

# SOVIET COMPUTING WONDERS

DREAMING (AND STEALING) TO BEAT THE WEST



# ABOUT THE TALK

- ★ **QUICK FACTS: HOW DID WE GET THERE...**
- ★ **PERSONAL HISTORY OF SOVIET LIFE**
- ★ **FUN FACTS, STORIES OF SOVIET COMPUTERS**
- ★ **ESTONIAN ICT FROM ITS ROOTS TO E-STONIA**
- ★ **SOME PARALLELS WITH THE WORLD TODAY**





# ESTONIA BETWEEN THE WARS

- ★ **ESTONIA, INDEPENDENCE 1918-40**
- ★ **PART OF THE WEST**
- ★ **DEMOCRACY, FROM 1934 AUTHORITARIAN**



# IRON CURTAIN

- ★ **IRON CURTAIN BEFORE 1940**
- ★ **MOLOTOV-RIBBENTROP LINE 1939-40**
- ★ **WARSAW PACT**
- ★ **SOCIALIST COUNTRIES**
- ★ **FINLANDIZATION!**





# SOVIET ESTONIA 1939-40; 1944-91

- ★ **SOVIET BASES IN 1939**
- ★ **ANNEXATION IN 1940**
- ★ **NAZI GERMANY 1941-44**
- ★ **SOVIETS RETURN 1944, REFUGEES, DEPORTATIONS, GUERRILLA WAR**
- ★ **1960'S KHRUSHTSHOV TIME, SOME RELIEF**



# LIFE IN ESTONIA IN 70'S-80'S

- ★ **UNAVAILABILITY OF BASIC GOODS**
- ★ **NUMBER AND VARIETY OF CARS**
- ★ **FINNISH TV, BUSINESS WITH FINNS**
- ★ **- NO FREEDOM OF SPEECH**
- ★ **+ FREE HEALTH CARE, EDUCATION**
- ★ **+ AUTONOMY OF EDUCATION, CULTURE**



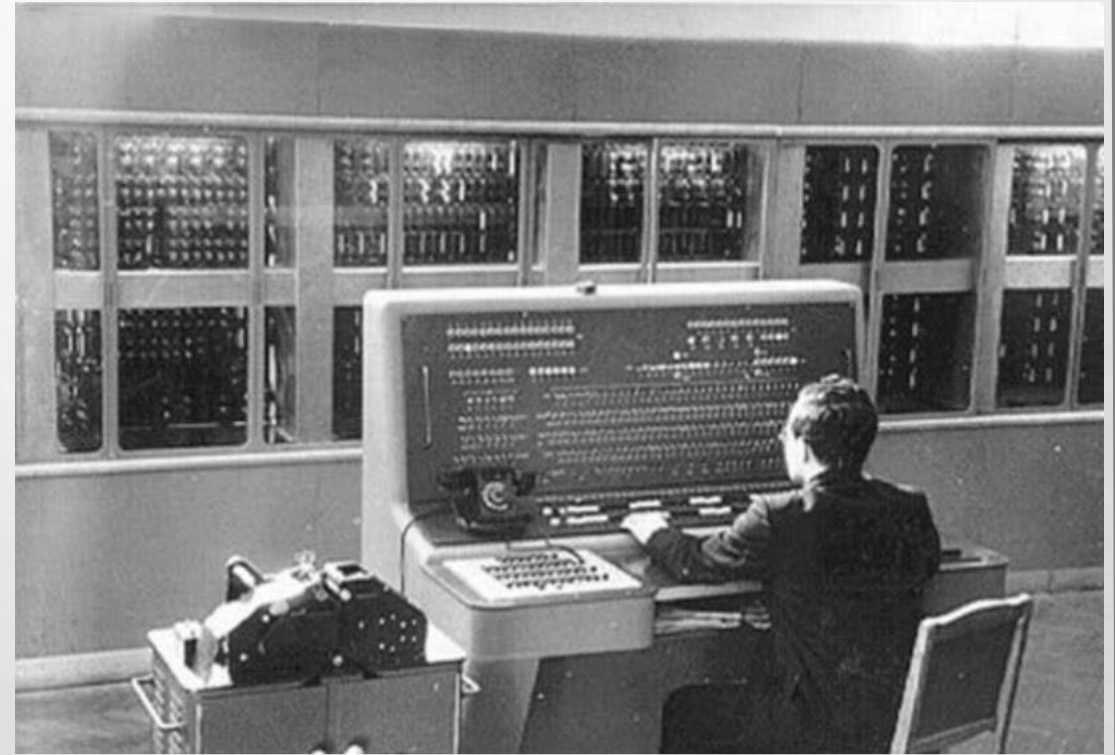
**Film:  
The Dissidents  
(2017)**





# DAWN OF SOVIET COMPUTERS

- ★ **M-1: BUILT ON WAR TROPHY TRANSISTORS (1951)**
- ★ **ES: IBM SYSTEM 360 CLONE**
- ★ **RELYING ON CLONES OF WESTERN COMPUTERS**
- ★ **SOOO MANY ARCHITECTURES, MANY CLASSIFIED**
- ★ **FIRST COMPUTERS CONTAINED UP TO 3KG GOLD!**
- ★ **BECAME A PROBLEM WHEN THE ECONOMY CRUMBLED**



M-1 EVM control panel

# AGAT – SOVIET PC

★ INTRODUCED 1983

★ “INSPIRED” BY APPLE II

★ MOTOROLA 6552 CPU

★ OTHER CLONES:

★ PDP-11

★ Z80

★ LAST “SUCCESSFUL” CLONE:

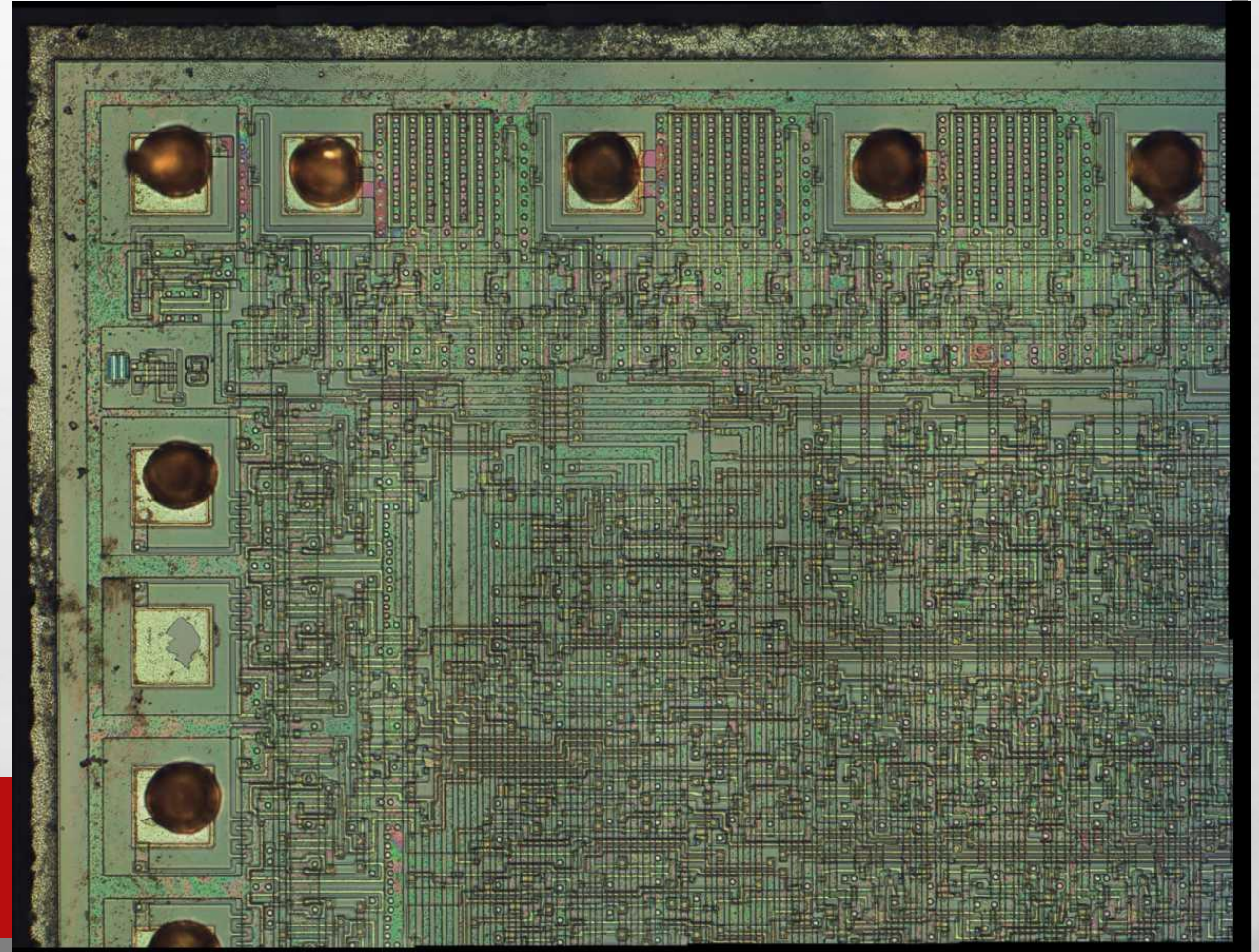
★ INTEL 286 (1985) CLONED BY 1990





# REVERSE ENGINEERING AND SPYING

- ★ **SECRET FACILITIES FOR REVERSE ENGINEERING**
- ★ **ALSO IN TALLINN**
- ★ **EDGING AND PEELING THE DIE**



# IC MANUFACTURING IN TALLINN

★ PÖÖGELMANN FACTORY

★ 1958-91

★ NEXT TO A TRAM TERMINAL!





# ELBRUS

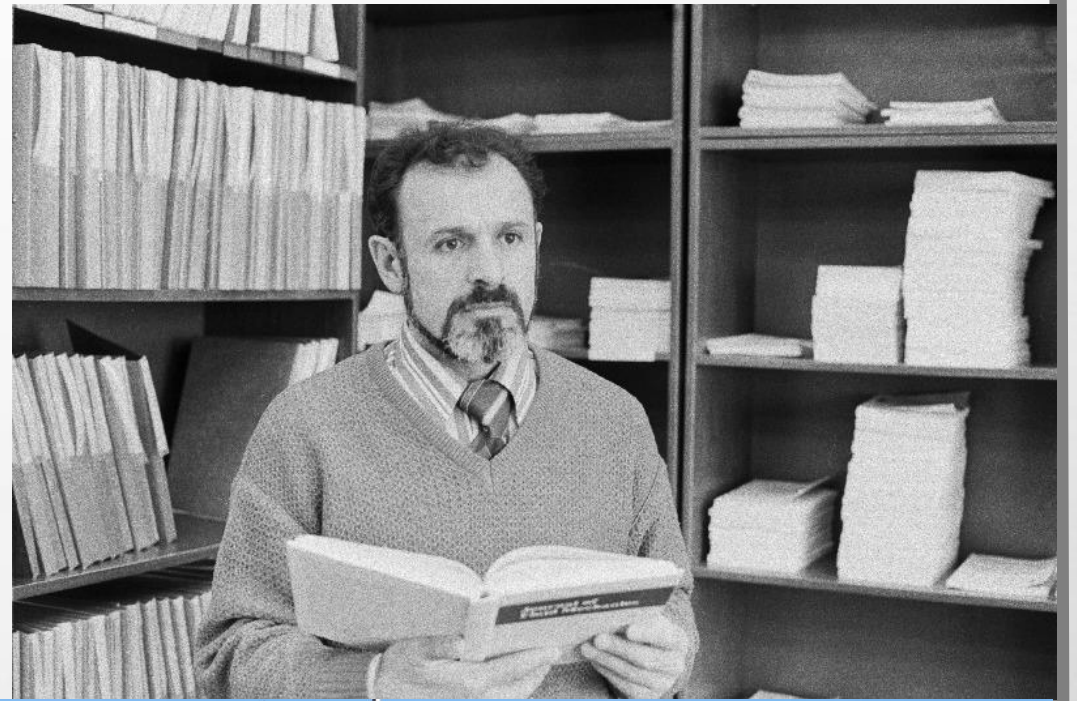
- ★ **HIGHEST POINT OF EUROPE**
- ★ **SOVIET SUPERCOMPUTER**
- ★ **DESIGNED FOR AIR DEFENCE**
- ★ **... ALSO, NEWEST RUSSIAN CPU**





# ELBRUS 1 TO TALLINN

- ★ **INSTITUTE OF CYBERNETICS 1960**
- ★ **PURCHASE OF ELBRUS 1, 1980, 7 MRBL**
- ★ **ELBRUS 1 = ELBRUS "LIGHT"**
- ★ **100 KW, WATER TUBING, DEDICATED BUILDING**
- ★ **ARRIVAL 1986 ... 88**
- ★ **APPLE LISA MORE POWERFUL**
- ★ **PERSONAL COMPUTER OF NAUM VEKSER**





# INSTITUTE OF ELECTRONIC COMPUTERS

- ★ 1966, FOUNDED BY USTUS AGUR
- ★ PREDECESSOR OF DEPT OF COMPUTER SYSTEMS
- ★ RAIMUND UBAR, ANDRES KEEVALLIK
- ★ DIGITAL TEST, FSM SYNTHESIS/PARTITIONING



# NEW INDEPENDENCE

- ★ SINGING REVOLUTION 1988-91
- ★ IME ("WONDER"), ECONOMIC AUTONOMY
- ★ 3 DAYS THAT CHANGED THE WORLD





# RESTART IN 90'S, UBAR

★ **PLD LABORATORY, ELECTRONICS COMPETENCE CENTER**

★ **TEMPUS COOPERATION (DARMSTADT, GRENOBLE)**

★ **EU FP3 PROGRAMME 1993 ...**

★ **EUROPRACTICE 1995: CADENCE, SYNOPSYS, MENTOR, ...**

★ **FIRST TAPEOUT: 1997, 1.0 MICRON NODE**





# E-ESTONIA TIMELINE



are e-estonia



eesti.ee



e-school



digital  
signature



id-card



e-cabinet



e-tax  
board



m-parking



i-voting



e-notary



e-justice



mobile-id



company  
registration  
portal



e-police  
system



id bus  
ticket



e-health  
system



e-prescriptions



keyless  
signature  
infrastructure



visualised  
business  
register



e-residency



e-receipt



public services  
green paper



e-service of the  
Estonian Road  
Administration



data  
embassy



crossborder  
e-prescription



AI strategy



NIS  
x-road  
consortium



kick-off:  
proactive  
government

2000-2003

2004-2007

2008-2011

2012-2015

2016-2019



# CONCLUSIONS

## ★ WHAT WENT WRONG WITH THE SOVIET IDEA?

- ★ SOVIET COMPUTER SCIENCE AND TECHNOLOGY RESEARCH NOT BAD (AFTERALL: SPUTNIK, 1<sup>ST</sup> MAN IN SPACE)

- ★ BUT...

- ★ HIGHLY INEFFICIENT SYSTEM

- ★ MILITARY SPENDING, LAGGING BEHIND IN COMPUTER TECHNOLOGY WAS THE KEY

## ★ HOW DID ESTONIA MANAGE TO GET BACK ON TRACK?

- ★ FINNISH TIES, EXPOSURE TO THE WEST

- ★ RIGHT MINDSET, VERY WELL ORGANIZED SOCIETY

- ★ RIGHT IN TIME, NO LEGACY ICT

## ★ WILL WE EVER LEARN FROM HISTORY?

# ECHOES OF THE PAST

- ★ **TRUMP, EUROPEAN POPULISM, PUTIN**
- ★ **DE-GLOBALIZATION**
- ★ **NEW SANCTIONS, REPRESSIONS**
- ★ **IRON CURTAIN 2.0?**
- ★ **HOW SUSTAINABLE?**





**THANK YOU, COMRADES! ANY QUESTIONS?**

