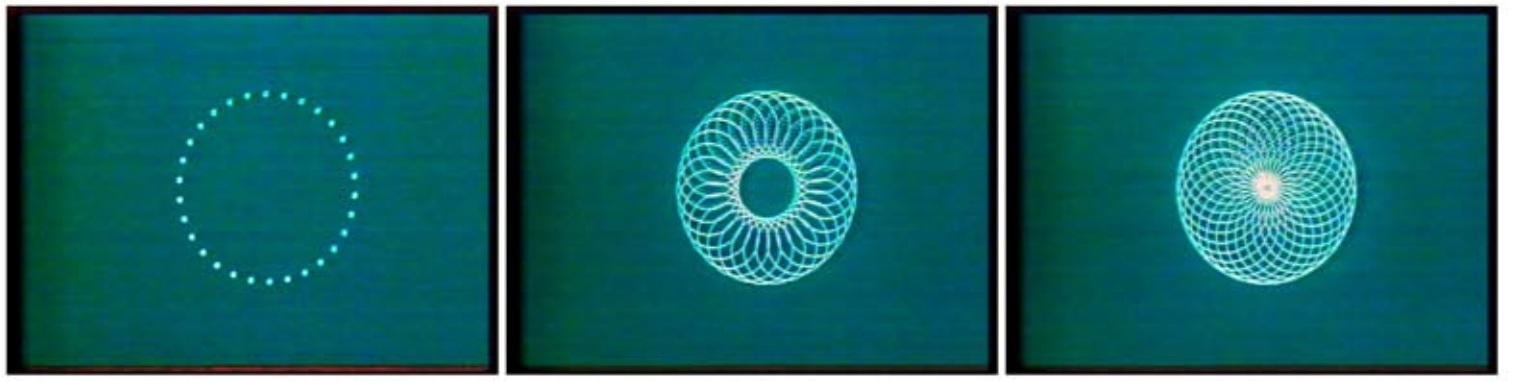
ŠPICA PRVE ZBIRKE
Opener - First Compilation
Morphing

1976, 21 sec
16 mm B/W positive film
Colour added to video



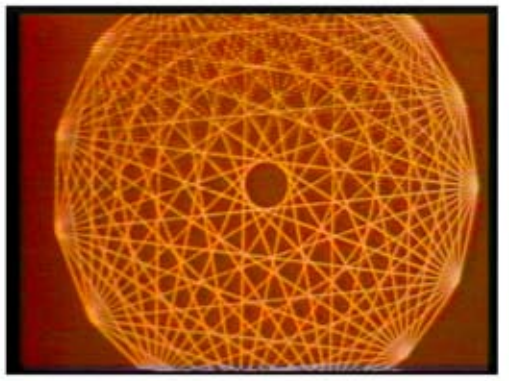
POLIGONI
Polygons

1976, 4 sec
16 mm B/W positive film
Colour added to video



30 KRUŽNICA
30 Circles

1976, 7 sec
16 mm B/W positive film
Colour added to video

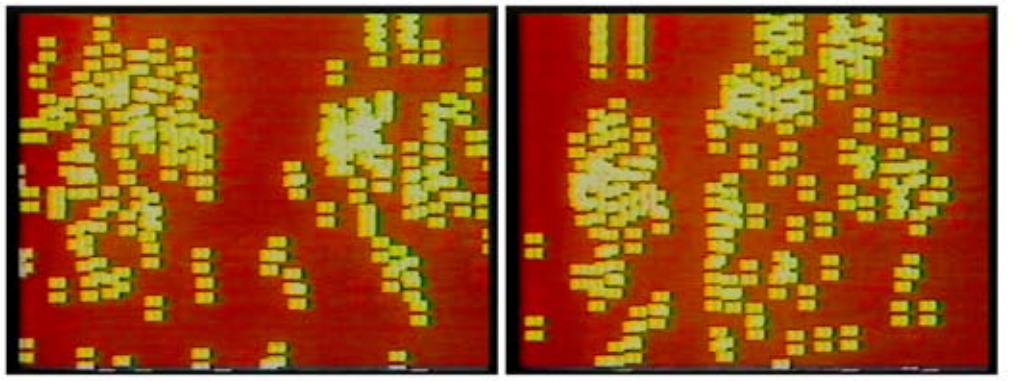


PROBA BRZINE OKRETANJA
Rotation speed test
Pentadecagon (15 vertices)

1976, 5 sec, 16 mm B/W positive film
Colour added to video

VRTNJA SLOVA
Alphanumeric characters spinning
Tektronix 4012 terminal

1976, 33 sec
16 mm B/W positive film
Colour added to video



RANDOM
First computer animated film (CGI) made in Croatia.

1976, 2:14 sec
16 mm film, 4 colours (optical printer)

PRVA SAMOSTALNA IZLOŽBA
First one-man exhibition

Public projection of "RANDOM" the first computer animated film made in South Europe.

13th May 1976, Nova Gallery in Zagreb
Plotter drawings, silkscreen prints and multimedia projection on the walls and ceiling with two 16 mm film projectors and 6 audio-synchronized 35 mm slide projectors.

(Ljerka Šibenik, Julije Knifer, Marijan Susovski, Tomislav Mikulić, Mladen Galić, Marijan Draganić [Studio], Slavomir Drinković, Nina Ivančević, Damir Sokić, Tomislav Raić, Mladen Kmetić, Đorđe Janjatović, Nada Žiljak r. Kinert, Ivan Doroghy, Danilo Dučak, Josip Brkić [Oko], Vilko Žiljak and Zdravko Drvar among others.)

MOŽETE LI OVAKO ČITATI?
Can you read in this way?
Morphing

1976, 50 sec
16 mm B/W positive film
Colour added to video

FILMETAK
The "Filmeau"
"Tom's poemeau to display, weird words in morphing way"

1976, 2:04 sec
16 mm B/W positive film
Colour added to video

MIKULIĆ SROČITI
PROGRAMETAK ANIMIRATI
PETEK OFILMITI
FILMETAK NASLOVITI

POČETAK ZAMISLITI
BURETAK POCUGATI
PALJETAK OTPJEVATI
VRAGOLJAK POŠKAKLJATI
BATAK ZASLINITI
ŽVALJETAK ZAPJENITI
KRAMPUSETAK CEREKATI
PAKLENJAK OTPRITI
CURETAK ZADOVOLJITI
TERETAK VOLJETI

ZNOJETAK PRIUŠTITI
KONKRETAK PRIONUTI
MISLENJAK ZAPOSLITI
SAŽETAK SLOŽITI
KOČETAK PRESKOČITI
SERETAK ODBACITI
SEPETAK NAPUNITI
VODETAK PUSTITI
LEDENJAK PRETVORITI
ŽARETAK SMRZNUTI
ČEZNUTAK NE DOBITI
SEBENJAK PODIJELITI
OSTATAK POTROŠITI
SUTRAK NE MISLITI
DANAK PLATITI

ČETVRTAK USHITITI
PETAK NE POZNATI
NULETAK POSTATI
PROSTAK SLOVITI
UŽITAK ZNATI
IPAK NE ZALUTATI
NEKAK USPJETI
POŠTENJAK BITI
SUMNJETAK SPRATI
ČOVJEK TVRDITI
I TAK SRATI
BEDAK OSTATI
SVRŠETAK NAPRAVITI

30th Anniversary of the First Computer-Animated Film in Croatia
1976. - 2006.

One evening thirty years ago a fair number of artists, art critics, students, journalists, acquaintances, relatives and other interested people came to the Nova Gallery for the opening of my first independent exhibition. Along with computer graphics and drawings, I had arranged a screening of my first computer-animated films. The screening was a short one, and when the lights came up again there was lively discussion of this unusual event. Everyone experienced it and commented on it differently, yet no one took notice of the fact that we had all just witnessed a historic first step in this country, one with which the development of that marvelous illusion, computer animation, had begun.

Today it makes us smile when we compare the first computer animations with those we see every day on our screens – just as if we were to compare the first flying machines with today's jets. The difference between the machines and technology we had then and what we have now might seem grotesquely large to the new generation of animators. Yet certain details seem especially valuable when viewed from today's perspective, from a great distance in time. Only now do we know that "morphing" and "differential frame update" became commercially viable, and popular, only twenty years later.

In order to transfer an image from the computers of that time onto film, an endless amount of technical obstacles had to be overcome. Back then vector graphics were used, rather than today's raster graphics. This meant that the data composing an image were not part of that image, but rather a kind of instruction to the machine on how to build it. Without a terminal to interpret the numbers and draw the picture on the screen, these data could not otherwise be transformed into an image. The screen could not reproduce colors, as it was made only of green phosphorous. This represented an additional problem, as black-and-white film is least sensitive to precisely this color. And there was no simple way of extending single frame exposure time in a film camera outside the studio. Nonetheless, we succeeded in obtaining a usable image which was subsequently treated in the laboratory. By producing high-contrast copies on an optical printer, we tried to color the black-and-white images using filters and masking, but this led to the loss of fine detail. Only coloring with the use of video technology gave us substantially better results.

At that time there were no computer drawing or animation programs. Anything I wanted to draw or animate I had to program myself. At first these were just the simplest figures, squares and circles. But in order to bring them to life, complicated mathematical functions had to be used. As the ideas came to involve more and more intricate movements, programming became the most extensive part of the job, but also the most rewarding. With great impatience I waited for the film to arrive from the laboratory, and could only view my animation several days or even weeks later.

After only five or six years this technology had become outdated, due to the arrival of personal computers. The new generation of computers completely transformed animation. The camera was no longer used, since it could only film off the video screen, and this was unusable due to flickering and lack of sharpness. There were still no readymade programs, and each animation required lots of programming.

But computers were developing ever more rapidly, readymade programs eventually began to appear, and the technical limitations became smaller and smaller. The evolution of computer technology is constantly accelerating, and today we see to what great extent technical improvements can open the door to new visions and effects which were once inconceivable.

I am grateful to the organizers of this year's festival (2006) for making possible this short trip back through time, into the history of the origins of this whole process in our country. And I am proud to be the one who bears the blame for it in this part of Europe, in my city of Zagreb.

Tomislav Mikulić, BFA
Painter and graphic artist

Translated by Timothy Steyskal

www.tomislavmikulic.com tom@tomislavmikulic.com

30. obljetnica prvog kompjuterskog animiranog filma u Hrvatskoj
1976. - 2006.

Jedne se večeri prije 30 godina okupio priličan broj umjetnika, likovnih kritičara, studenata, novinara, znanaca, rodbine i drugih znatiželjnih ljudi u galeriji "Nova" na otvorenju moje prve samostalne izložbe. Uz kompjuterske grafike i crteže priredio sam projekciju mojih prvih kompjuterskih animiranih filmova. Projekcija je bila kratka i kad se ponovo upalilo svjetlo svi su burno komentirali neobičan doživljaj. Svatko ga je drukčije doživio i komentirao i nitko nije obraćao pažnju na činjenicu da smo tada svi zajedno zapravo bili svjedoci povijesnog prvog koraka u našoj zemlji. Koraka kojim je počeo razvoj te divne iluzije, kompjuterske animacije.

Danas možemo s osmjehom na licu usporediti prvu kompjutersku animaciju s onim
što svakodnevno gledamo na ekranima. Jednako kao kad bi uspoređivali prvu letjelicu s nekim današnjim mlaznjakom. Razlika u strojevima i tehnologiji koje smo imali onda i koje imamo danas može izgledati groteskno velika generaciji mladih animatora. Ali neki detalji postaju posebno dragocjeni kad ih vidimo iz današnje perspektive iz jedne velike vremenske udaljenosti. Tek sad znamo da su npr. "Morphing" i "Differential frame update" postali komercijalni i popularni tek nakon dvadesetak godina.

Da bi mogli prenesti sliku iz ondašnjeg kompjutera na filmsku traku trebalo je rješavati bezbroj tehničkih prepreka. Grafika je bila vektorska za razliku od današnje rasterske. To znači da podaci koji su činili sliku nisu bili dio slike nego jedna vrsta uputa stroju kako graditi sliku. I bez terminala koji je interpretirao brojeve i crtao sliku na zaslonu ti podaci nisu mogli biti nikako drukčije pretvoreni u sliku. Zaslon nije mogao reproducirati boje jer je bio napravljen samo od zelenog fosfora. To je bio dodatni problem jer je crno bijeli film najmanje osjetljiv baš na tu boju. A pojedinačnu ekspoziciju se nije moglo jednostavno produžiti na filmskoj kameri izvan studija. Ipak smo uspjeli dobiti upotrebljivu sliku koja je obrađivana naknadno u laboratoriju. Izradom visokokontrastnih kopija na optičkoj klupi probavali smo filterima I maskiranjem bojati crno bijele slike, ali na taj smo način zapravo gubili fine detalje. Tek je bojanje u video tehnici potpuno uspjelo.

U to vrijeme nisu postojali kompjuterski programi za crtanje ili za animiranje. Sve što sam htjeo nacrtati i animirati trebao sam sâm programirati. Najprije su to bili najjednostavniji likovi, kvadrat i krug. Ali da bi se njih oživilo trebalo je koristiti složene matematičke funkcije. Kako su ideje navirale o sve zamršenijim pokretima programiranje mi je postalo najopsežniji ali i najdraži dio posla. S velikim nestrpljenjem sam morao čekati dok film dođe iz laboratorija a svoje sam animacije mogao vidjeti tak nakon nekoliko dana ili čak tjedana.

Već nakon 5 - 6 godina ta je tehnologija zastarjela pojavom osobnih računala. Nova generacija kompjutera je potpuno promjenila animaciju. Filmska kamera se prestala koristiti jer je jedino mogla snimati s video ekrana što je bilo neupotrebljivo zbog treperenja i nedostatka oštrine. Još uvijek nije bilo gotovih programa i trebalo je puno programiranja za svaku animaciju.

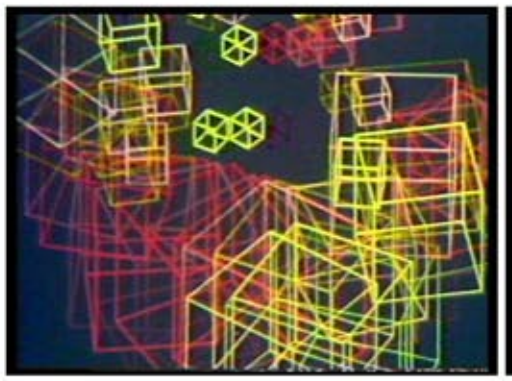
Ali kompjuteri su se sve brže razvijali, počeli su se pojavljivati gotovi programi i tehnička ograničenja su postajala sve manja. Razvoj kompjuterske tehnologije je sve brži i danas smo svjedoci koliko tehnička poboljšanja otvaraju vrata novim vizijama i efektima koji su nekad bili nezamislivi.

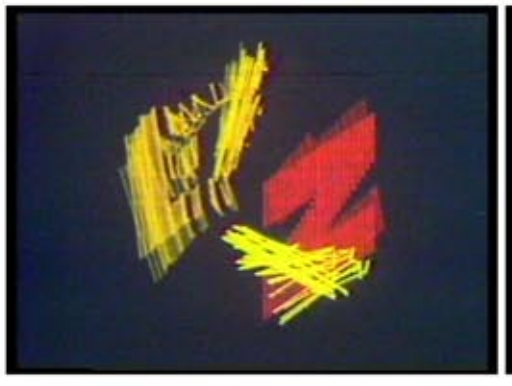
Zahvalan sam organizatorima ovogodišnjeg Festivala (2006) što su omogućili ovaj kratki izlet vremeplovom u povijest nastanka tog cijelog procesa kod nas. I ponosan sam što sam baš ja kriv za taj početak u ovom dijelu Europe, u svom Zagrebu.

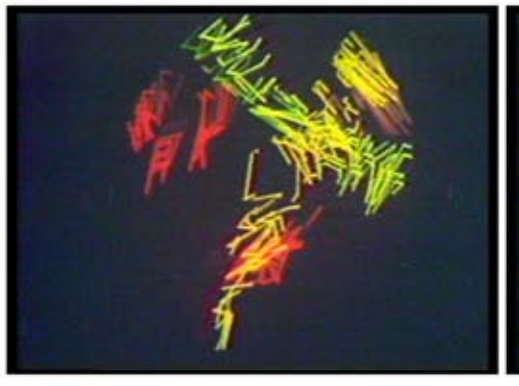
Tomislav Mikulić
Akademski slikar grafičar

KOLAŽ KOLAČ
Collage Cake
Opener for the second compilation

1976, 15 sec
16 mm B/W positive film
Colour added to video





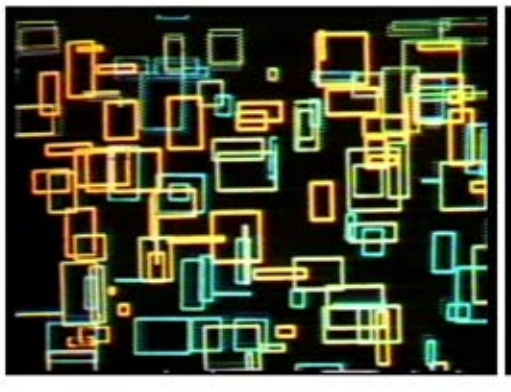


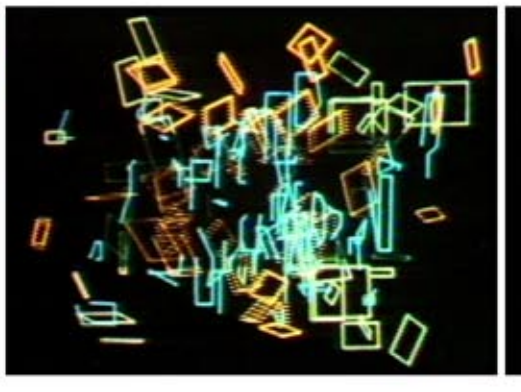
MUZIČKI BIENNALE ZAGREB
Music Biennale Zagreb

1977, 15 sec
16 mm film, 3 colours (optical printer)

ELEKTRONIKA
TV opener "Electronics"

1976, 25 sec
16 mm film, 3 colours (optical printer)



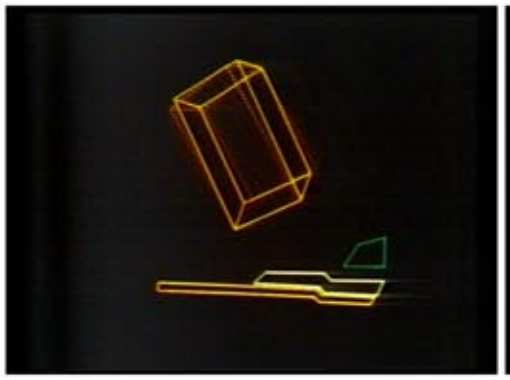


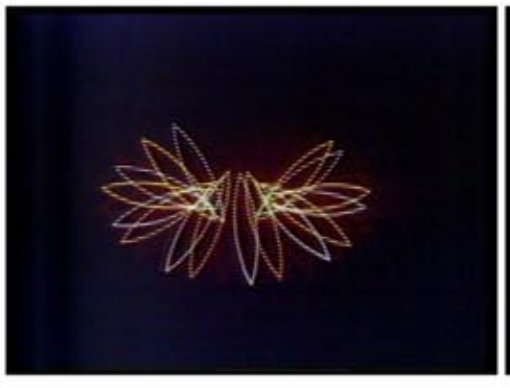
JESTE LI ZNALI?
Did you know?
TV opener
Editor in chief: Ingrid Černi

1976, 30 sec
16 mm B/W positive film
Video post production

LARIZON ANTIPLAQUE
A commercial for the Larizon tooth paste

1976, 2x 30 sec
16 mm film
Film post production

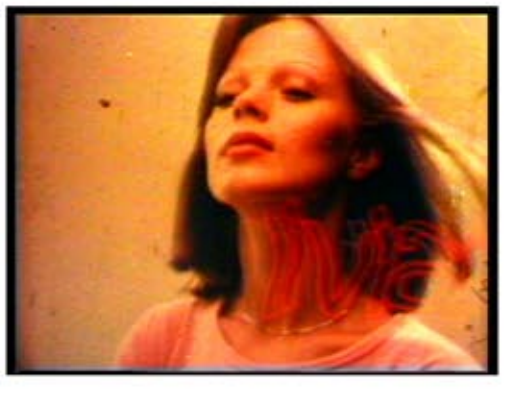




ŠAMPON LIVIA
A commercial for the Livia shampoo

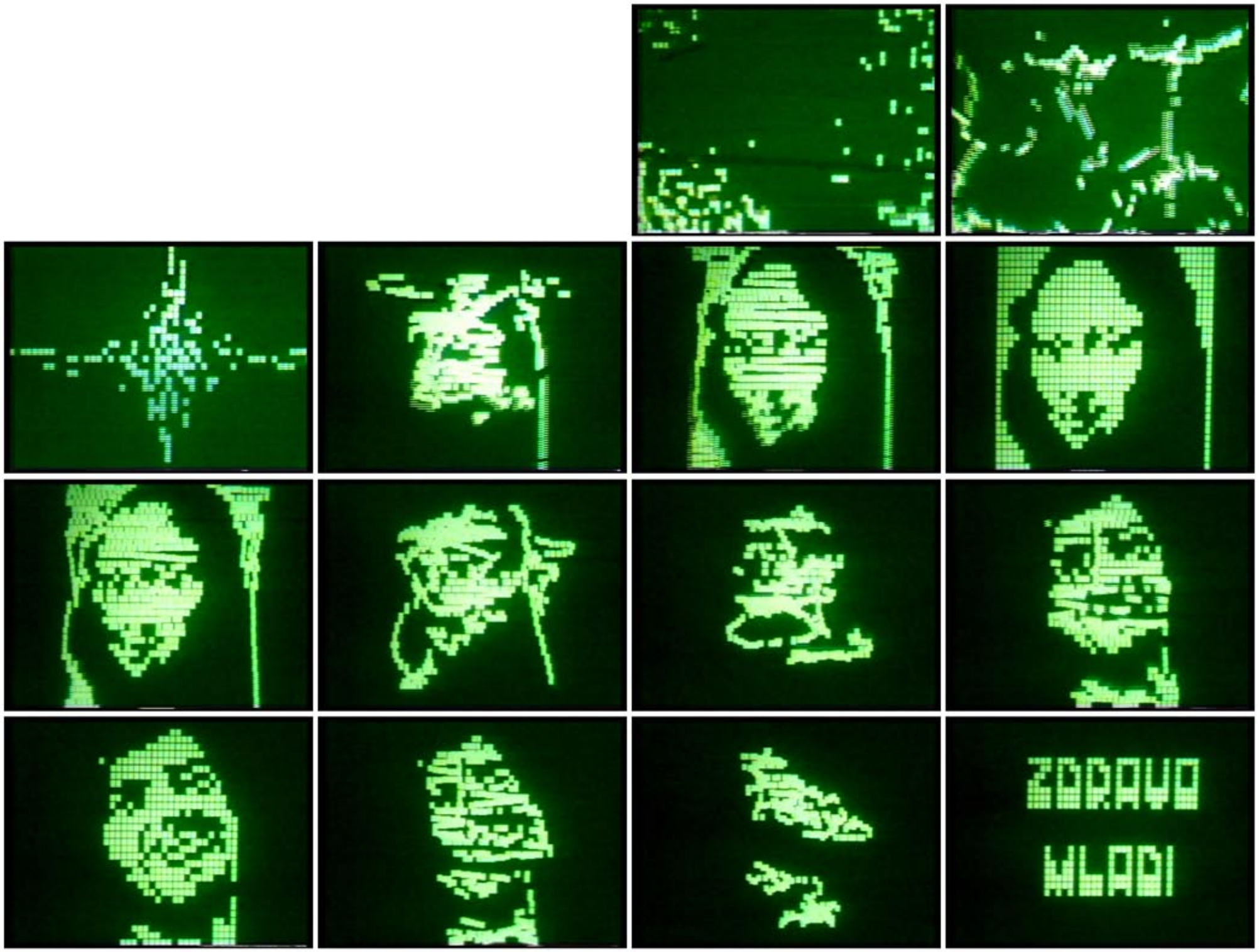
Editor in chief: Presečki, AM Vjesnik

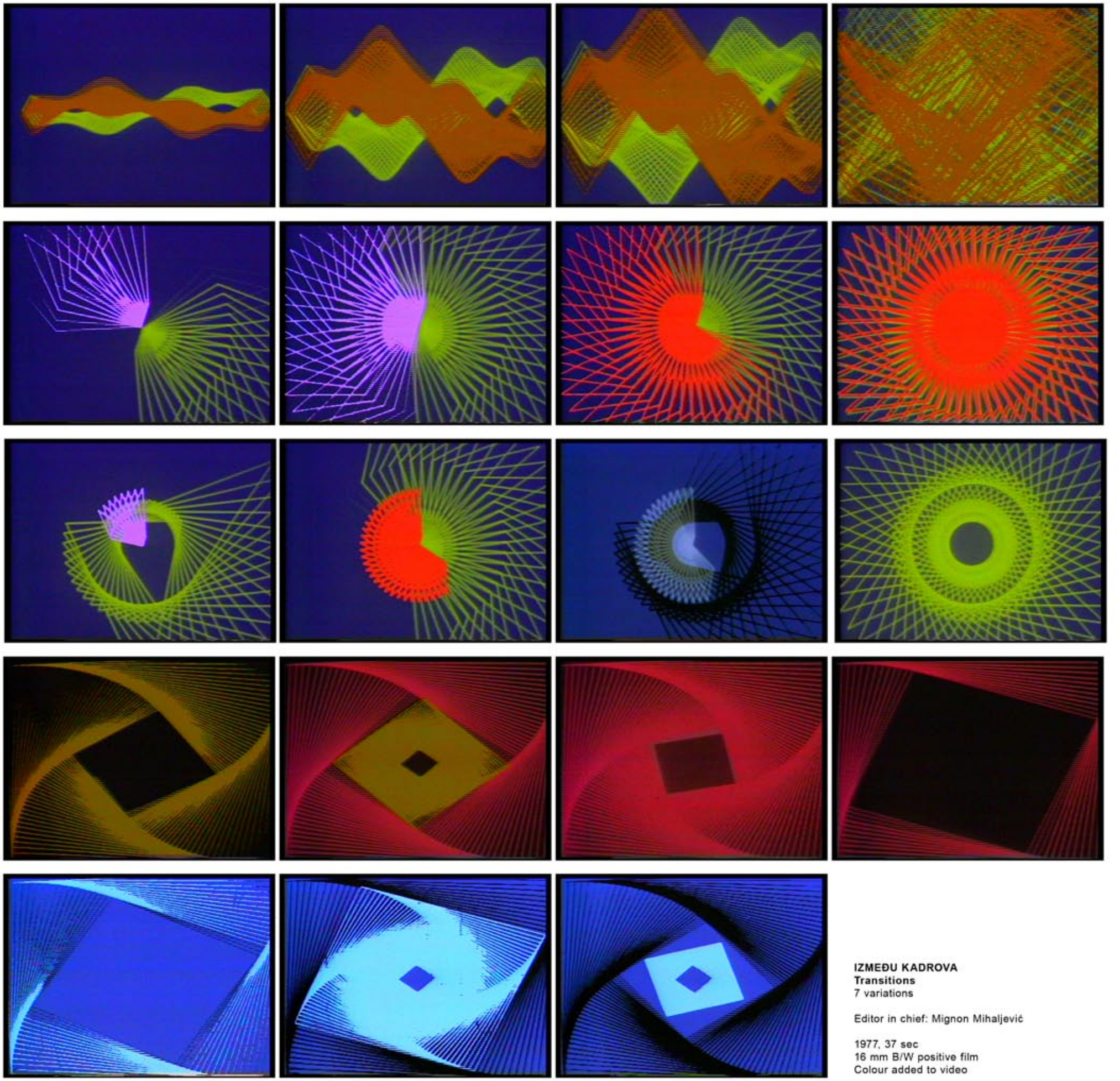
1976, 20 sec
16 mm film
Film post production



ZDRAVO MLADI
Hello Young Ones
Awarded opener for TV program

1976, 20 sec, Morphing
16 mm B/W positive film
Colour added to video





IZMEĐU KADROVA
Transitions
7 variations

Editor in chief: Mignon Mihaljević

1977, 37 sec
16 mm B/W positive film
Colour added to video

ZNANOST I MI
TV opener "Science and we"
Editor in chief: Ingrid Černi

1976, 15 sec
16 mm B/W positive film
Video post production

ASTRONOMIJA
TV opener "Astronomy"
Editor in chief: Stanko Govedić

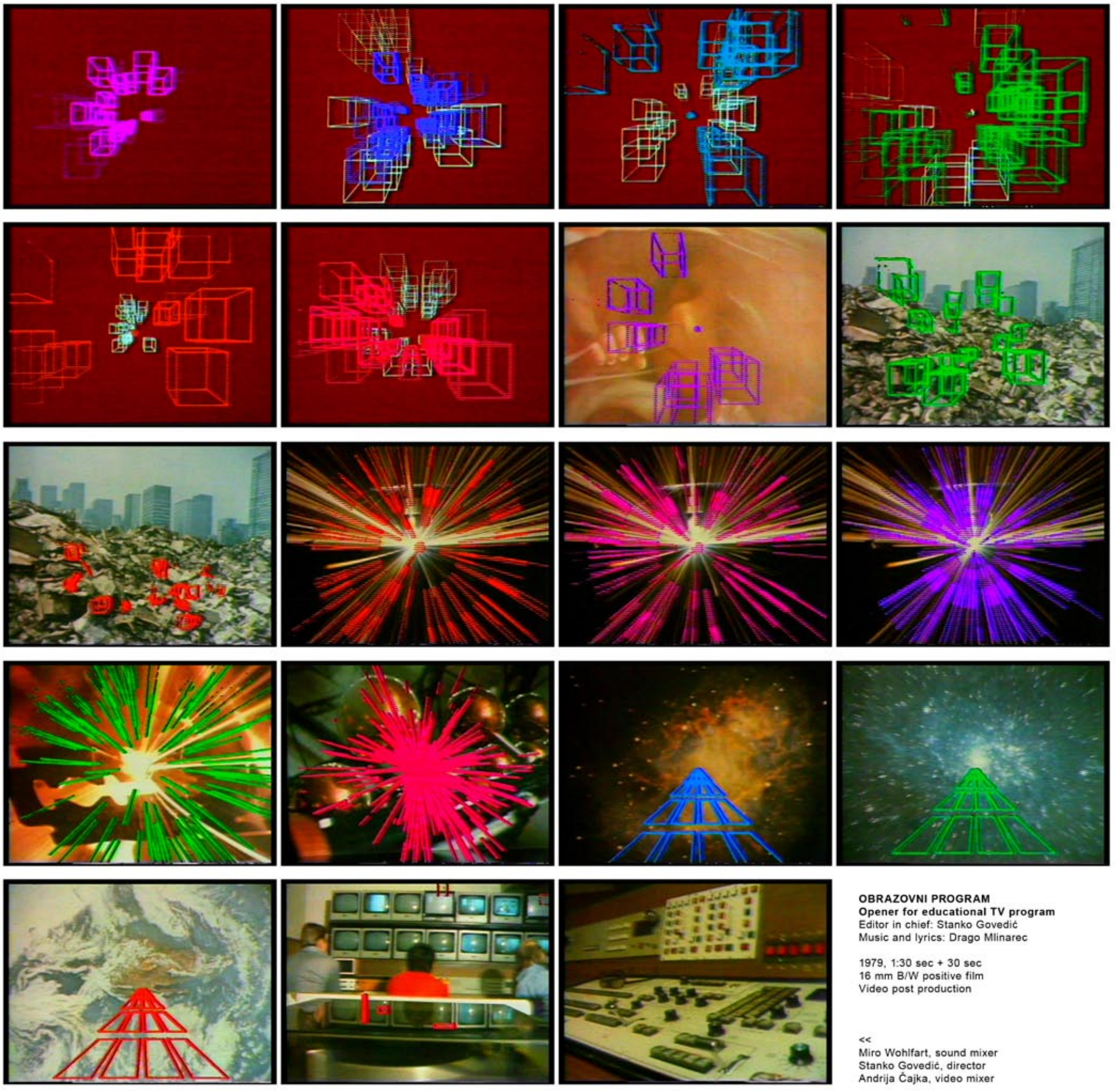
1977, 25 sec
16 mm B/W positive film
Video post production

TRENUTAK SPOZNAJE
TV opener "Moment of realization"
Editor in chief: Zlatko Hećej

1976, 13 sec
16 mm B/W positive film
Video post production

TELESPORT
TV opener "Tele sport"
Editor in chief: Vladimir Knezoci

1976, 1:08 sec
16 mm B/W positive film
Video post production



OBRAZOVNI PROGRAM
Opener for educational TV program
Editor in chief: Stanko Govedić
Music and lyrics: Drago Mlinarec

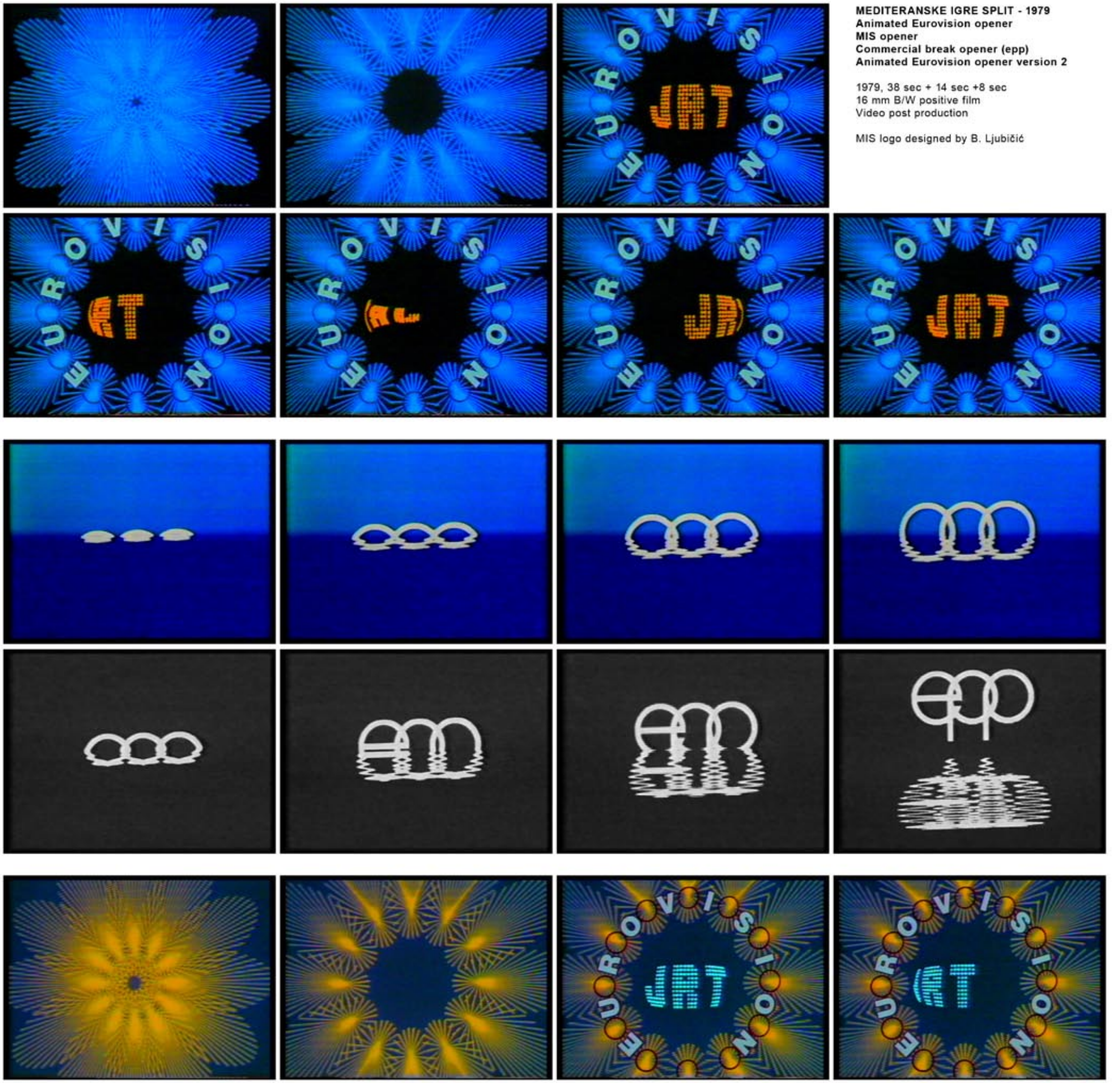
1979, 1:30 sec + 30 sec
16 mm B/W positive film
Video post production

<<
Miro Wohlfart, sound mixer
Stanko Govedić, director
Andrija Čajka, video mixer

KOMPJUTOR UMJESTO KISTA
Computer instead of a paintbrush

TV interview
Editor in chief: Ingrid Černi

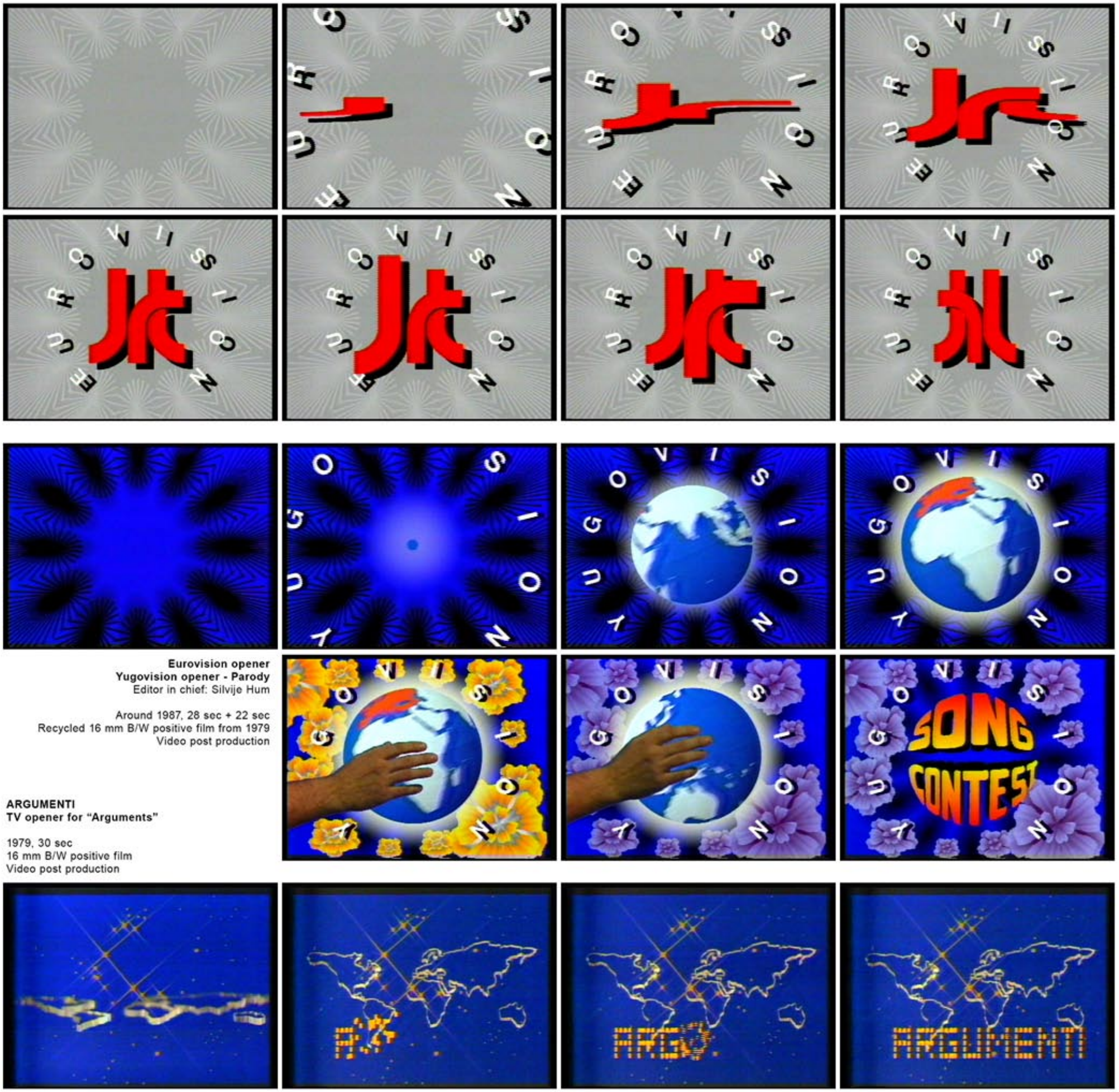
1979, 6 min
16 mm colour film
Video post production



MEDITERANSKE IGRE SPLIT - 1979
Animated Eurovision opener
MIS opener
Commercial break opener (epp)
Animated Eurovision opener version 2

1979, 38 sec + 14 sec +8 sec
16 mm B/W positive film
Video post production

MIS logo designed by B. Ljubičić

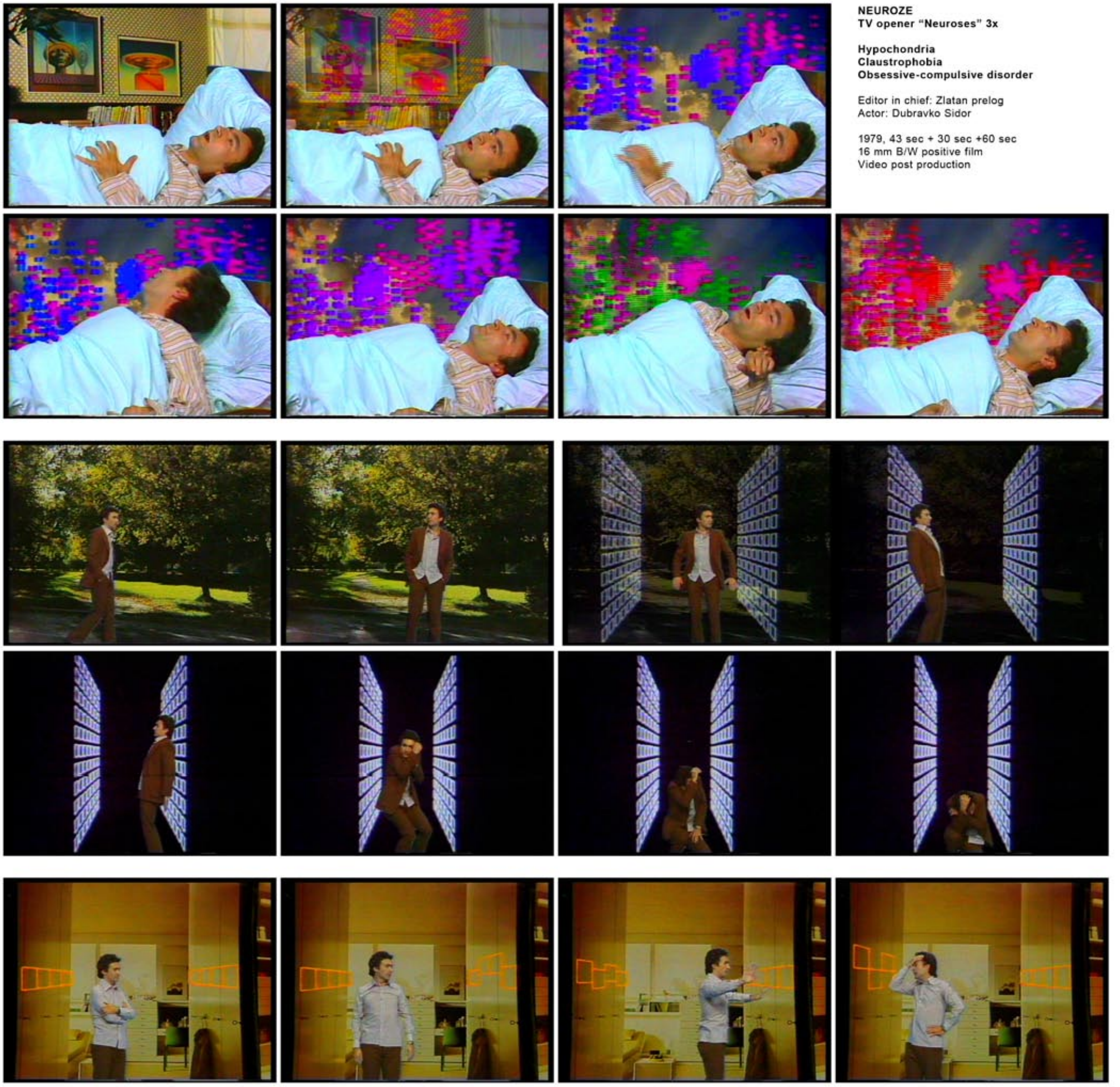


Eurovision opener
Yugovision opener - Parody
Editor in chief: Silvije Hum

Around 1987, 28 sec + 22 sec
Recycled 16 mm B/W positive film from 1979
Video post production

ARGUMENTI
TV opener for "Arguments"

1979, 30 sec
16 mm B/W positive film
Video post production

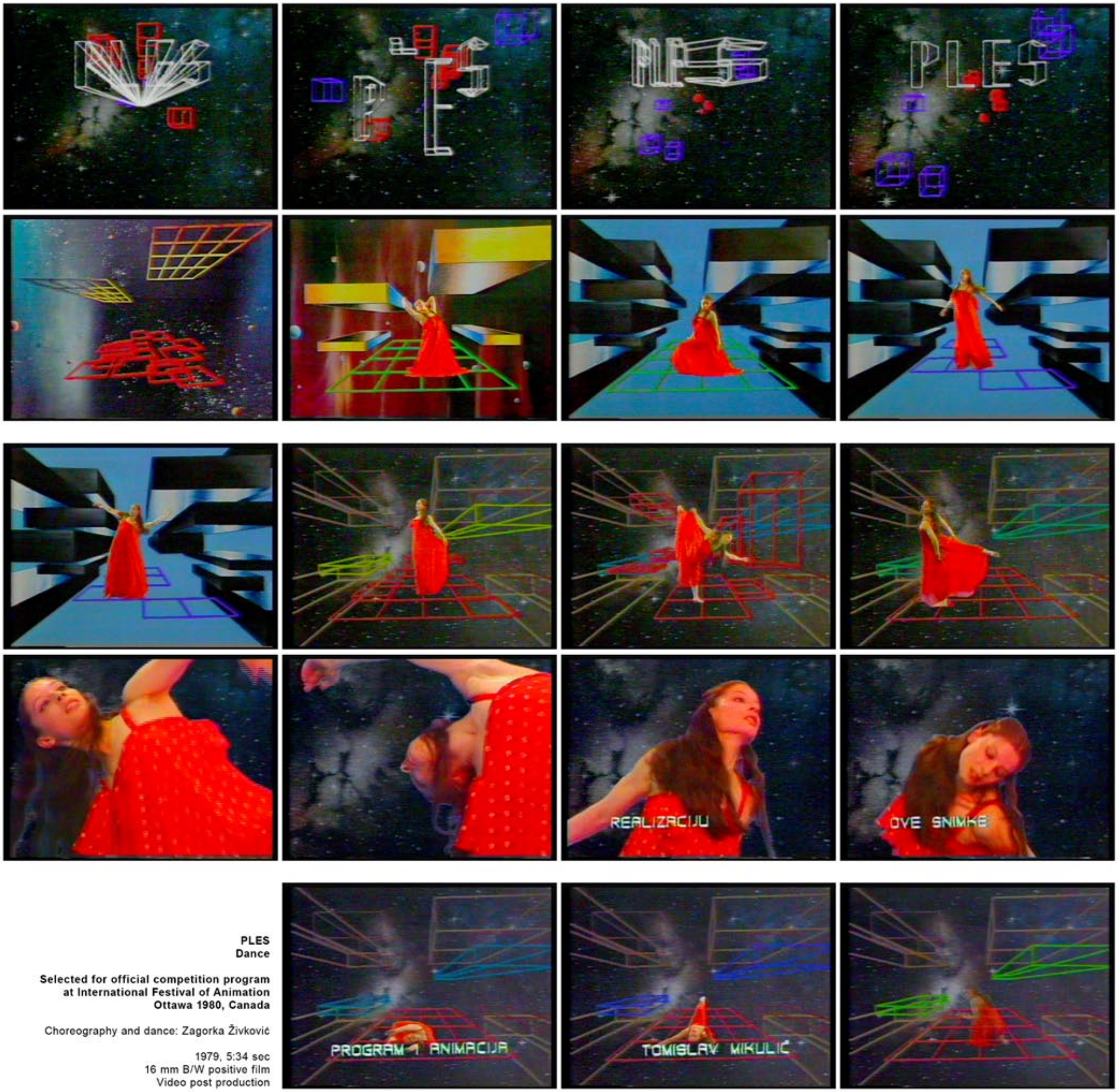


NEUROZE
TV opener "Neuroses" 3x

Hypochondria
Claustrophobia
Obsessive-compulsive disorder

Editor in chief: Zlatan prelog
Actor: Dubravko Sidor

1979, 43 sec + 30 sec +60 sec
16 mm B/W positive film
Video post production



PLES
Dance

Selected for official competition program at International Festival of Animation Ottawa 1980, Canada

Choreography and dance: Zagorka Živković

1979, 5:34 sec
16 mm B/W positive film
Video post production

SUBOTOM UVEČER
TV program "Saturday night"

Rock 'n' Roll dama
Rock 'n' Roll Lady
Performed by Biljana Petrović

1979, 3:14 sec
16 mm B/W positive film
Video post production

SUBOTOM UVEČER
TV program "Saturday night"

Ti luda ženo
You crazy woman
Performed by Meri Cetinić

1979, 3:30 sec
Video feedback effect
Video post production

Novi fosili

Đurđica Barlović

computers and people

March – April, 1980
Vol. 29, Nos. 3-4
formerly Computers and Automation

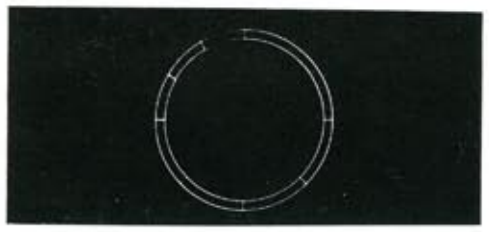
COMPUTER ART – A MINI-EXPOSITION

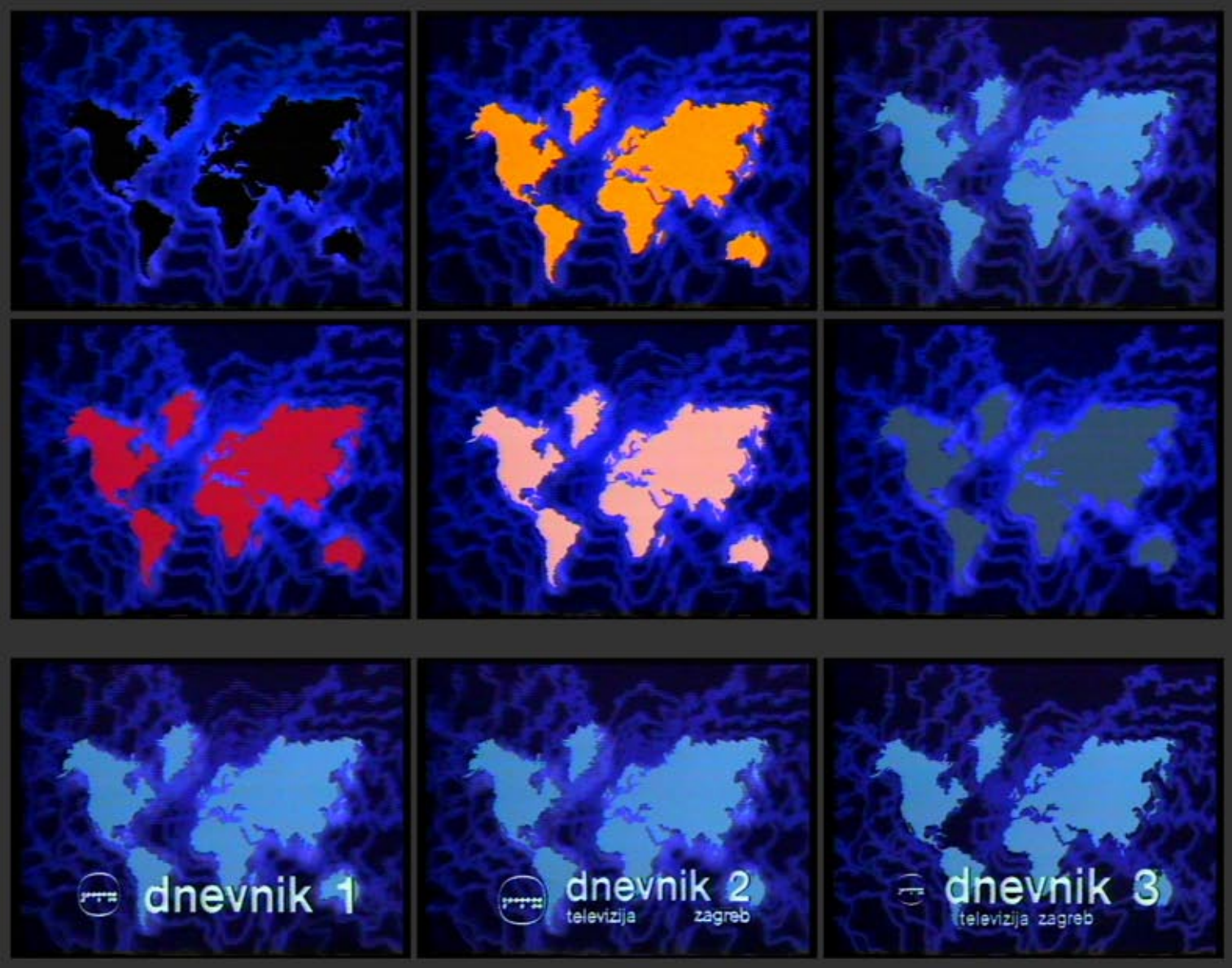
Art Editor – Grace C. Hertlein

Computer Art for Television

by Tomislav Mikulic, Zagreb, Yugoslavia

The black and white frames show the computer animation for the show opening of "Subotom uvecer", which means "Saturday Night". The logotype was designed using another computer program. In addition to black and white graphics, I also work in color, and my computer art is combined with music and ballet numbers, shown on RTZ, Zagreb television.

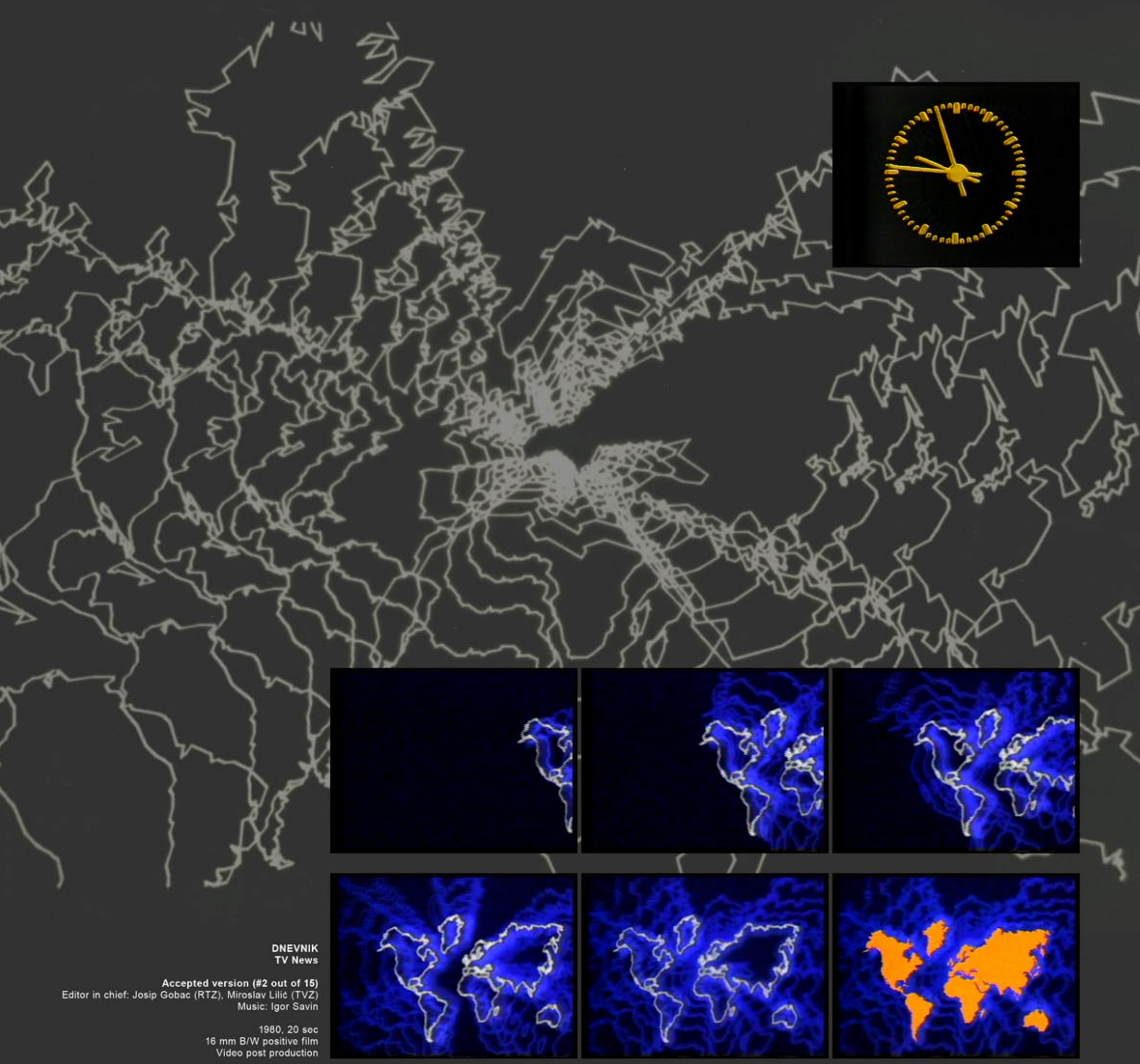




DNEVNIK
TV News

Variations 1 to 9
Editor in chief: Josip Gobac (RTZ), Miroslav Lilić (TVZ)

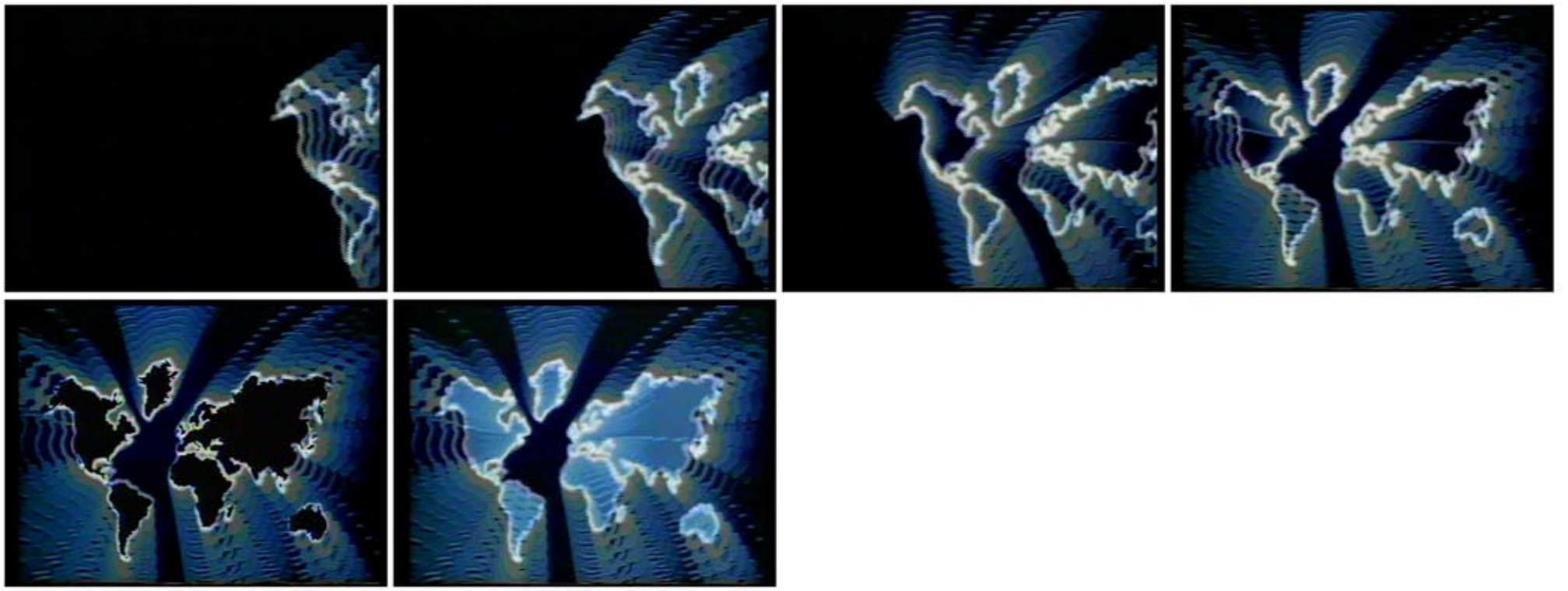
1980, 20 sec each
16 mm B/W positive film
Video post production



DNEVNIK
TV News

Accepted version (#2 out of 15)
Editor in chief: Josip Gobac (RTZ), Miroslav Lilić (TVZ)
Music: Igor Savin

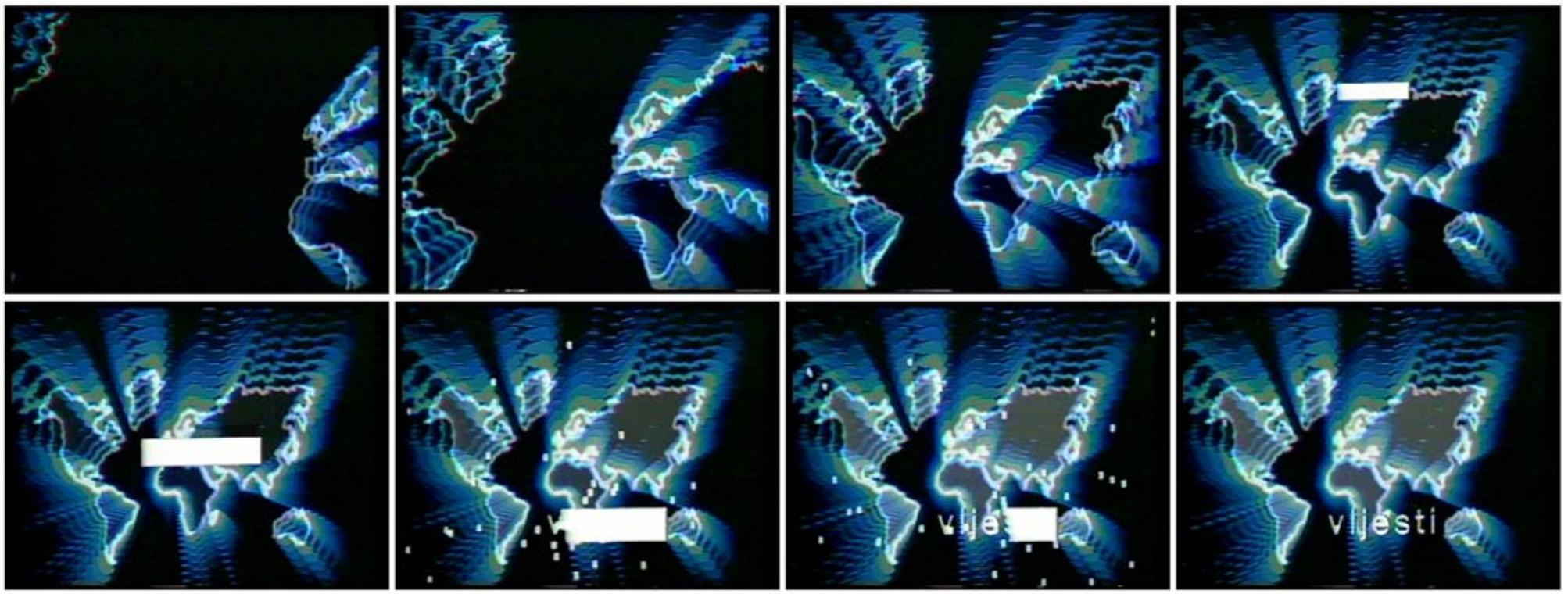
1980, 20 sec
16 mm B/W positive film
Video post production

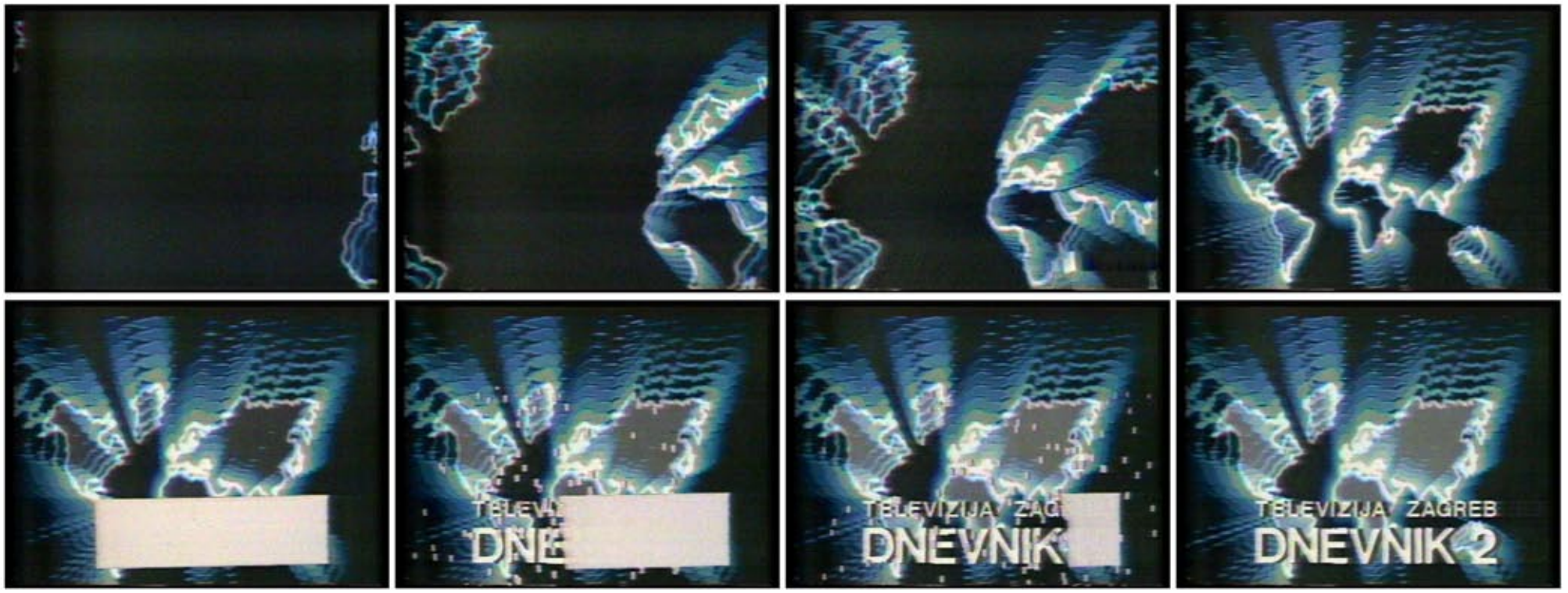


DNEVNIK
TV News

Variations 10 & 11
Editor in chief: Josip Gobac (RTZ), Miroslav Lilić (TVZ)

1980, 20 sec each
16 mm B/W positive film, video feedback
Video post production

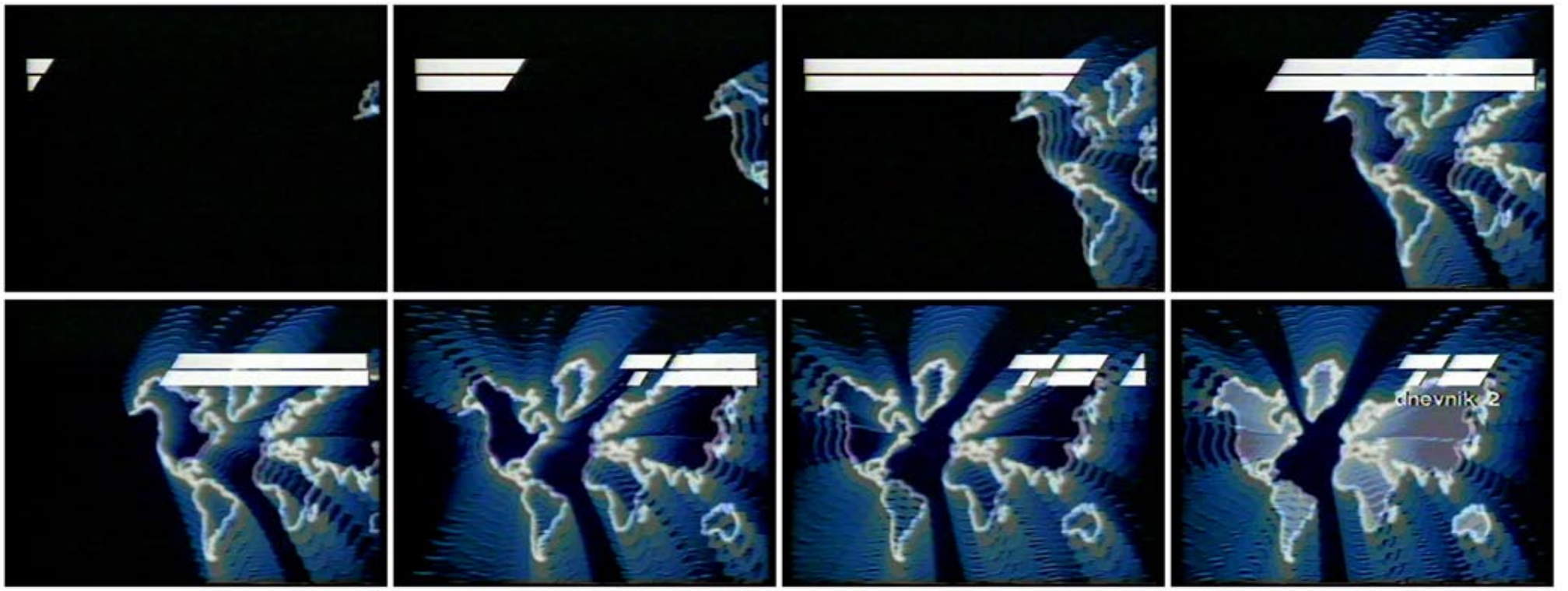


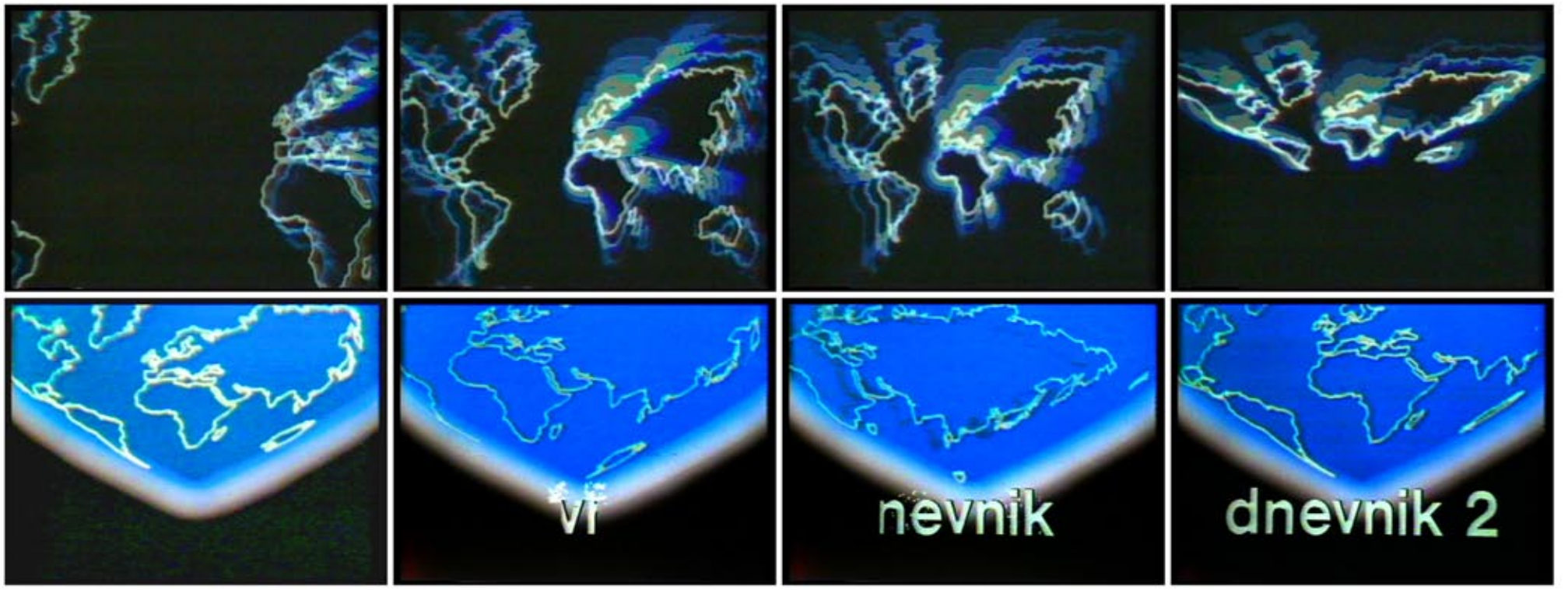


DNEVNIK
TV News

Variations 12 & 13
Editor in chief: Josip Gobac (RTZ), Miroslav Lilić (TVZ)

1980, 20 sec each
16 mm B/W positive film, video feedback
Video post production





DNEVNIK
TV News

Variations 14 & 15
Editor in chief: Josip Gobac (RTZ), Miroslav Lilić (TVZ)

1980, 20 sec each
16 mm B/W positive film, video feedback
Video post production

NAJAVA
DNEVNIK 1
DNEVNIK 1
DNEVNIK 1
DNEVNIK 1
DNEVNIK
DNEVNIK 1
DNEVNIK 1
DNEVNIK 1

Not only computing—also art

JOHN LANSDOWN

Yugoslavian first

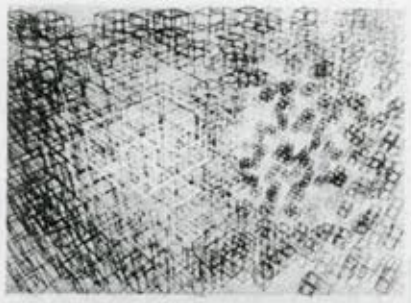
One of the pleasantest things about being Secretary of the Computer Arts Society is that my Russell Square office is often first port of call for overseas computer artists passing through London. During the summer, I receive a stream of visitors bringing slides, tapes or catalogues of their work, news of developments in their country as well as other interesting intelligence. Recent visitors have included Manfred Mohr; a severely jet-lagged Dick Land from MIT on his way to a Sabbatical in Australia (I kick myself for not enquiring why anyone should spend a Sabbatical in Australia: suggestions please!); and, a few days ago, complete with knapsack, having just hitchhiked from his native Yugoslavia, Tomislav Mikulic.

Tomislav had come on a weekend visit to England to see what developments there were in computer animation here and was able to see some of the works of Colin Emmett and Tony Pritchett done on the Rutherford Laboratory's Stromberg Carlson 4020 and the newer FR80 microfilm plotters. He was mightily impressed by these efforts as he felt his own work had been restricted by lack of equipment. Nonetheless, he *had* produced the first Yugoslavian computer animated film which had its premiere on 13 May 1976 in Zagreb. This film (Figure 1) together with animated titles for TV (Figure 2) had been produced on a Tektronix 4012 terminal driven by an HP 2000F time sharing system and were simply photographed from the screen on 16mm black and white film filtered to give colour separation negatives. The language used was Basic.

His work was an object lesson in making do with limited resources—and, the way things are going, this is a lesson we are all going to have to learn: Dick Land said that, even in the US, funding for all sorts of university work was very difficult to come by with the result that computer art was going to be particularly hard to finance in the next few years.

Some years ago, Philip Hendren of the University of Texas described how, when walking down one of the corridors of his university he found a new colour computer display in pristine working order but discarded as surplus to the requirements of some US Navy research: he commandeered it. Clearly those days are gone.

Figure 1
Figure 2 (below)



Hrvatski vjesnik 17
Petak, 2. lipnja 2006

TRIDESET GODINA KOMPJUTORSKE ANIMACIJE U HRVATA:

Tomislav Mikulić – poseban gost Svjetskog festivala animiranog filma

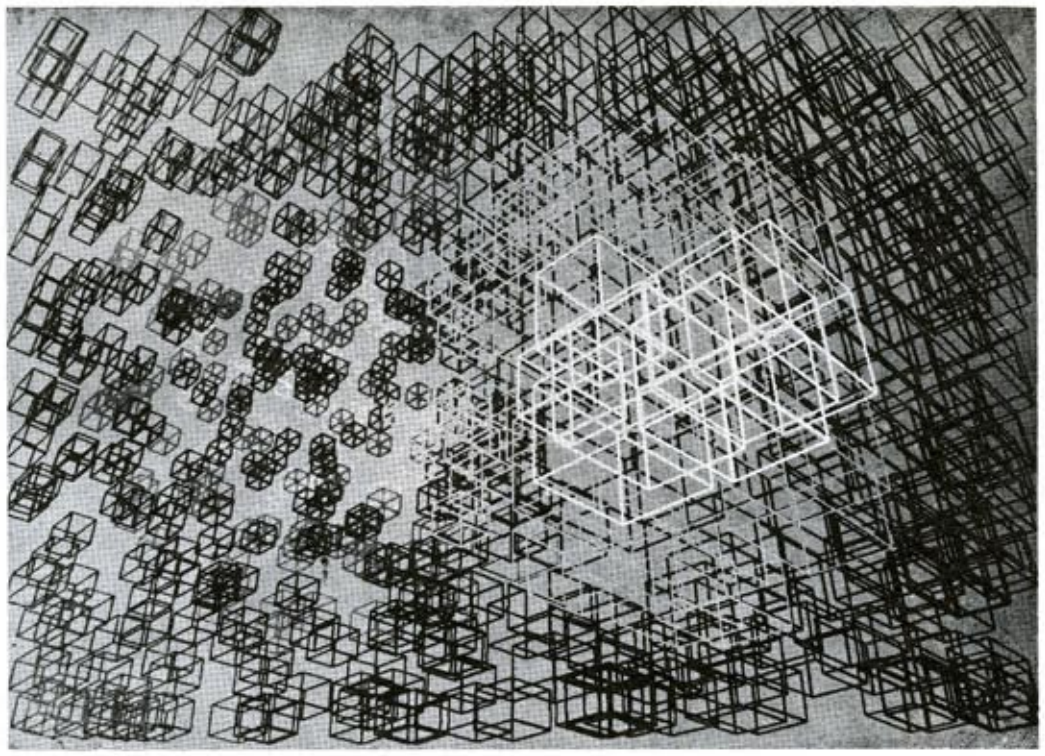
Tomislav Mikulić za vrijeme snimanja filma u MMC-u 1976. godine.

SYDNEY – Ne idu svi australski Hrvati koji ovih dana napuštaju Hrvatsku isključivo na nogometno prvenstvo u Njemačku.

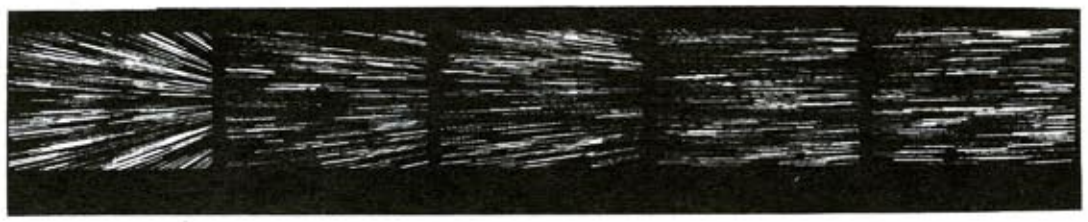
Jedan od naših uglednih australskih Hrvata zaputio se ovih dana u Zagreb sa sasvim drugom svrhom, na Svjetski festival animiranog filma (Animafest).

Razlog tome je tridesета obljetnica od dana kad je upravo taj grafički dizajner i autor crtića, australski Hrvat Tomislav Mikulić, prikazao prvi hrvatski kompjutorski animirani film.

U povodu ove obljetnice u sklopu Festivala u Zagrebu bit će u Maloj dvorani koncertne dvorane Vatroslav Lisinski 16. lipnja priređena posebna projekcija u povodu tridesete obljetnice prikazivanja prvog kompjutorskog animiranog filma, čiji će posebni gost biti upravo Tomislav Mikulić. Nakon projekcije bit će upriličen susret s autorom.



TOMISLAV MIKULIC – YUGOSLAVIA
Illustrations of 16mm films of computer-generated art are shown on this page.



"Drawings, serigraphy, graphic terminal displays, multi-vision displays, and 16mm films in black and white and in color were shown in a recent one-man show in Zagreb." (Unfortunately, we cannot print the excellent colored illustrations from the catalog.)

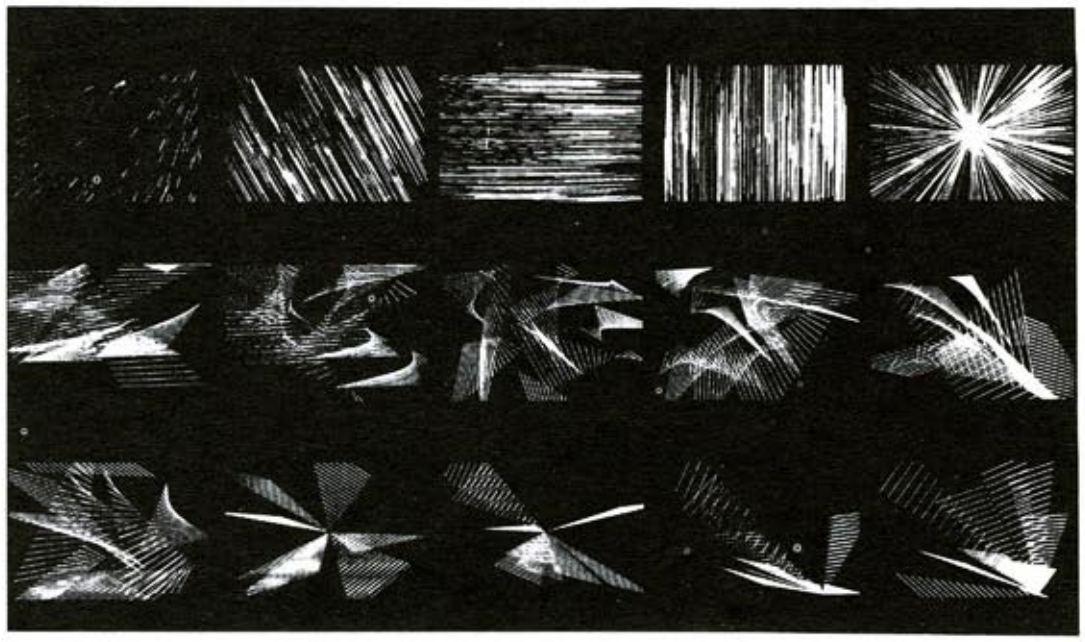


Figure 1

Figure 2

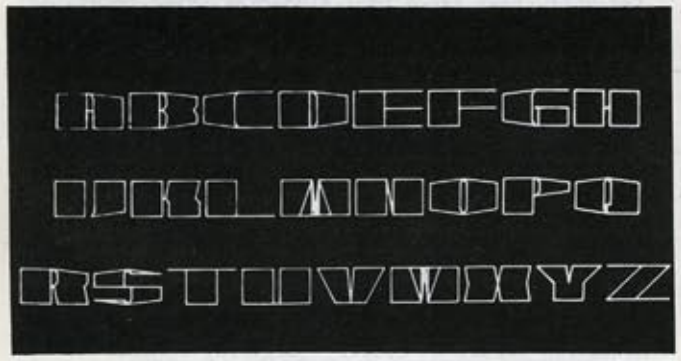


Figure 3

Figure 4

TOMISLAV MIKULIC - YUGOSLAVIA

Letra (letter) Generator by Tomislav Milukic. Comments are by the artist.

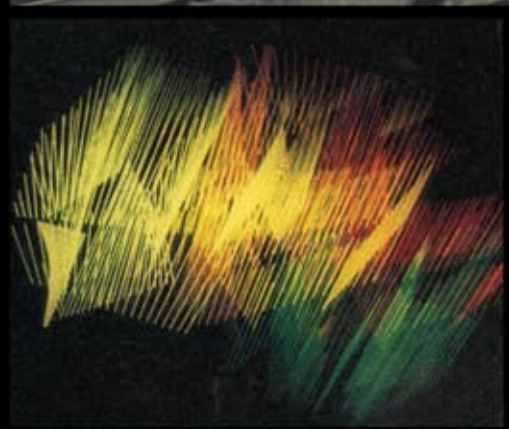
Figure 5

Figures 1 through 5 are examples of the letter generator program. It was necessary to design letters, numbers and special signs for television use. They should be readable and attractive in a variety of different types and "computer processible" for animation purposes. So I programmed a kind of "letra (or letter) generator". Each letter is a function of seven variables. Changing the letters in spacing and positioning is very easy. The next step is animation of such prepared texts.

Figure 5 is interesting in that this program can transform (on film in motion), any text or drawing, graphic, or label. "Tekst" means text, and "slika" means picture in the Croat language.

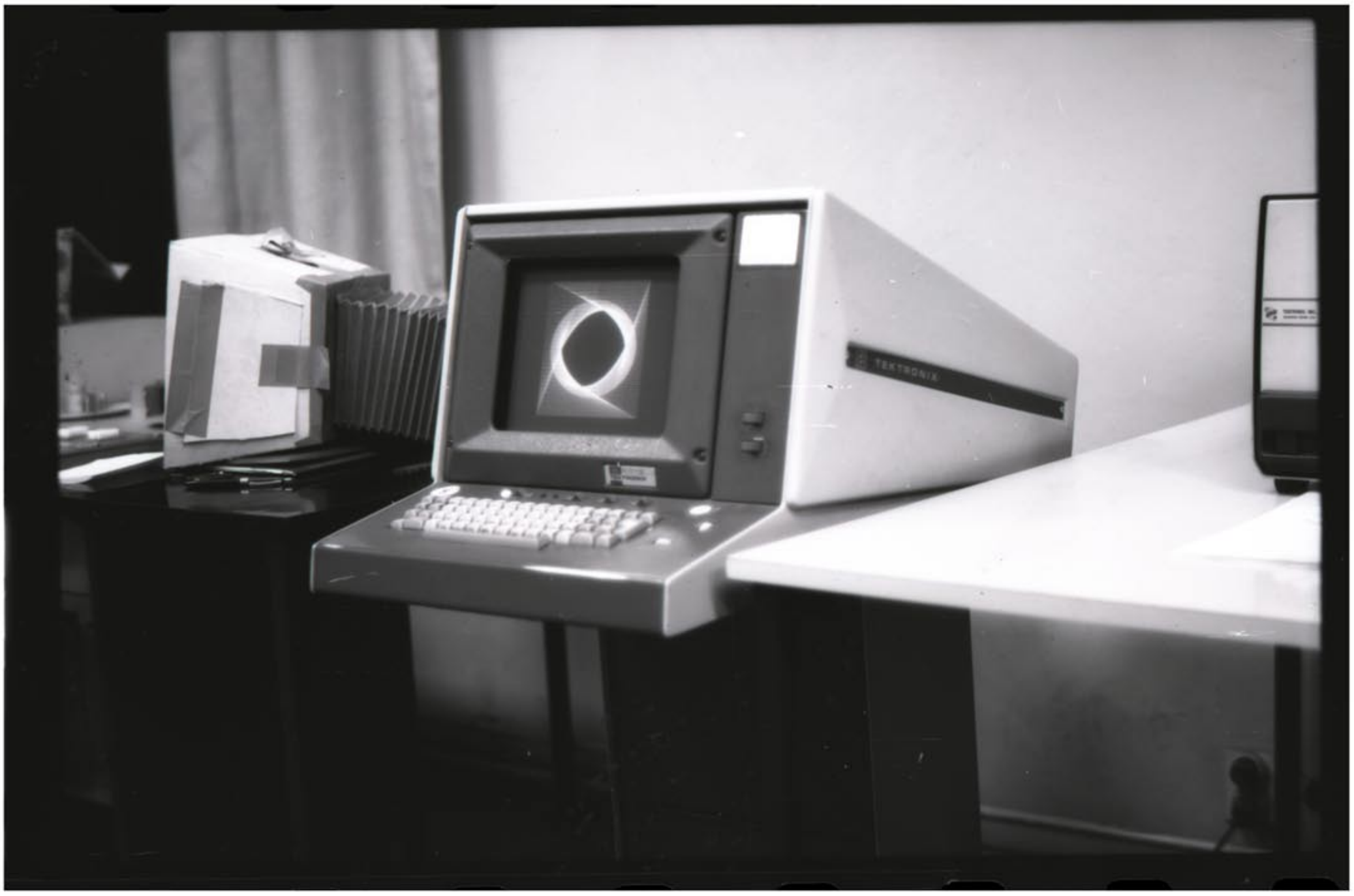
Using a color lab service and video technique I have executed animated titles for nine professional TV broadcasting programs of RTZ - Radio Television Zagreb. I use a HP 2000 computer and a Tektronix 4012 CRT.

I am very interested in studying electronic art in the U.S.A. Now that I have graduated from the University of Zagreb, I have been looking for a scholarship to your country. (See August, 1976 for graphics by Tomislav Mikulic.)



R
GEVAPAN 36
reversal
880
AGFA-GEVAERT

TEKTRONIX



1975, Multimedia Centre (MMC) at University of Zagreb, Croatia
Tom's DIY screen shade with bellows for a Tektronix 4012 graphics terminal connected to an HP 2000F computer.
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