

# SPIELEGESCHICHTE

SIMULATION

14. JUNI 2018



# Simulation

„to simulate is to model a (source) system through a different system which maintains (for somebody) some of the behaviors of the original system.“ The key term here is “behavior.” Simulation does not simply retain the—generally audiovisual—characteristics of the object but it also includes a model of its behaviors. This model reacts to certain stimuli (input data, pushing buttons, joystick movements), according to a set of conditions.“

Frasca (2003): Simulation versus Narrative, S. 223

# Modell



Modell eines fiktiven Piratenschiffs

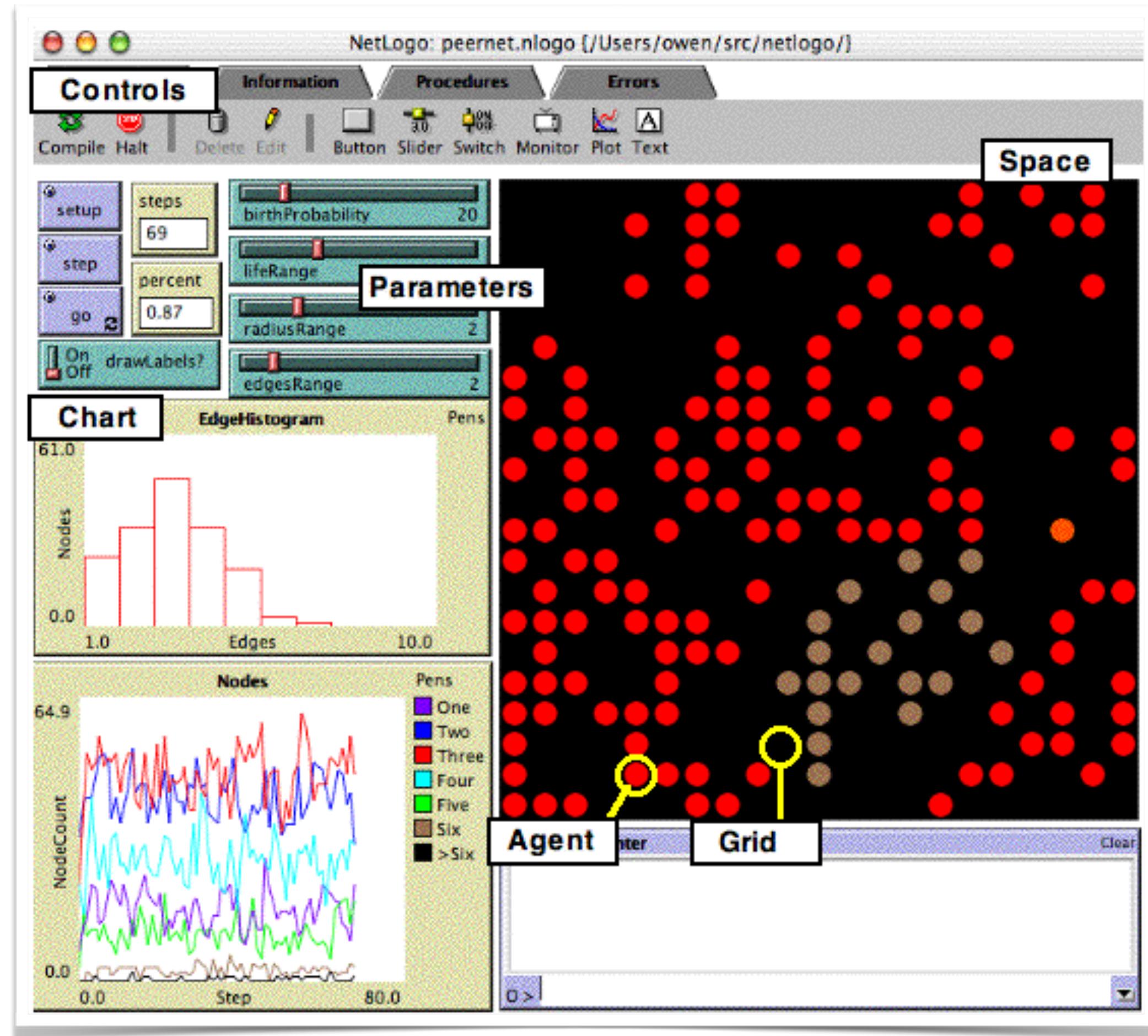
Modelle sind stets Modelle von etwas, nämlich Abbildungen, Repräsentationen natürlicher oder künstlicher Originale, die selbst wieder Modelle sein können.

Modelle erfassen im allgemeinen nicht alle Attribute des durch sie repräsentierten Originals, sondern nur solche, die den jeweiligen Modellerschaffern und/oder Modellbenutzern relevant scheinen.

Modelle sind ihren Originalen nicht per se eindeutig zugeordnet. Sie erfüllen ihre Ersetzungsfunktion a) für bestimmte – erkennende und/oder handelnde, modellbenutzende – Subjekte, b) innerhalb bestimmter Zeitintervalle und c) unter Einschränkung auf bestimmte gedankliche oder tatsächliche Operationen.

Stachowiak: Allgemeine Modelltheorie, S. 130–133

# (Digitale) Modellbildung

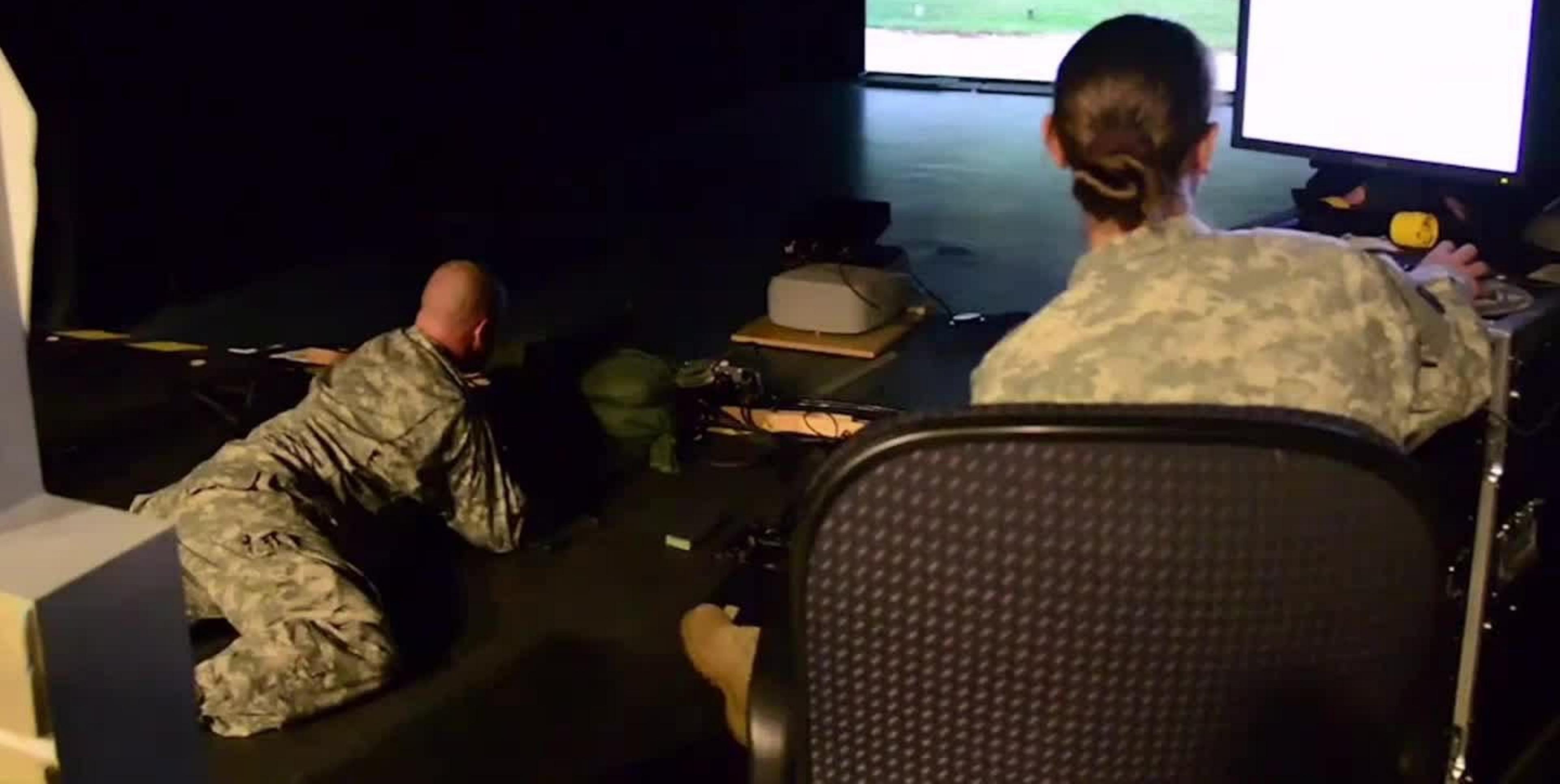


- Originalsystem auswählen
- Teilobjekte bestimmen
- Merkmale in Form von Parametern (Messgrößen) festlegen
- Prozesse identifizieren, bei denen Parameter geändert werden
- Beziehungen der Objekte festlegen
- Algorithmisierung

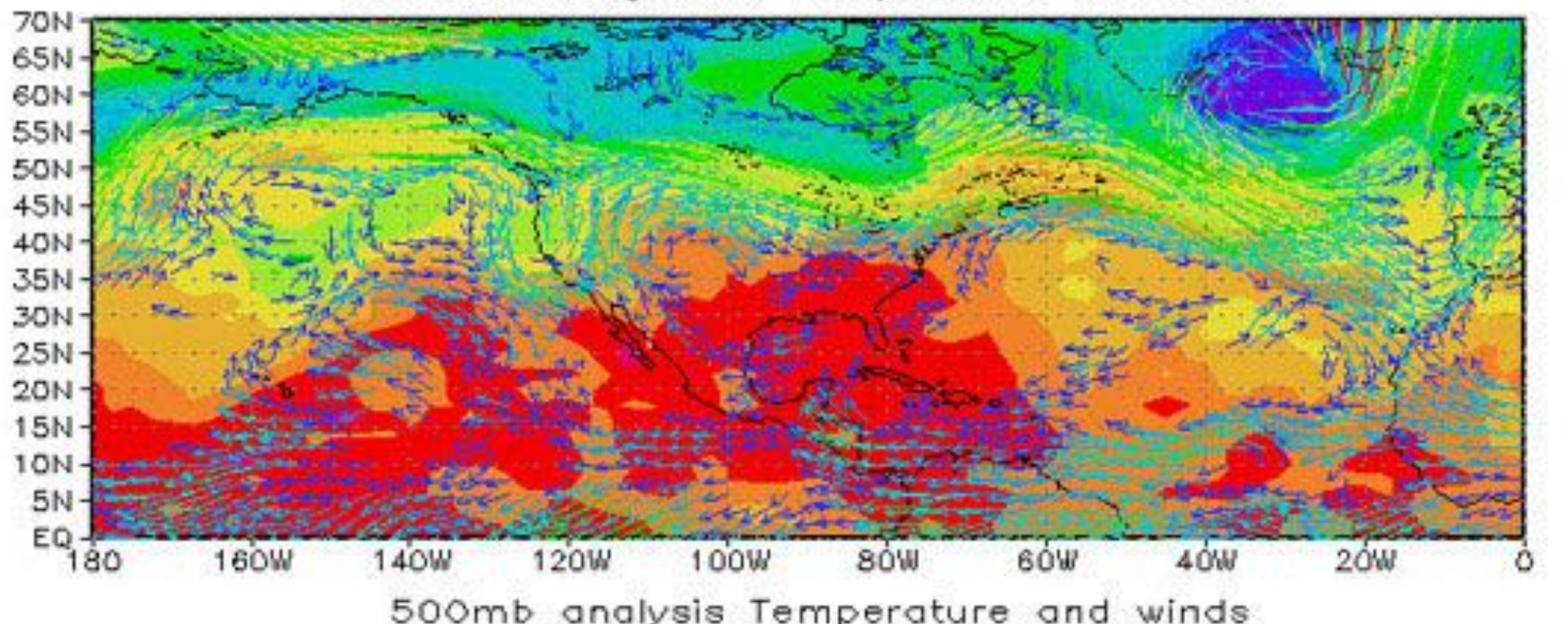


# US Military Simulator Training - Engagement Skills Trainer (EST)

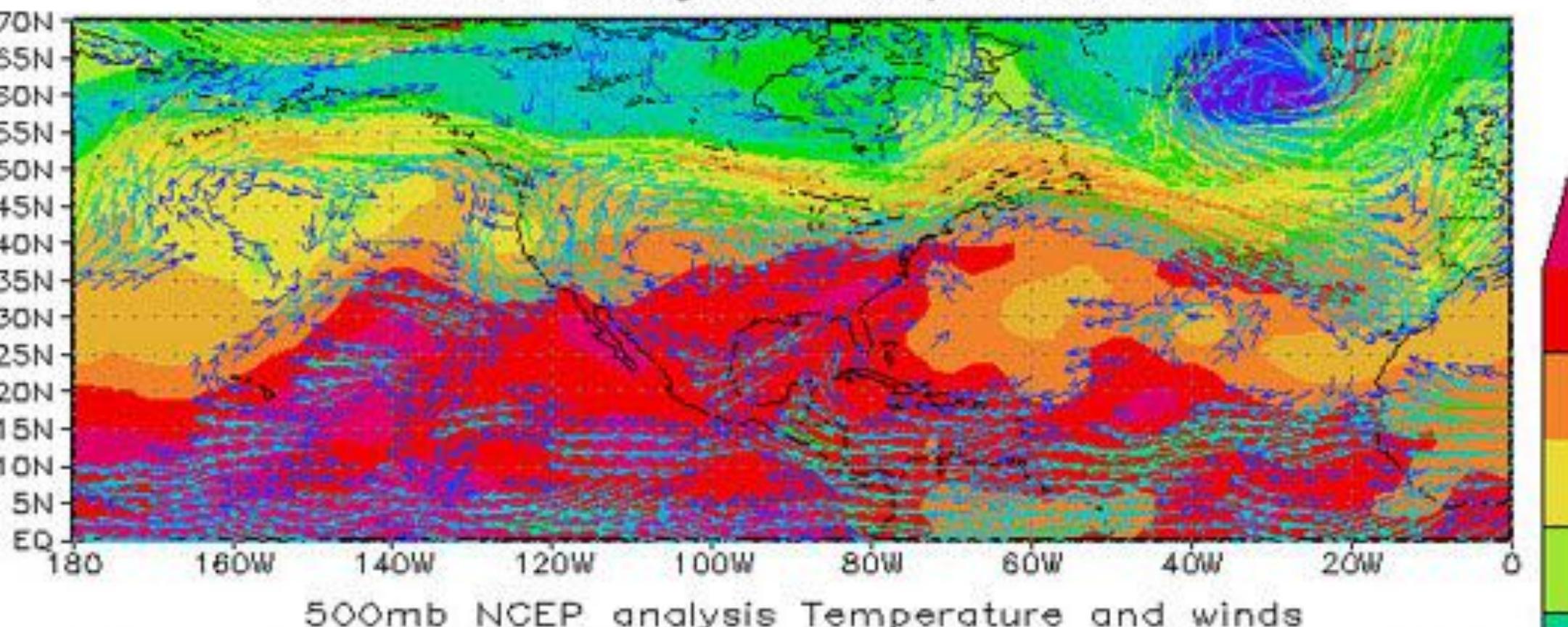
AIR SOURCE



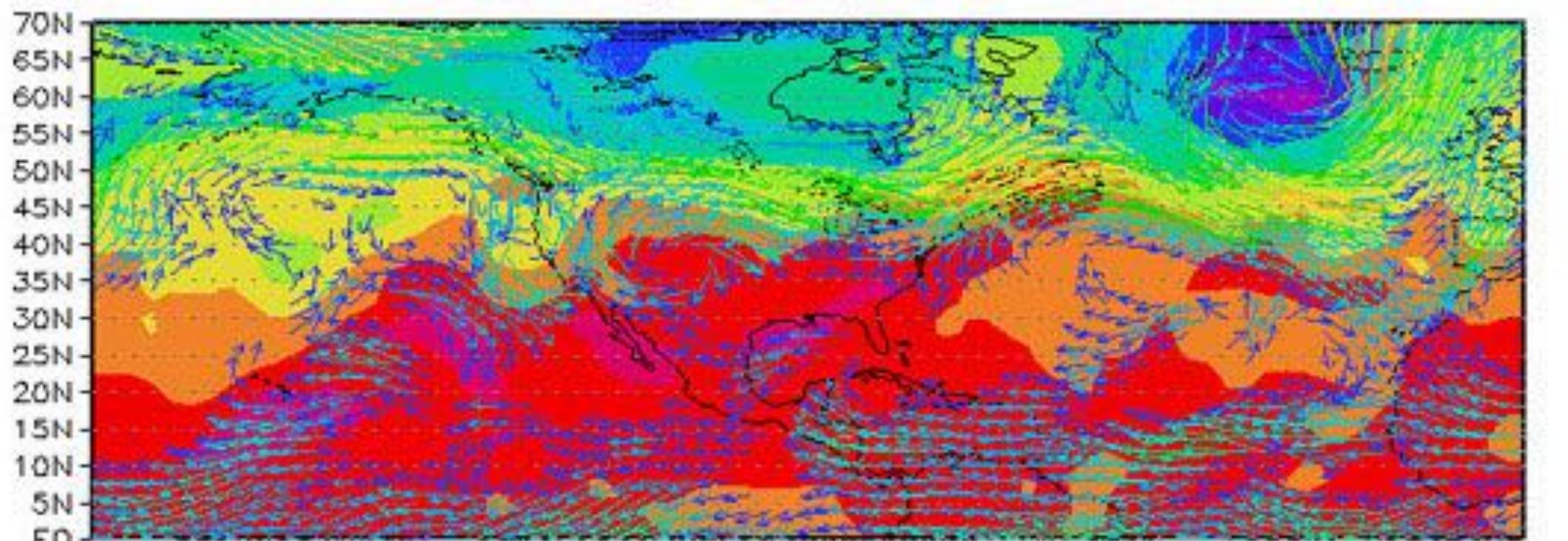
500mb background Temperature and winds



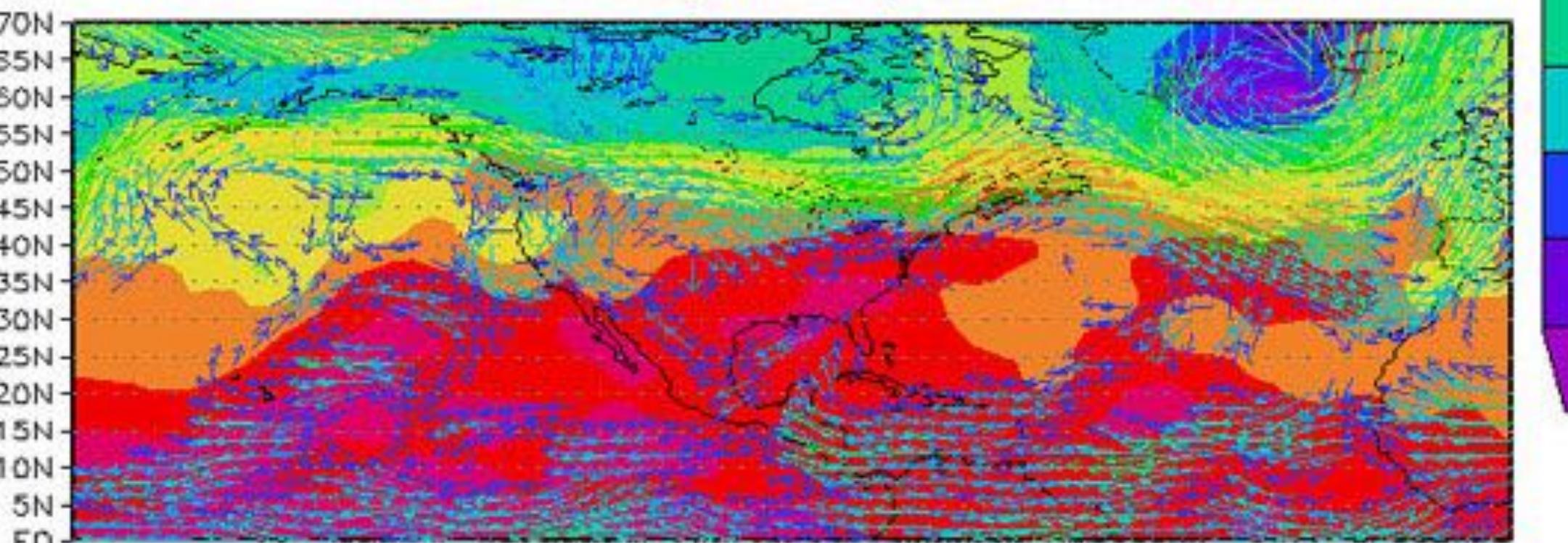
500mb NCEP background Temperature and winds



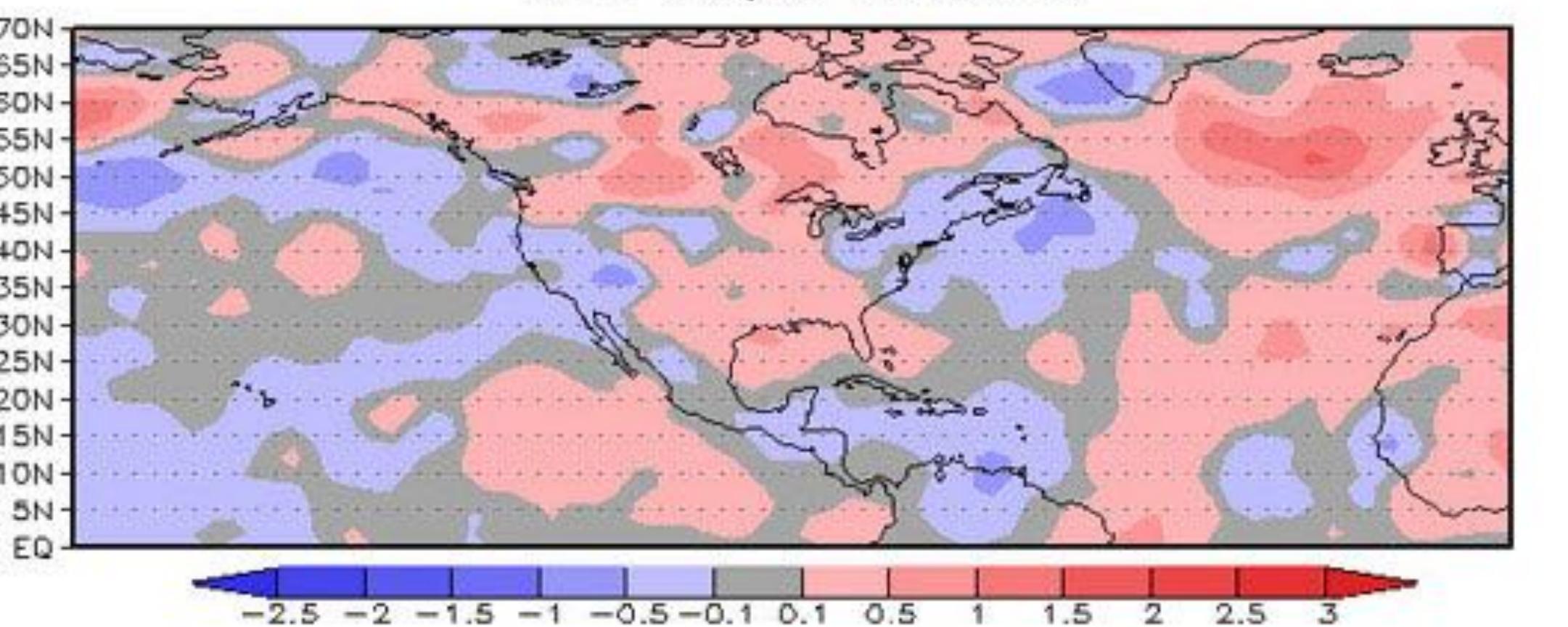
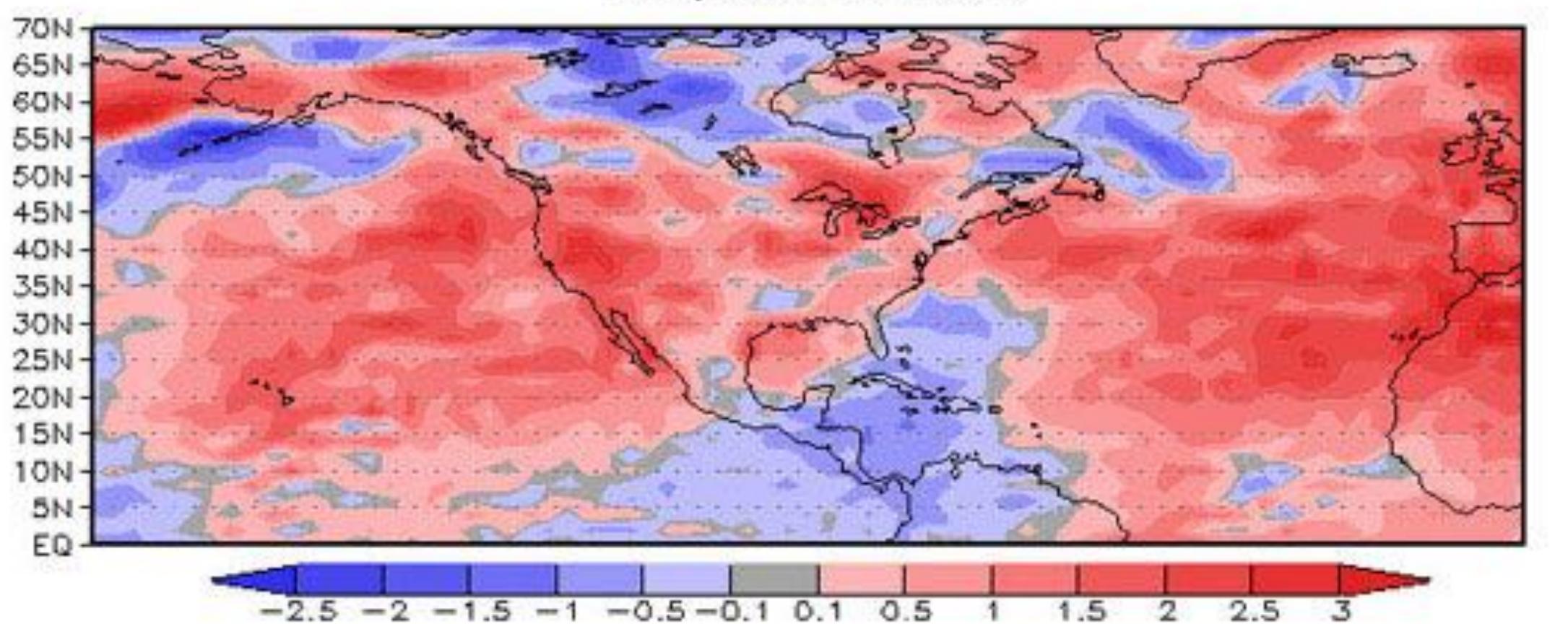
500mb analysis Temperature and winds



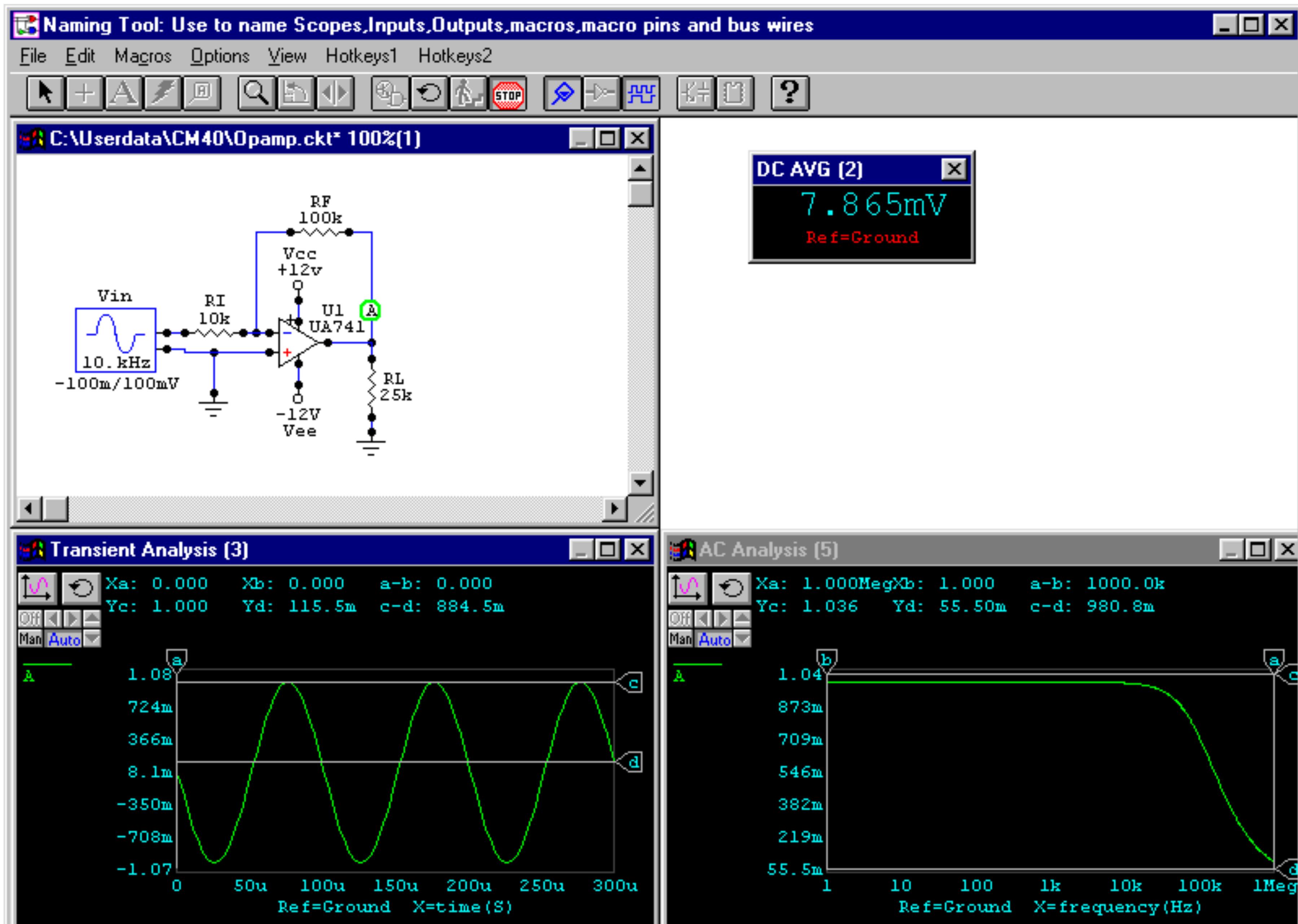
500mb NCEP analysis Temperature and winds



Analysis increments

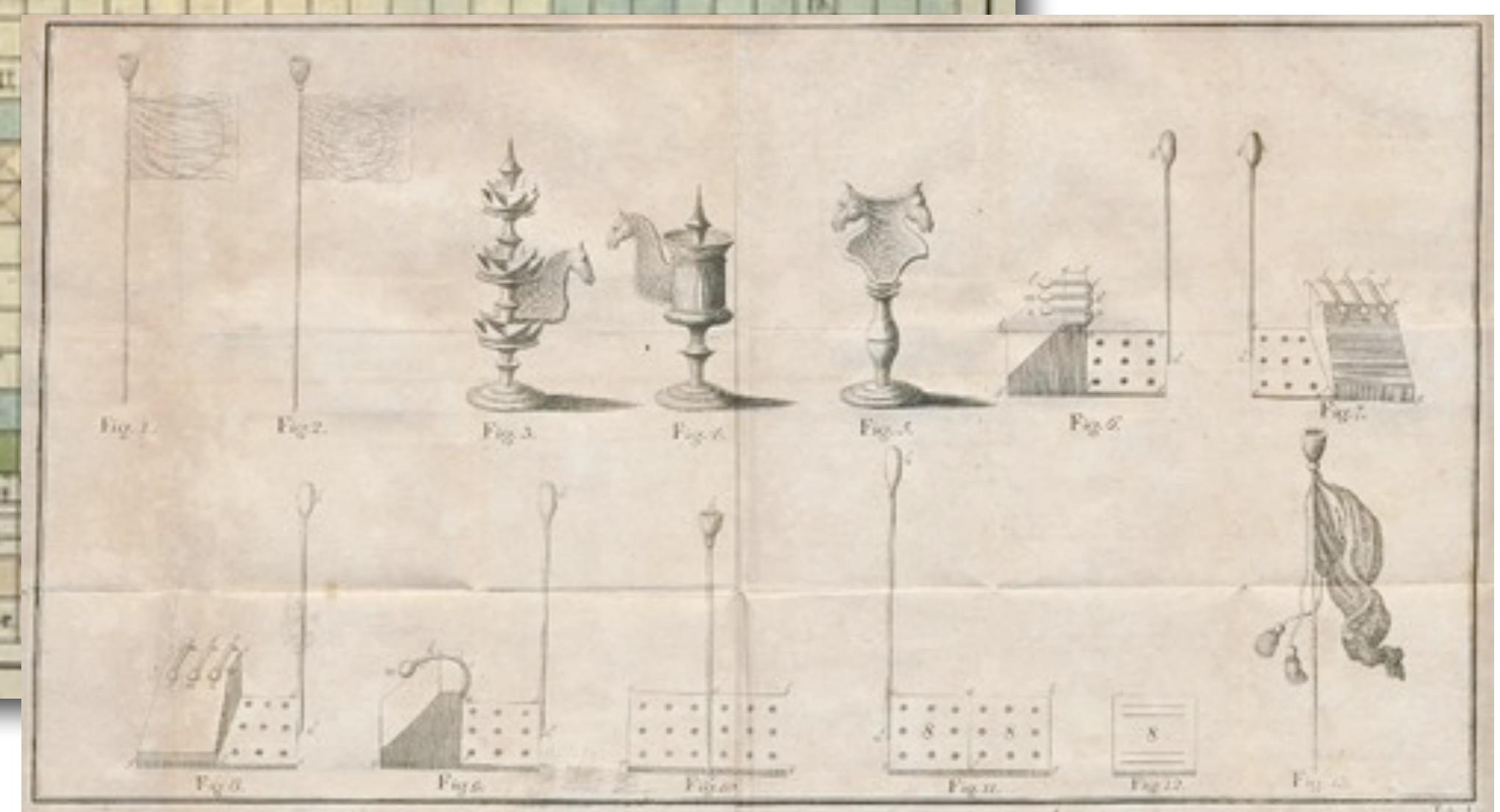
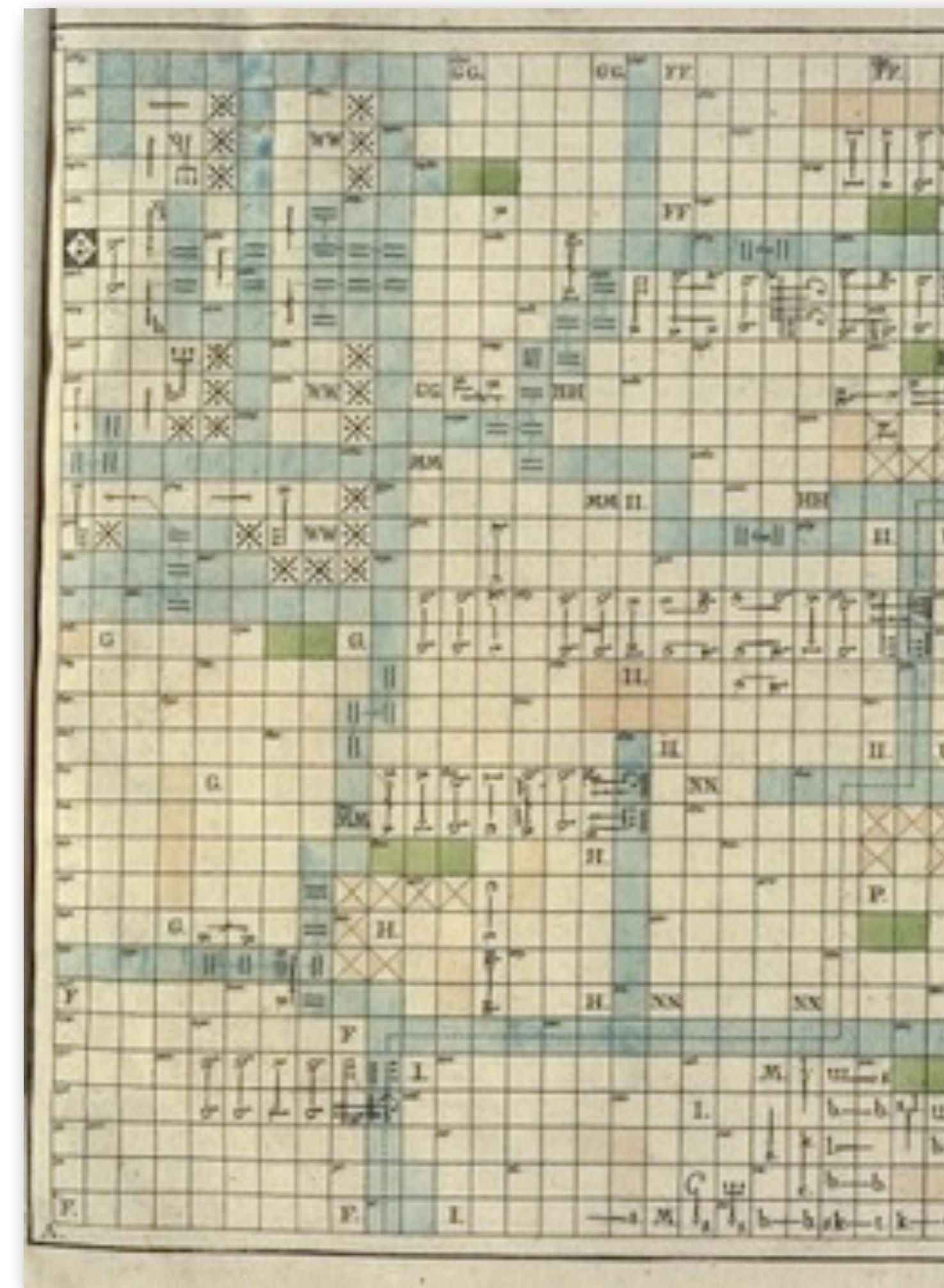
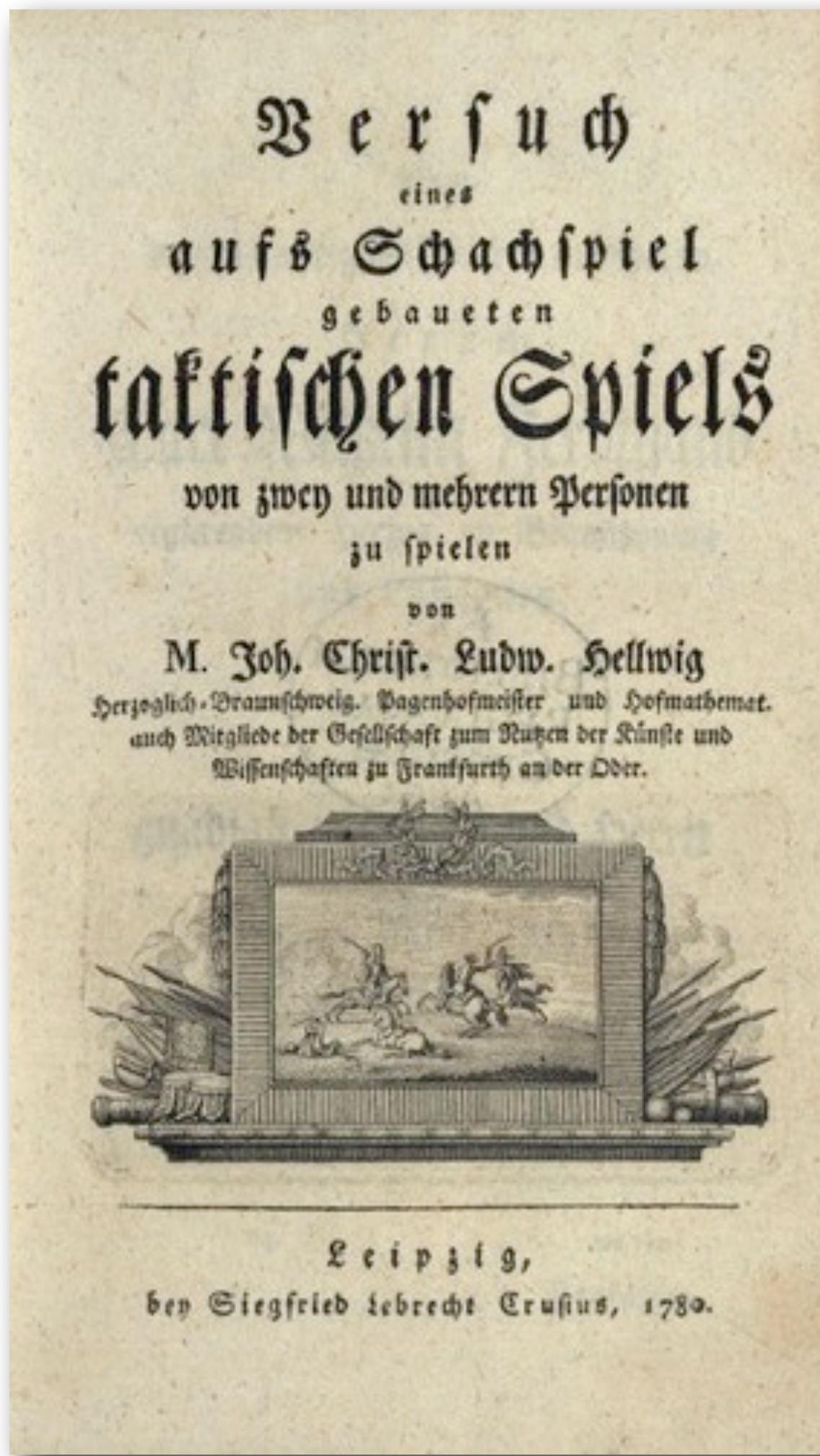


Klima-Simulation



Simulation elektrischer Schaltungen

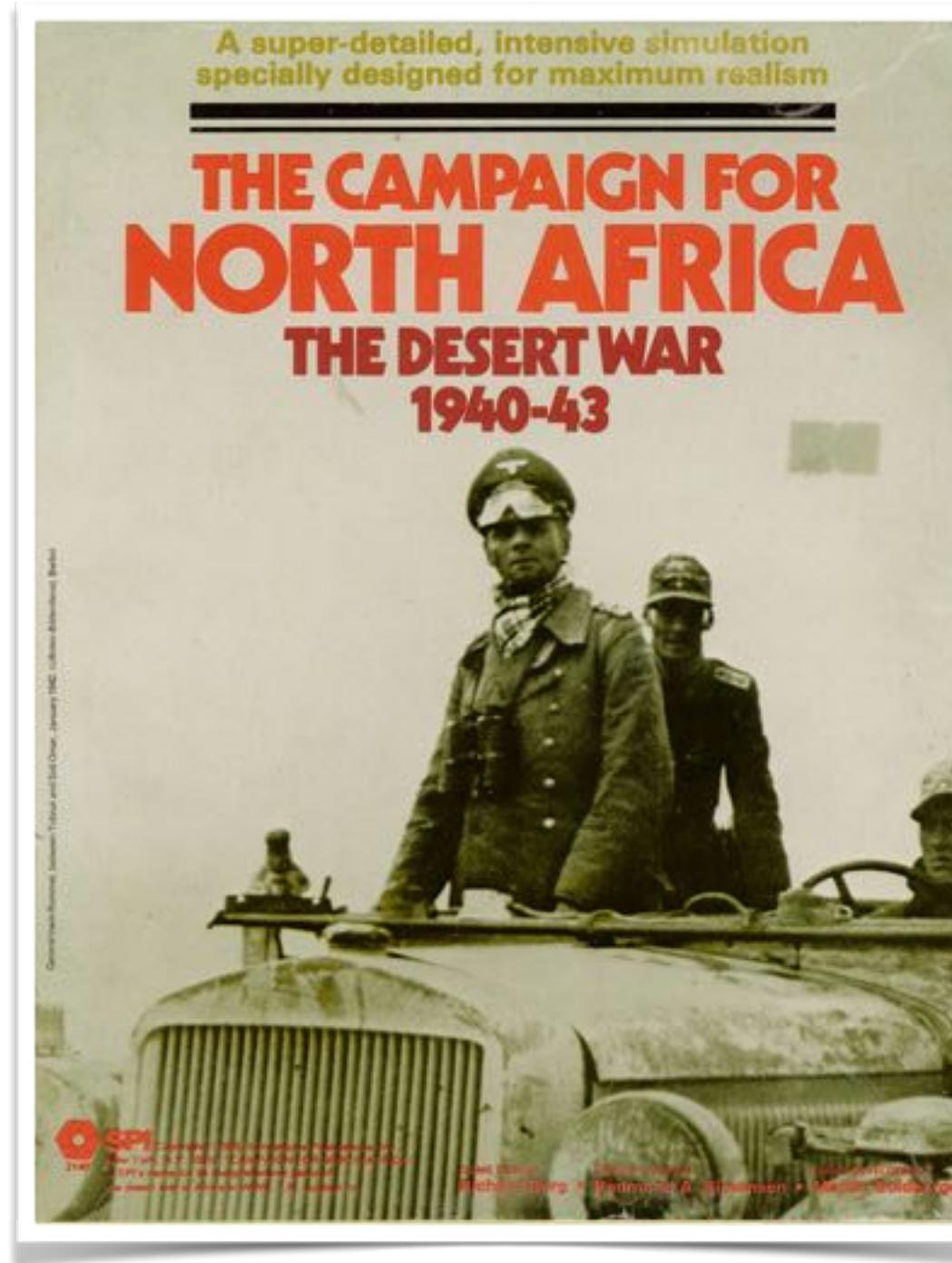
# Planspiel / Militärsimulation



1780 Johann Christian Ludwig Hellweg



# Konfliktsimulation: The Campaign for North Africa



Designer: Richard H. Berg

Artist: Redmond A. Simonsen

Publisher: SPI (Simulations Publications, Inc.)

8–10 Spieler

10.000 Stunden Spielzeit

# Simulation und Spiel

Ergebnisoffener Ablauf

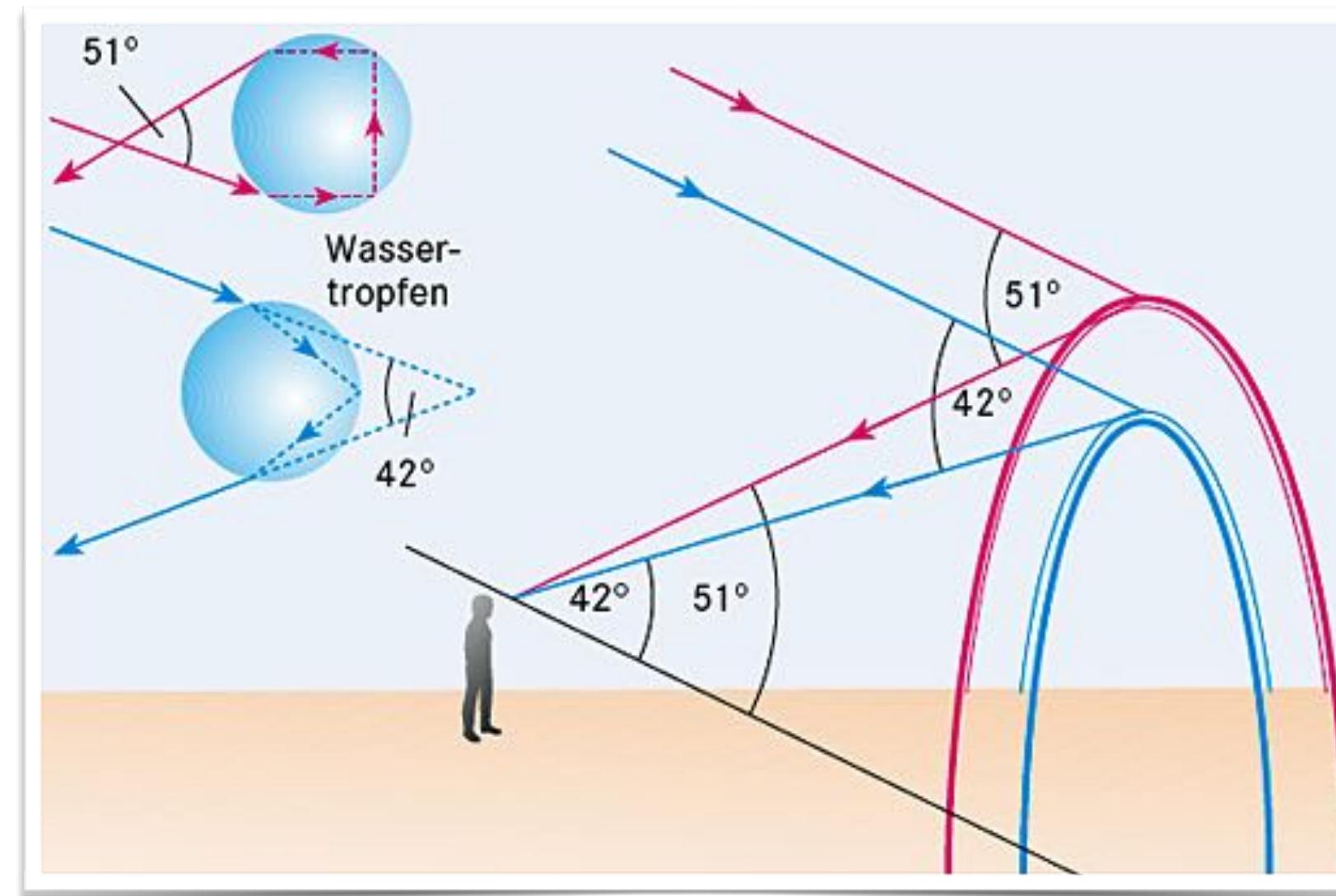
Nur realistischer Eingriff möglich

Wirklichkeitstreues Modell eines dynamischen Systems

Bevorzugte Systemzustände: Fortschritt, Sieg- und Verlustzustände

Eingreifen in den Simulationsablauf möglich

künstlerische Interpretation dynamischer Systeme



Simulationen sind technische Modelle



Spiele sind künstlerische Interpretationen

# Funktionen von Simulationen

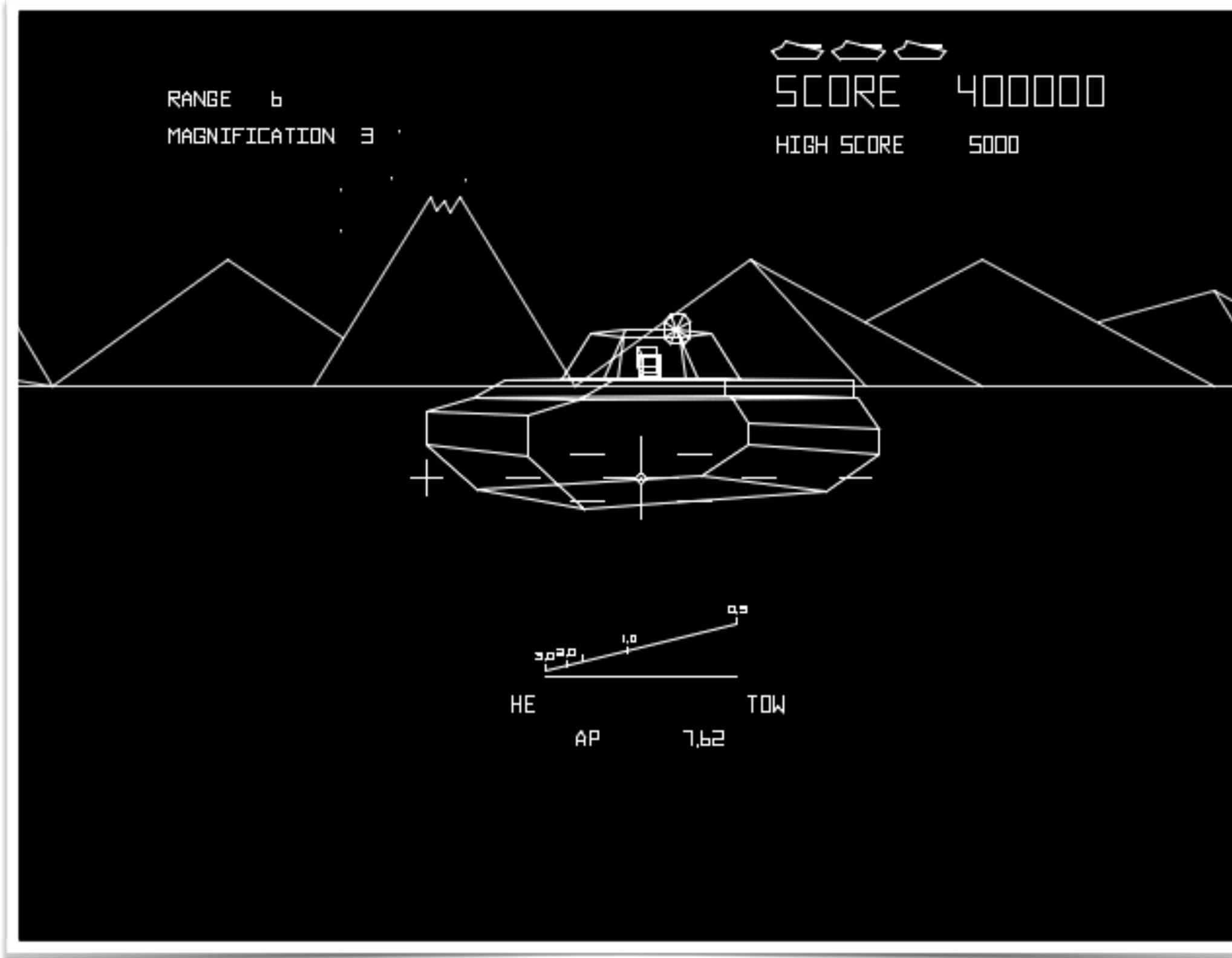


- Vermeiden von Aufwand
- Vermeiden von Gefahren
- Erkenntnis
- Vorhersage
- Training
- Archivierung
- Unterhaltung

Ein Crash-Test ist die Simulation eines echten Unfalls

# Simulationsaspekte

Alle Spiele simulieren reale oder fiktive Systeme



- Grafik
- Audio
- Narration
- Performativ
- Abläufe

Der Realismusgrad einer Simulation ist eine historische Größe.  
*The Bradley Trainer* wurde 1980 von Atari zur Ausbildung von  
Panzerschützen der U.S. Army entwickelt

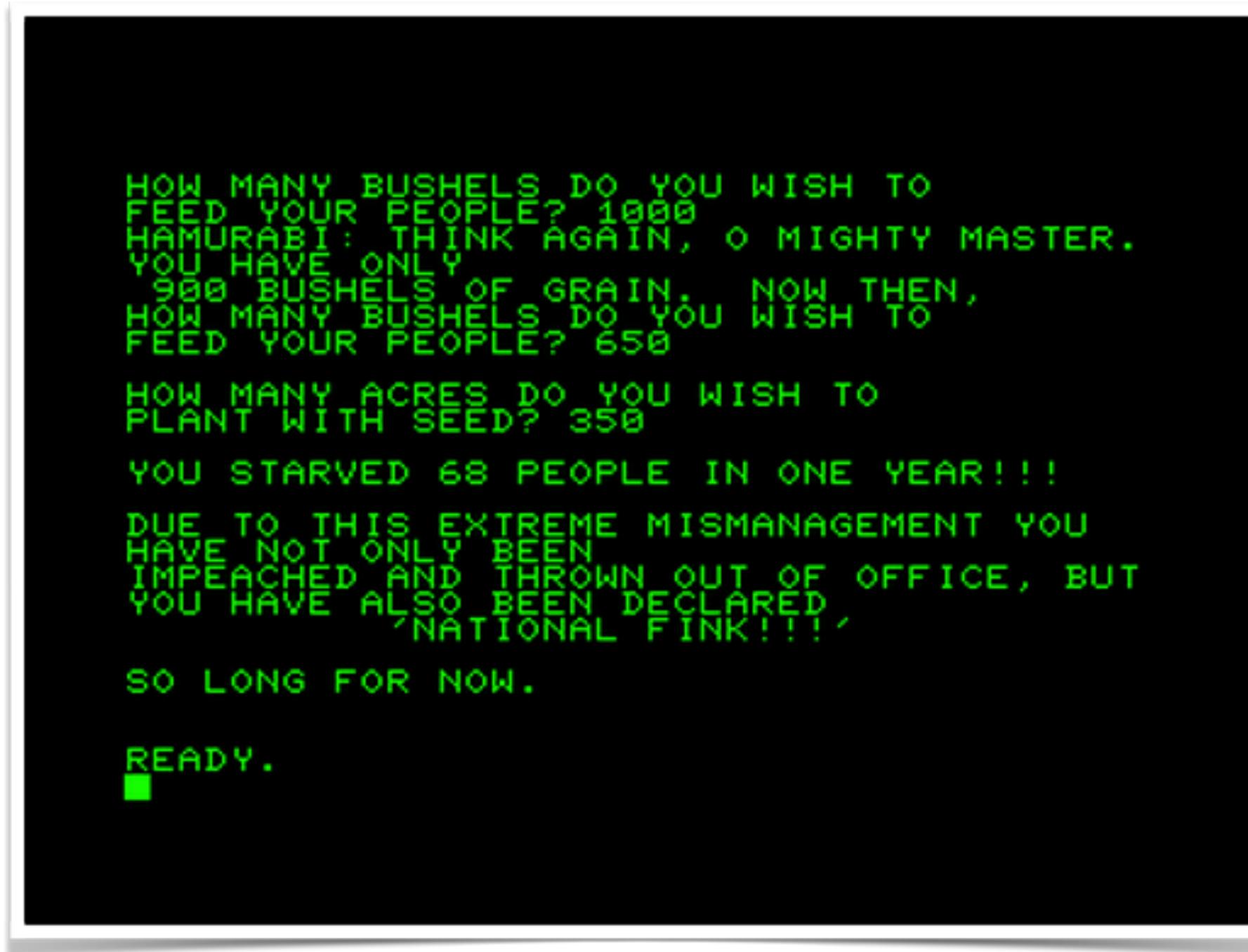
# Subgenres



*Angry Birds* simuliert zwar realistische Aspekte der Festkörperphysik, wird aber wegen des unrealistischen Referenzsystems nicht als Simulationsspiel eingeordnet.

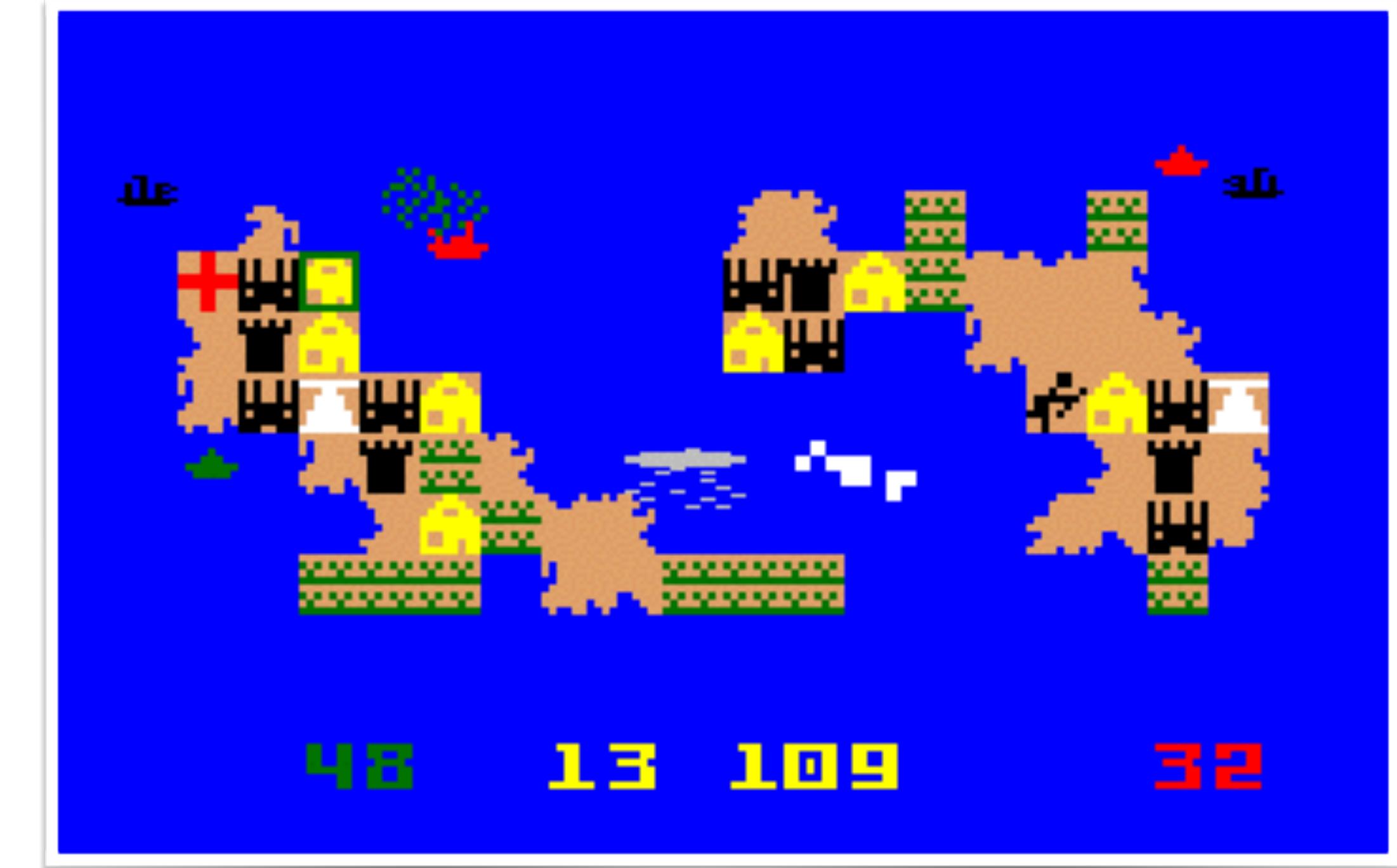
- Aufbau und Verwaltung
  - Wirtschaft
  - Stadt
  - Regierung
- Leben
  - Digitales Haustier
  - Gott
  - Soziales Leben
- Sports
- Fahrzeuge
- Andere Systeme

# Aufbau und Verwaltung



The Sumer Game / Hamurabi (1968)

[https://archive.org/details/msdos\\_Hamurabi\\_1996](https://archive.org/details/msdos_Hamurabi_1996)



Utopia (1982)

<https://www.youtube.com/watch?v=FVIHNmCHoY>

# Spielelemente

- Ressourcen: Geld, Material, Arbeiter, Raum, Zeit
- Planen und Bauen
- Kaufen und Platzieren
- Unterhalt
- Zufallereignisse
- Ökonomie: Produktion, Verbrauch, Wechsel, Tausch (s. VL Ökonomie)

# Tugendhafte Spiele



Aus ökonomischen, historischen, technischen und pragmatischen Gründen werden in Deutschland keine Militärsimulationen produziert.

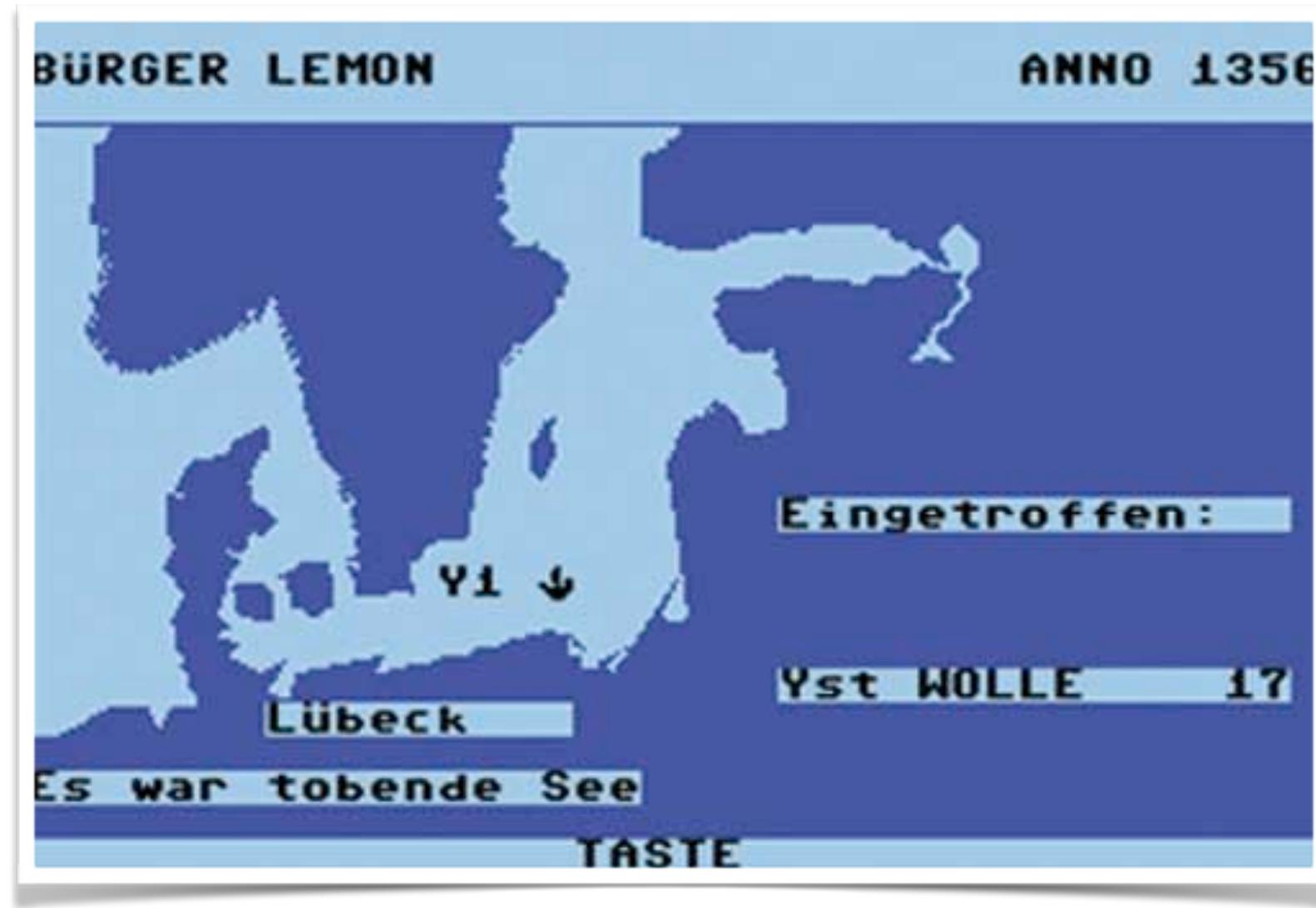
»Stattdessen wird Deutschland bekannt für Aufbauspiele, bei denen es nicht um Eroberung und Zerstörung, sondern um Geldvermehrung und Ressourcen-Verwaltung geht«  
retro gamer 2/2013: Made in Germany, Teil 1, S. 14.

KRON: Bundesliga-Manager ab 1989

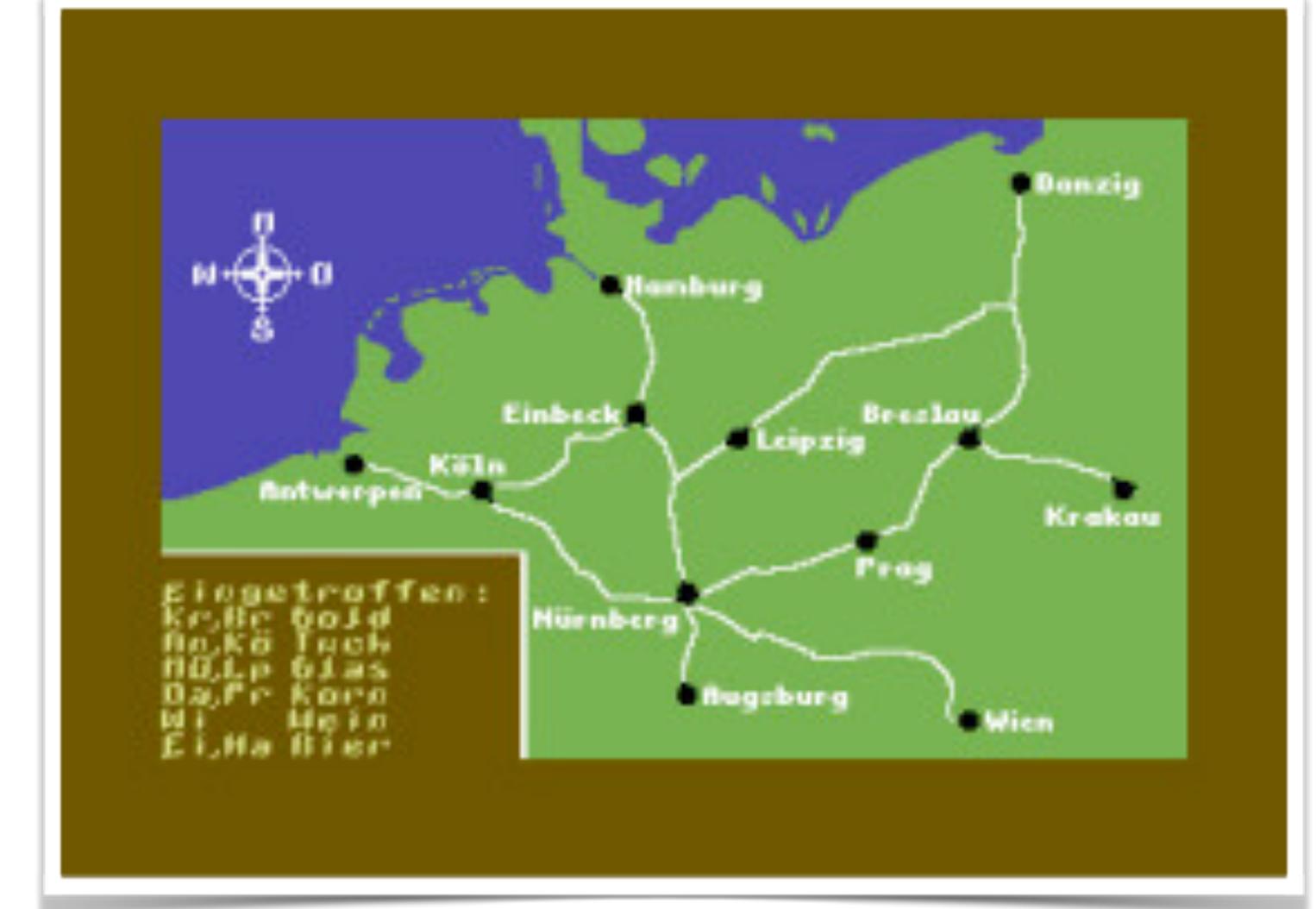
# Wirtschaftssimulation



Kaiser, 1984



Hanse, 1986



Fugger, 1988

# Wirtschaftssimulationen

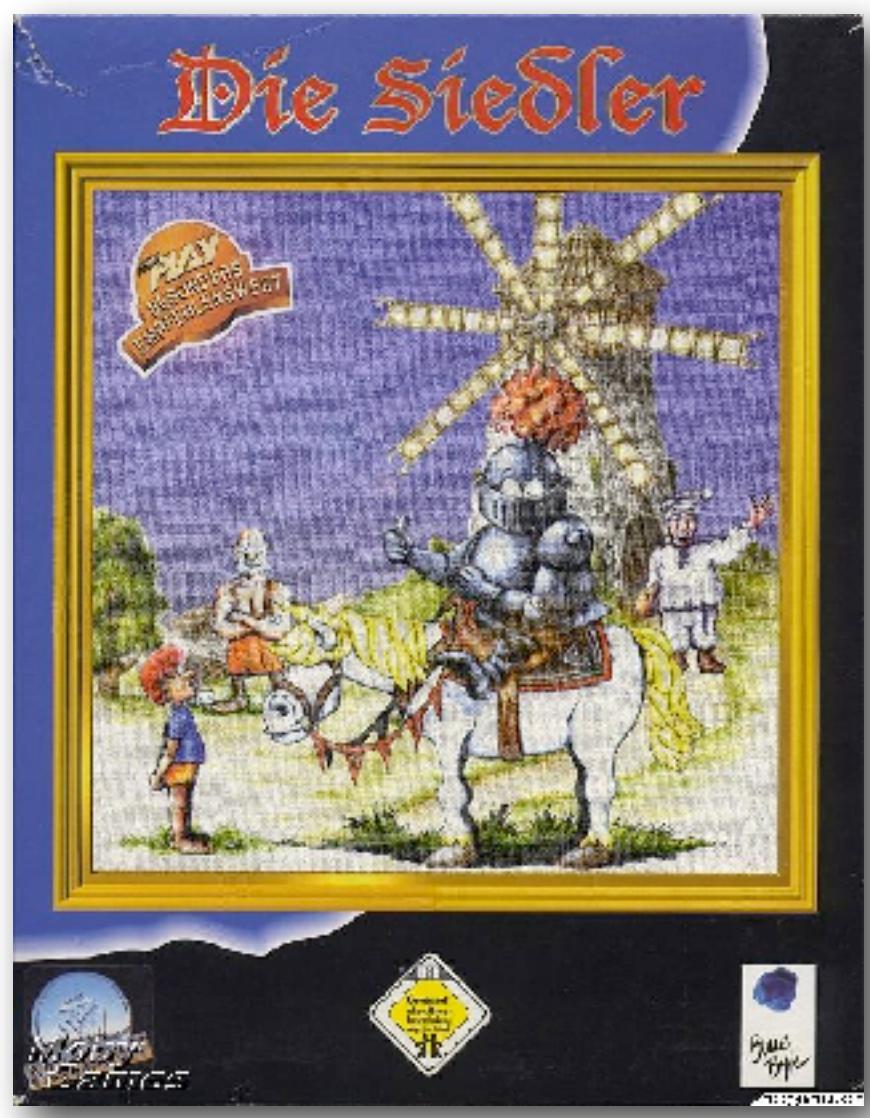


Ascon: Patrizier  
ab 1992

Max: 1869 – Hart am Wind, 1992

Oldtimer, 1994

# Aufbaustrategiespiele



BlueByte: Die Siedler  
ab 1993

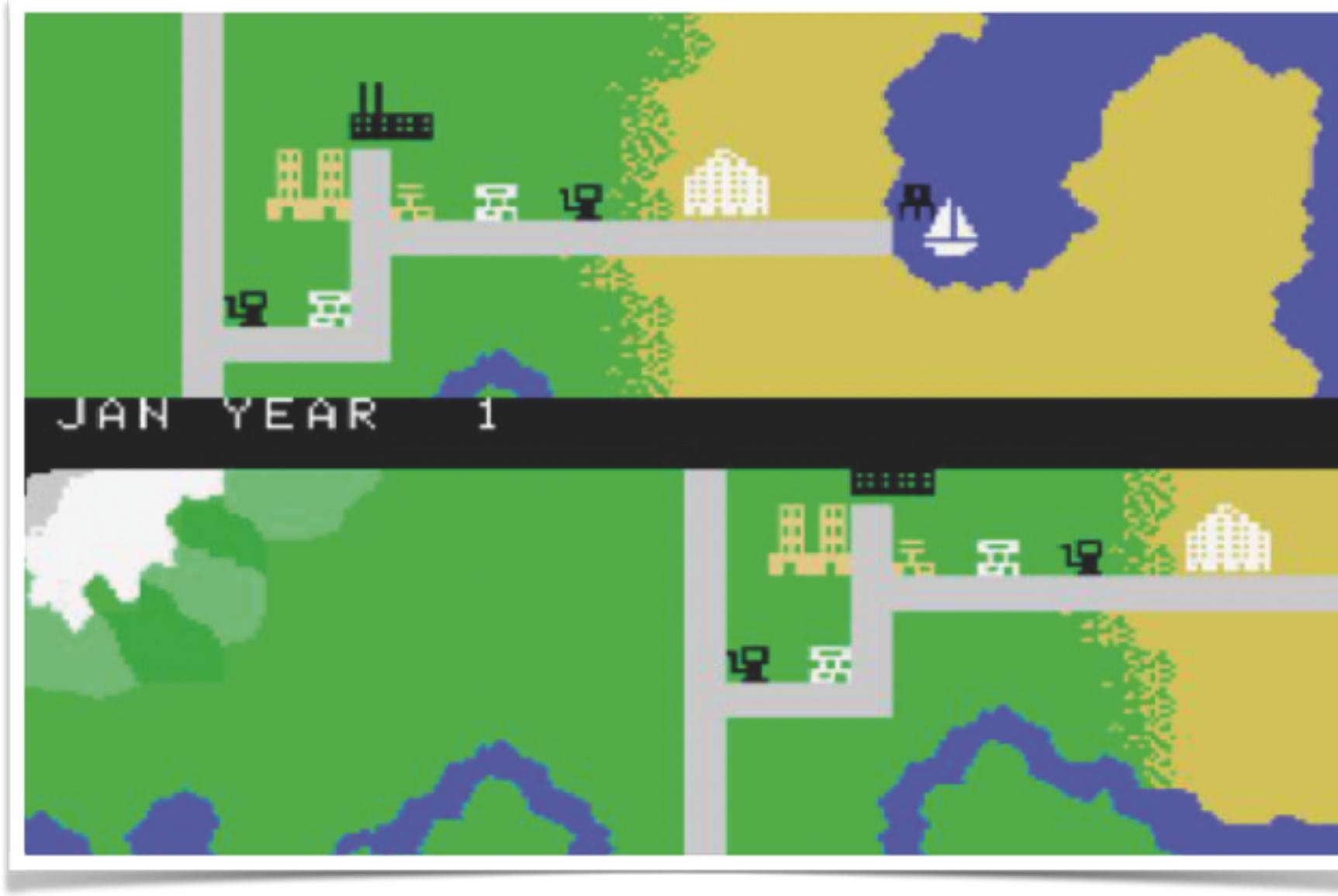


Max Design, Sunflowers,  
ab 1998



Bright Future: Fußballmanager  
ab 2002





Fortune Builder 1984



Sim City 1989

# Stadt-Simulation

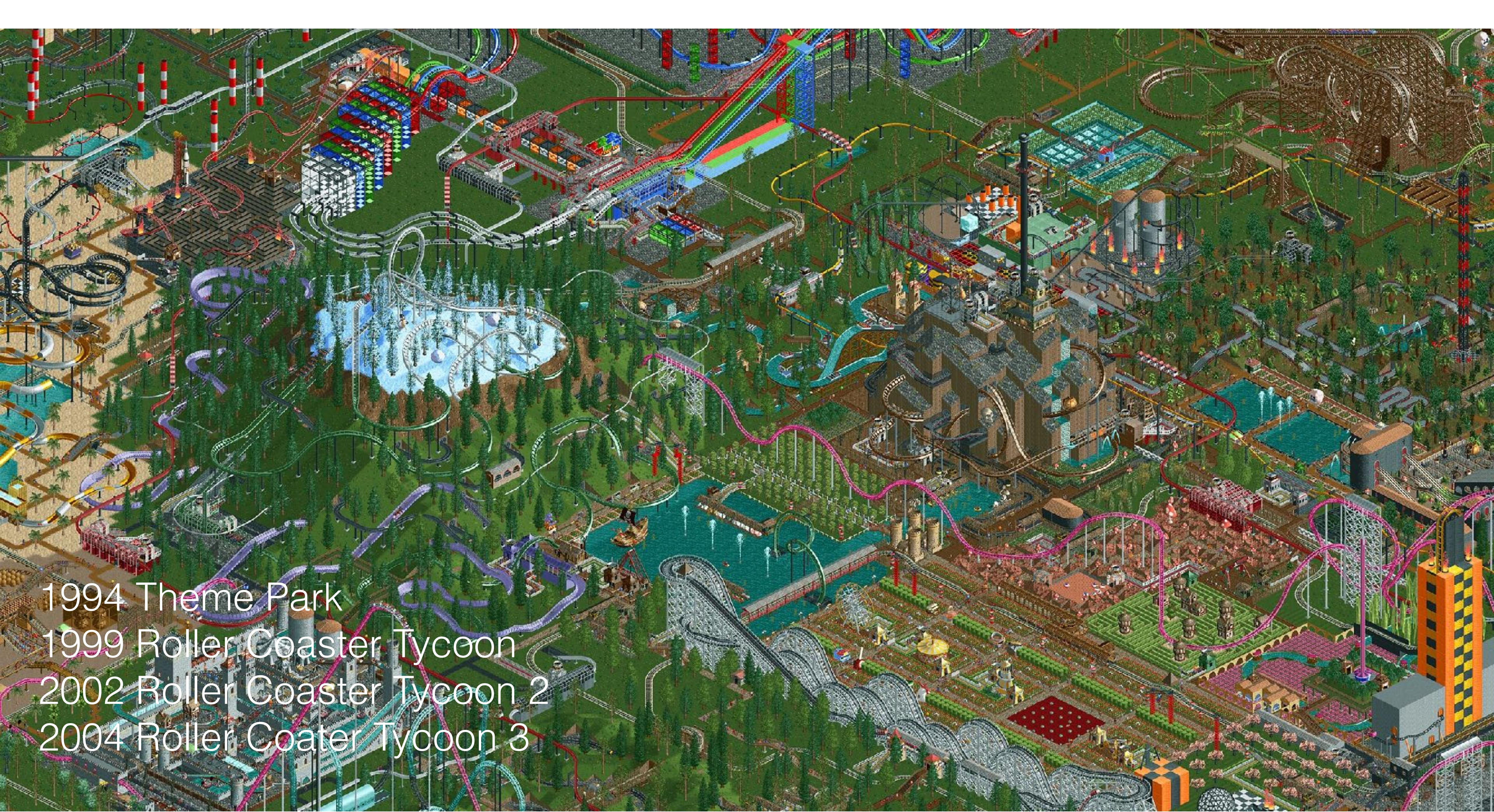


Sim City 2000



# Cities: Skyline





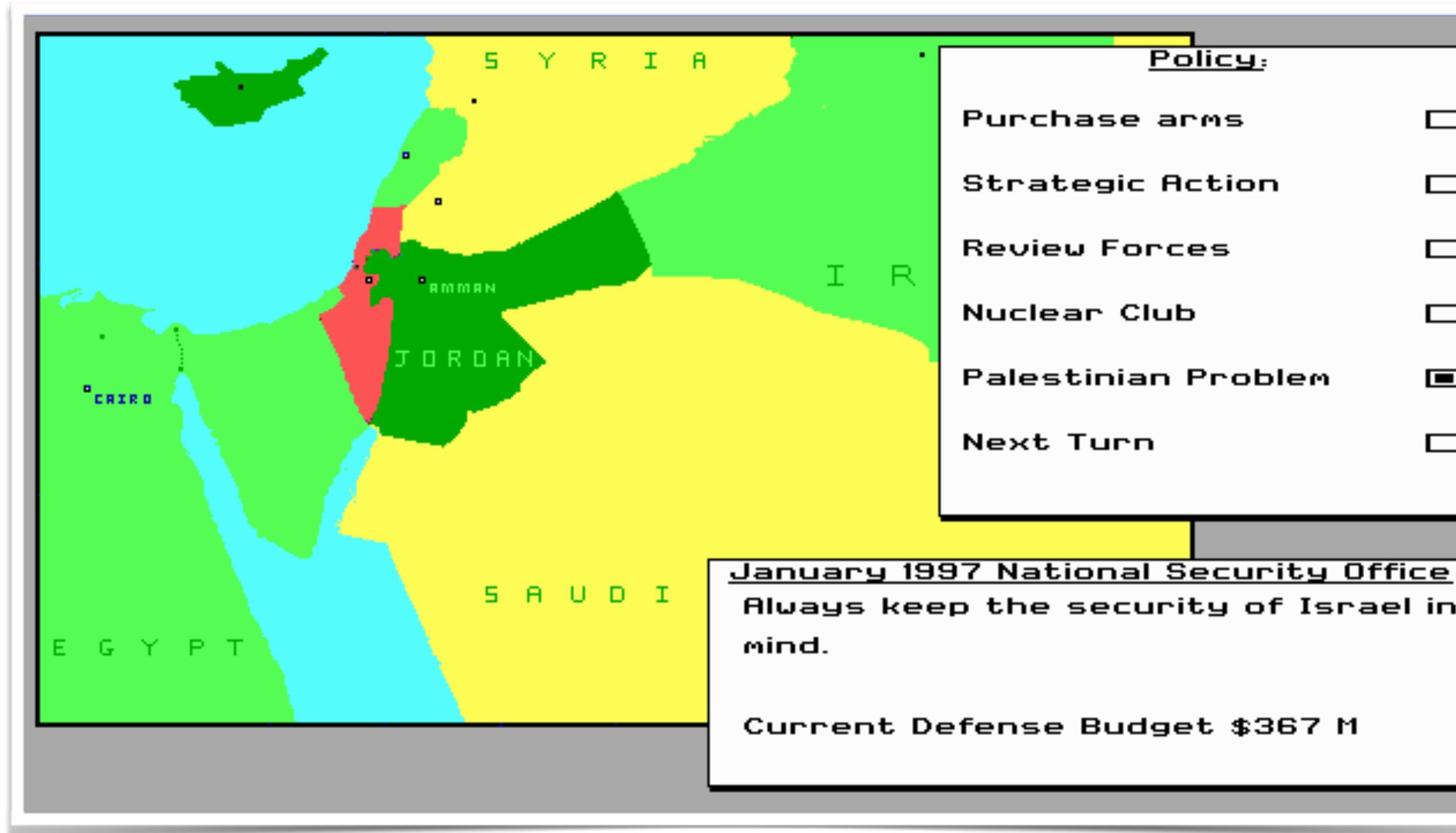
1994 Theme Park

1999 Roller Coaster Tycoon

2002 Roller Coaster Tycoon 2

2004 Roller Coaster Tycoon 3

# Government



Conflict: Middle East Political Simulator

- 1968 Hamurabi
- 1990 Conflict: Middle East Political Simulator
- 1993 Caesar
- 2003 Tropico
- Crusader Kings II



SimFarm (1993)



Harvest Moon

# Bauernhof



Stardew Valley

138

AUGUST

options



Photosynthesis

COST -12 -12 -12

GAIN 0 0 0

capacity

Stamen pollen saturation

mature flower

water	12	9	13
CO <sub>2</sub>	15	18	18
light energy	16	14	11
sunflower seeds	40	40	40
watering can	12	12	12
tomato seeds	31	31	31

Plant Part Costs



water  
fertilize

+ 27 + 50 + 70

NEXT TURN

Reach for the Sun

# Lebenssimulation



- Conway's Game of Life
- Little Computer People (1985)
- The Sims (2000)
- Spore (2008)

<https://bitstorm.org/gameoflife/>

# Little Computer People 1985



# Artificial Life



Creatures (1996)



Spore (2008)



Tamagotchi 1996



Furby 1990



Seaman 1999



Konrad the Kitten (Early Access)

# Digital Pet

- Tamagotchi
- Furby
- Dogz
- Catz
- EyePet (PS Eye)
- Nintendogs
- Seaman
- Kinectimals (Kinect)
- Konrad the Kitten (Vive)



Populous (1989)

# God Games

- Populous (1989)
- Dungeon Keeper (1997)
- Black & White (2001)
- Dwarf Fortress
- From Dust (2011)
- Reus (2013)
- Godus (2013)



Reus (2013)

# Social Sim

- Alter Ego
- Animal Crossing
- Façade
- The Sims (1999)
- Princess Maker
- Tomodachi Life



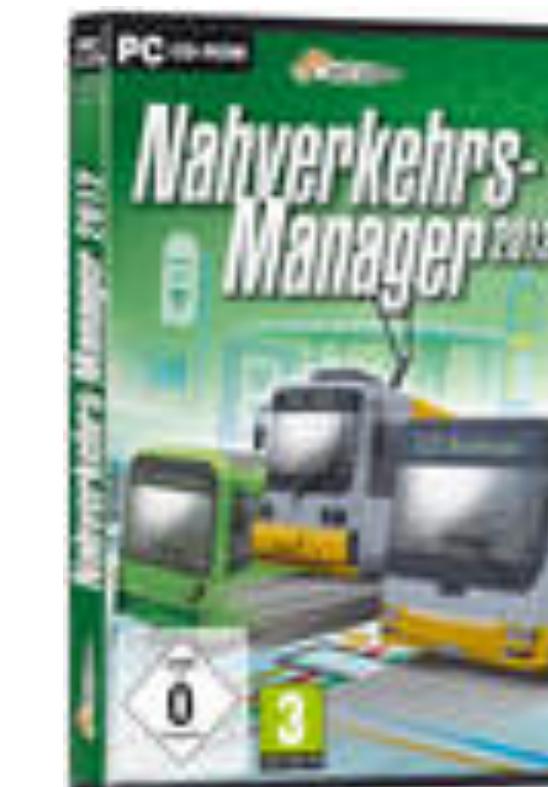
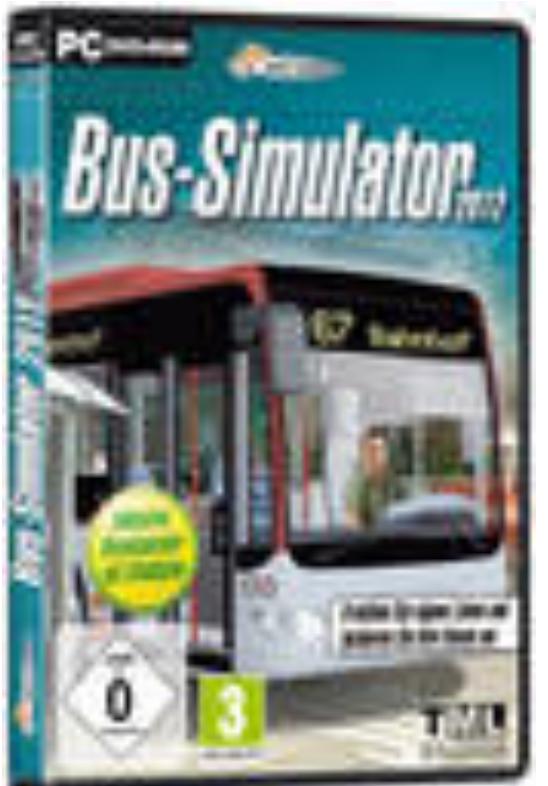
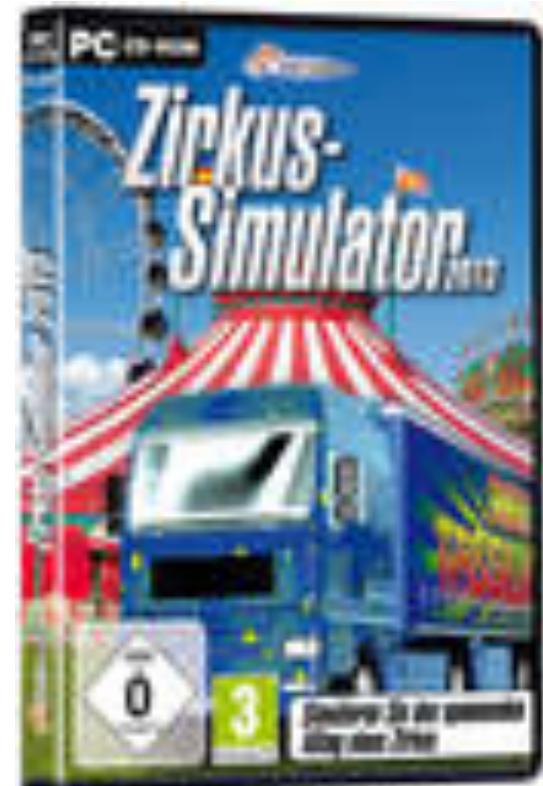
The Sims (1999)



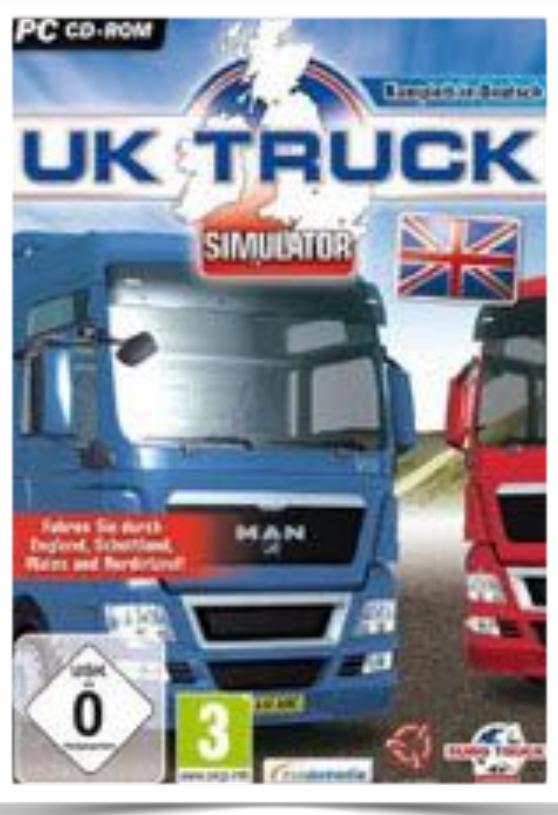
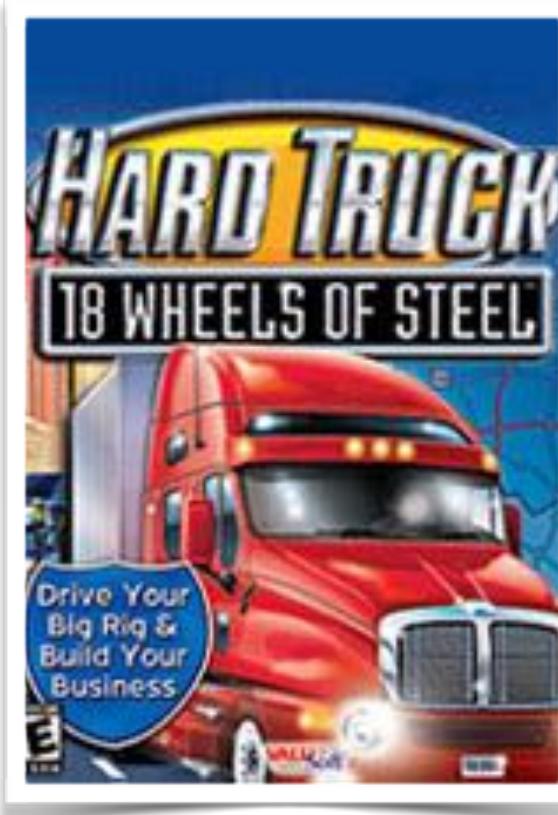
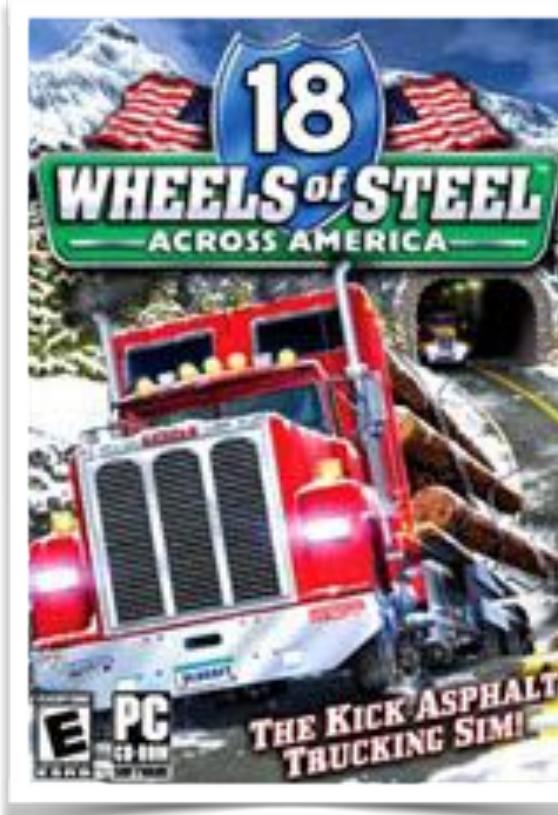
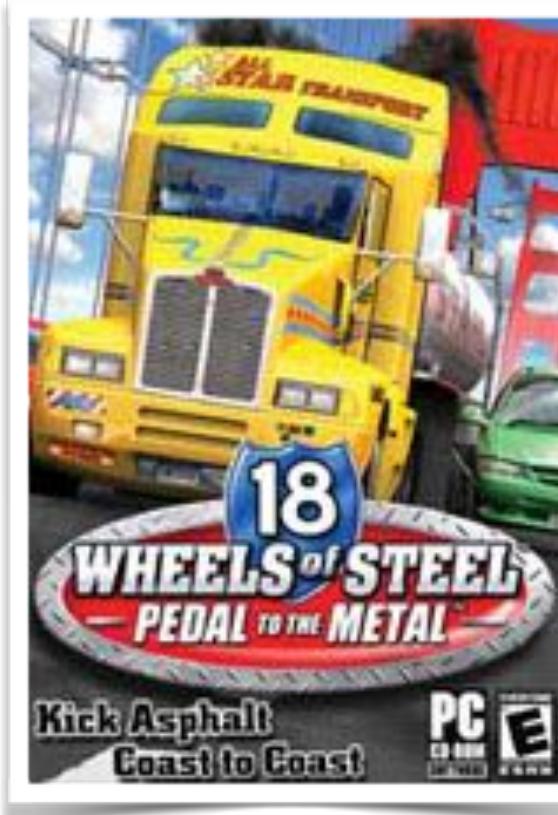
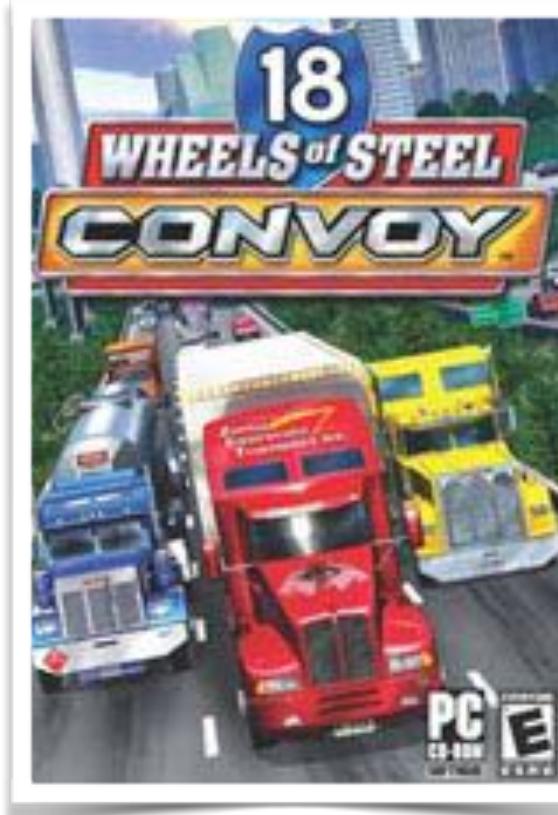
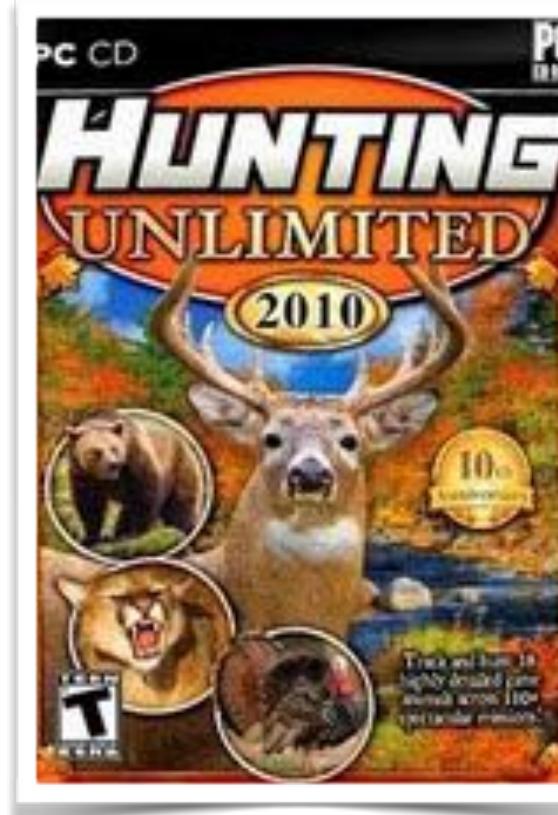
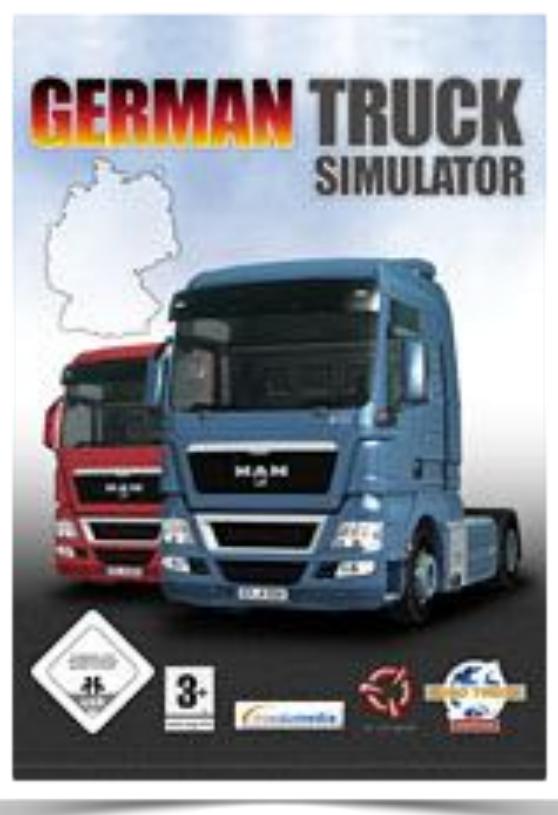
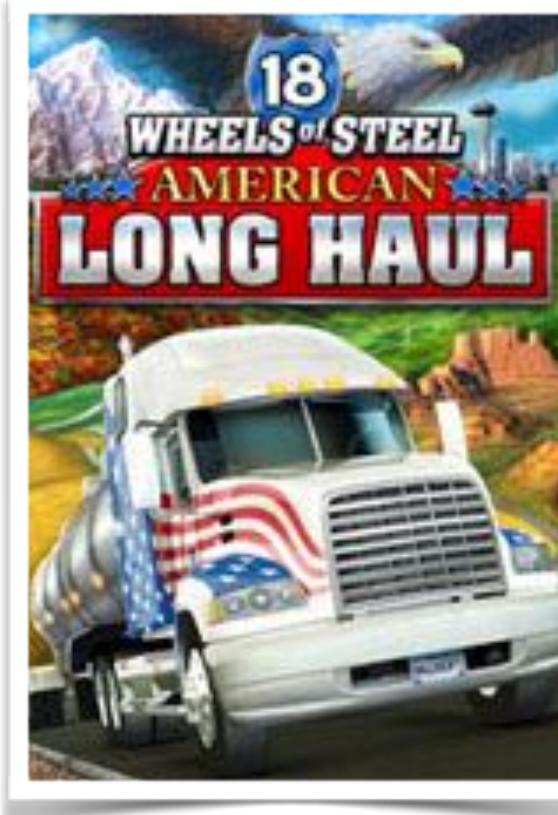
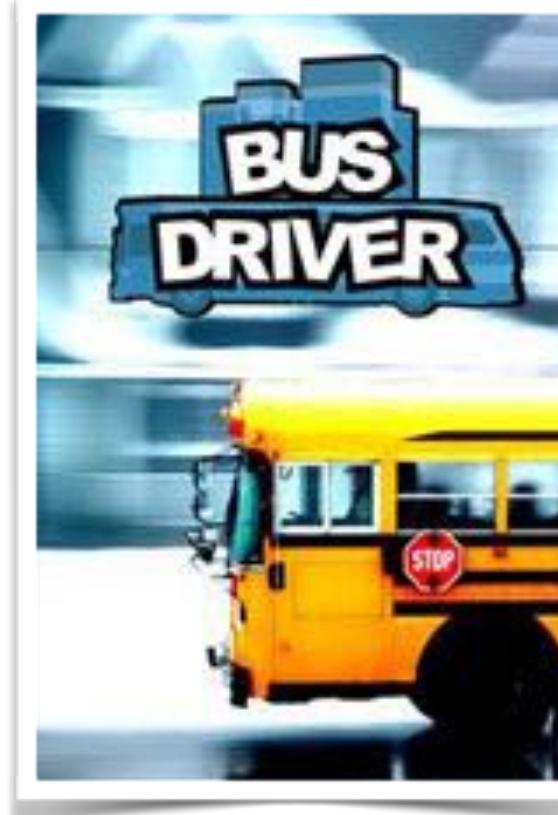
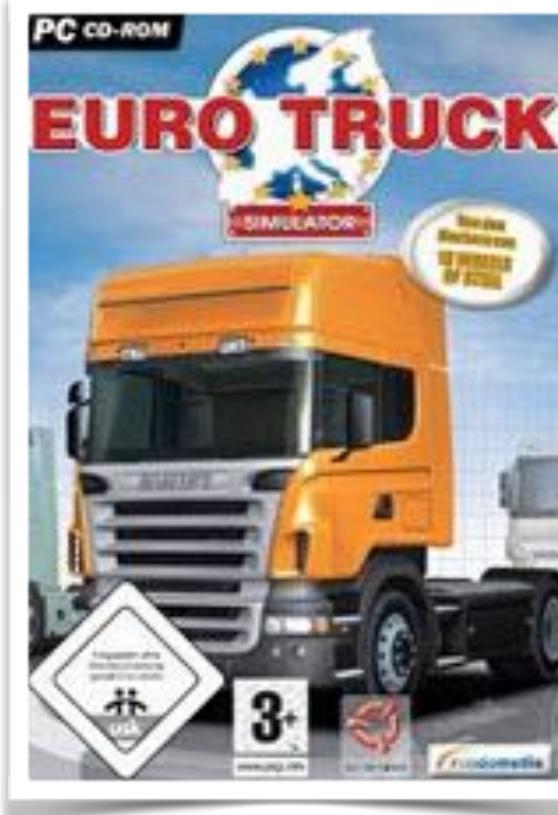
# Second Life (2003)

# Berufe

»Womöglich handelt es sich aber auch um ein typisch deutsches Phänomen. All diese Spiele halten Tugenden wie Fleiß oder Pünktlichkeit hoch, und die Liebe zum motorisierten Gefährt ist sozusagen die Grundlage der Spiele.« (Oliver Klatt)



# Berufe



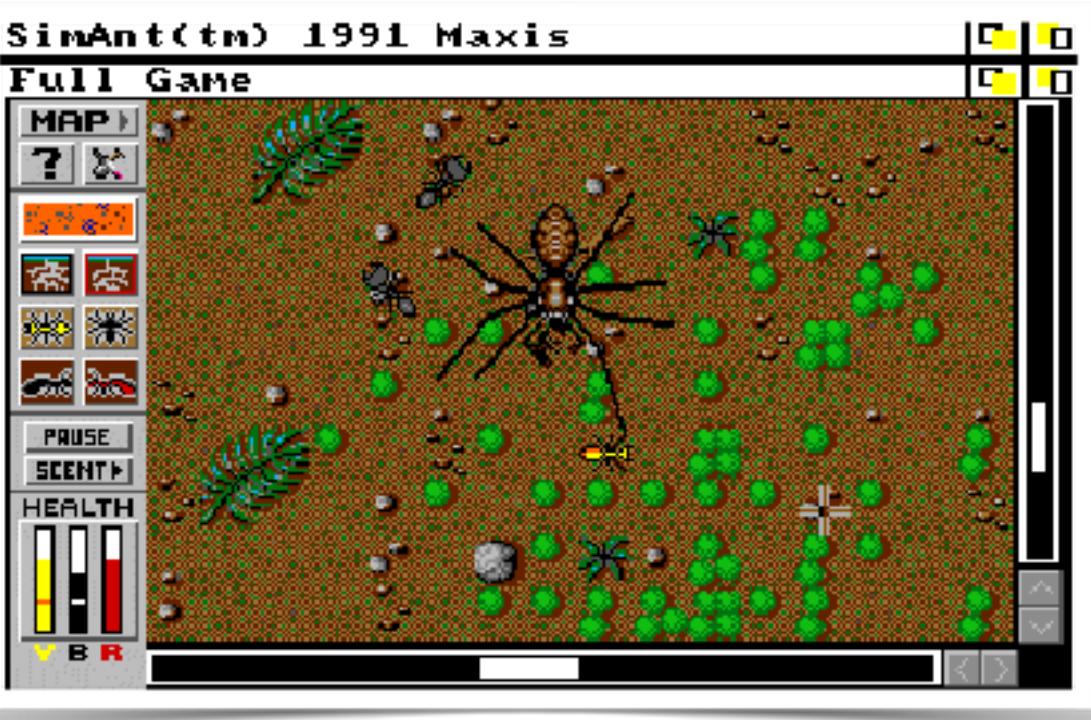
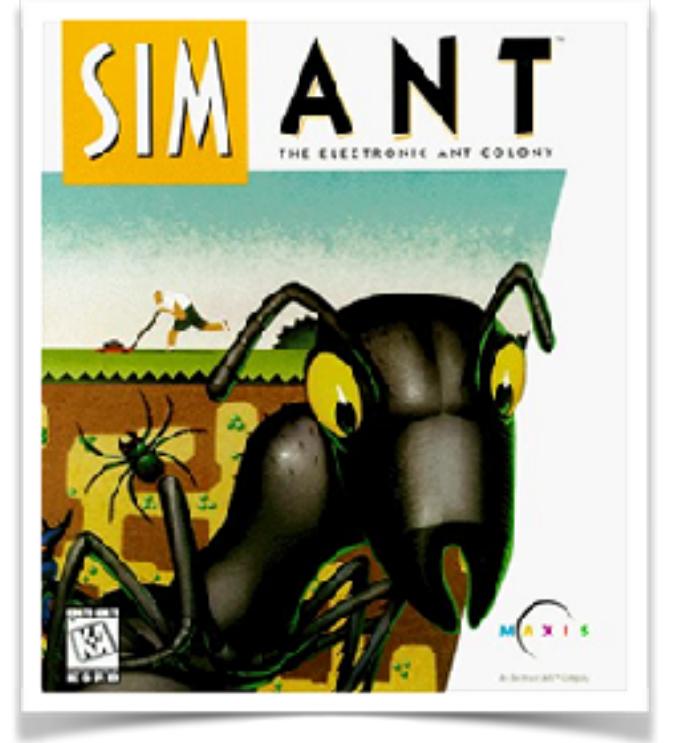
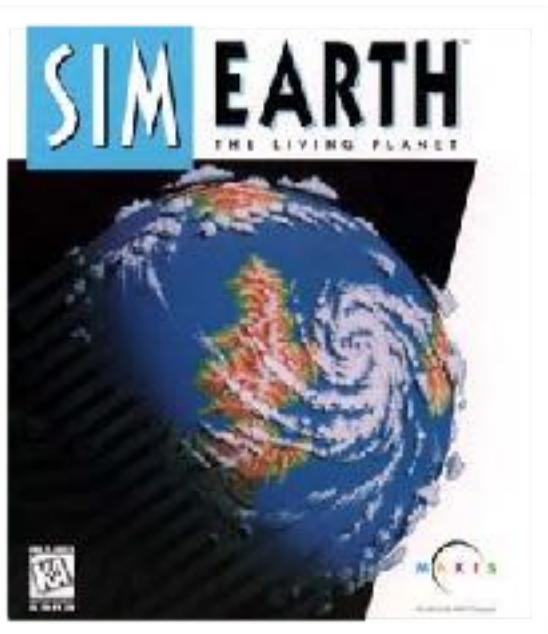
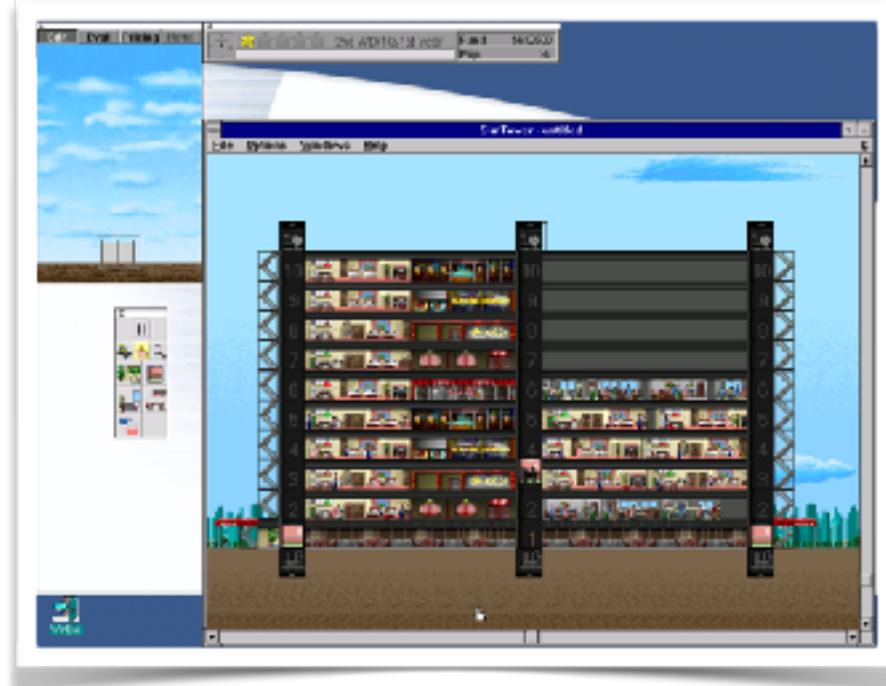
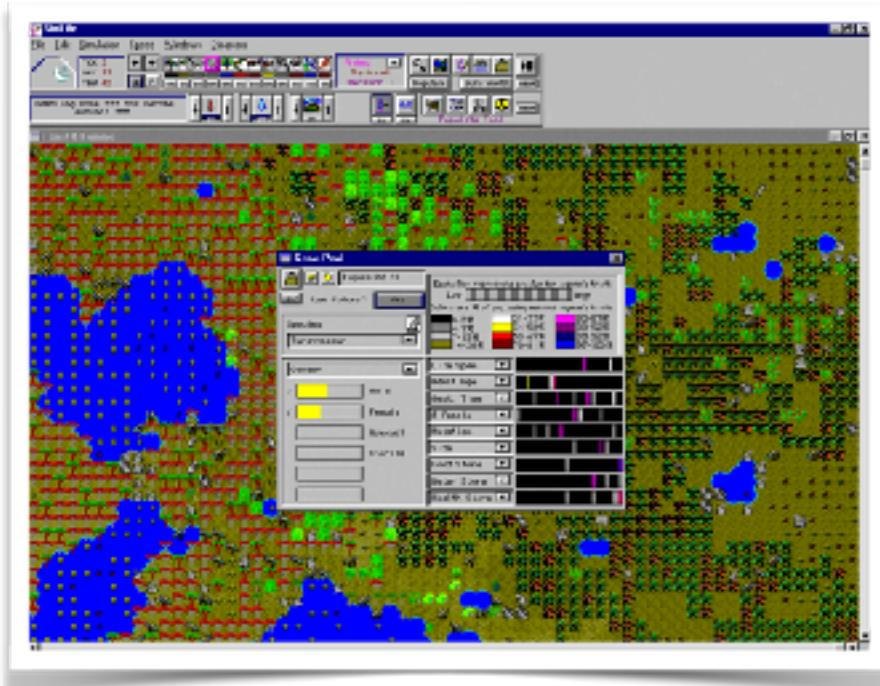
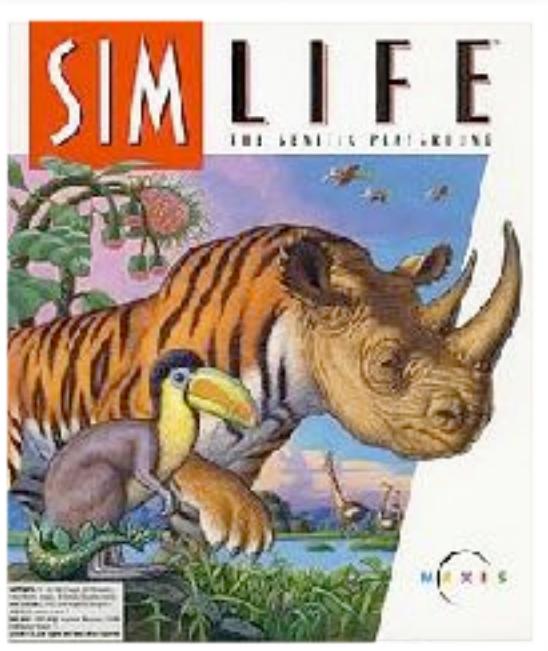


Slaves to Armok II: Dwarf Fortress (seit 2006)

# Verschiedene Systeme

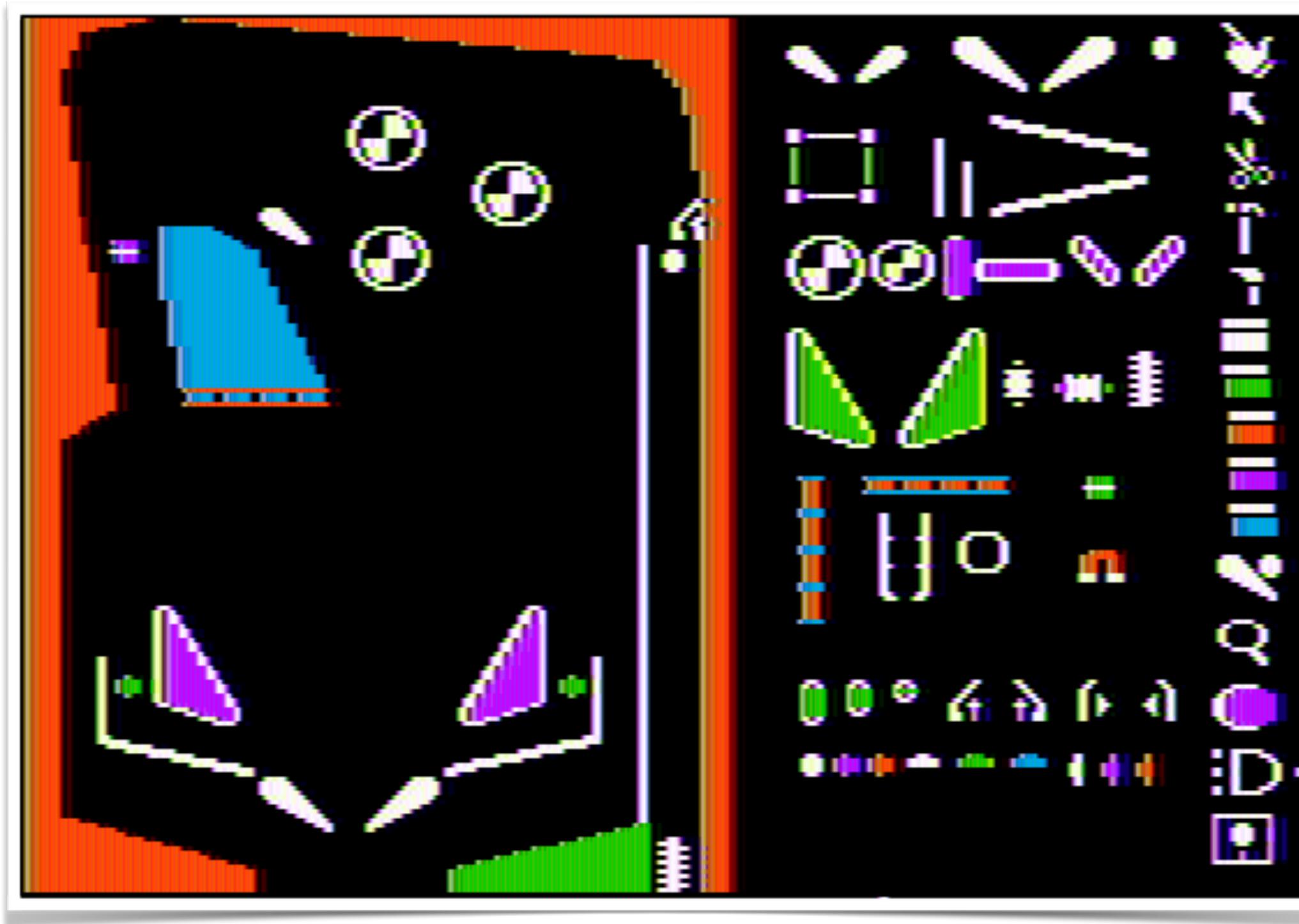
# Maxis / EA – Sim X

[https://en.wikipedia.org/wiki/List\\_of\\_Sim\\_video\\_games](https://en.wikipedia.org/wiki/List_of_Sim_video_games)



- SimEarth
- SimAnt
- SimLife
- SimFarm
- SimRefinery
- SimTower
- SimCopter
- Streets of SimCity
- SimHealth
- SimIsle
- SimTown
- SimPark
- SimGolf
- SimTunes
- SimSafari
- Sim Theme Park
- SimCoaster
- Sid Meier's SimGolf
- The Sims Carnival
- SimAnimals

# Flipper



Pinball Construction Set (1983)



The Pinball Arcade (2012)

„We are introducing classic pinball tables to people who would otherwise never get an opportunity to play them, and we are also preserving these machines and their culture“  
Rubens: *Virtual games bring pinball to new audiences*



Open

Earth

# Universe Sandbox 2

The screenshot shows a complex simulation of the solar system within the Universe Sandbox 2 application. In the center is Earth, with its moon visible. Numerous other celestial bodies, including several planets and numerous small objects like asteroids and comets, are scattered throughout the dark space, each with a distinct orbital path. The interface includes a top navigation bar with icons for search, zoom, and file operations. On the left, there's a sidebar with various simulation scenarios such as 'Solar System', 'Climate Simulation', 'New Horizon Pluto Encounter in 2015', 'Galaxy Collision', 'Bombardment of Moon', 'Saturn with Rings', 'Earth & Many Moons', and 'Climate Simulation with Tidally-Locked Earth'. The right side features a detailed properties panel for 'Earth' with tabs for Basic, Motion, Climate, Materials, and Actions. The 'Basic' tab is selected, displaying parameters like Name (Earth), Mass (1.00), Radius (6371 km), Density (5.51 g/cm³), Age (4.50 G years), Surface Temperature (15.0 °C), Total Velocity (598 m/s), Rotational Period (23.9 hours), Surface Gravity (9.82 m/s²), and Escape Velocity (11.2 km/s). The bottom of the screen contains controls for time step, power, chart, view, and simulation.

Solar System

Climate Simulation

New Horizon Pluto Encounter in 2015

Galaxy Collision

Bombardment of Moon

Saturn with Rings

Earth & Many Moons

Climate Simulation with Tidally-Locked Earth

2.10 hours

step

mins/sec

21.7

edit

add

power

chart

view

sim

stats

search

photo

All

Core

Solar Sys

Planets

Exoplanets

Supernovas

Basic

Motion

Climate

Materials

Actions

Name

Mass

Radius

Density

Age

Surface Temperature

Total Velocity

Rotational Period

Surface Gravity

Escape Velocity

earth

km

g/cm³

G years

°C

m/s

hours

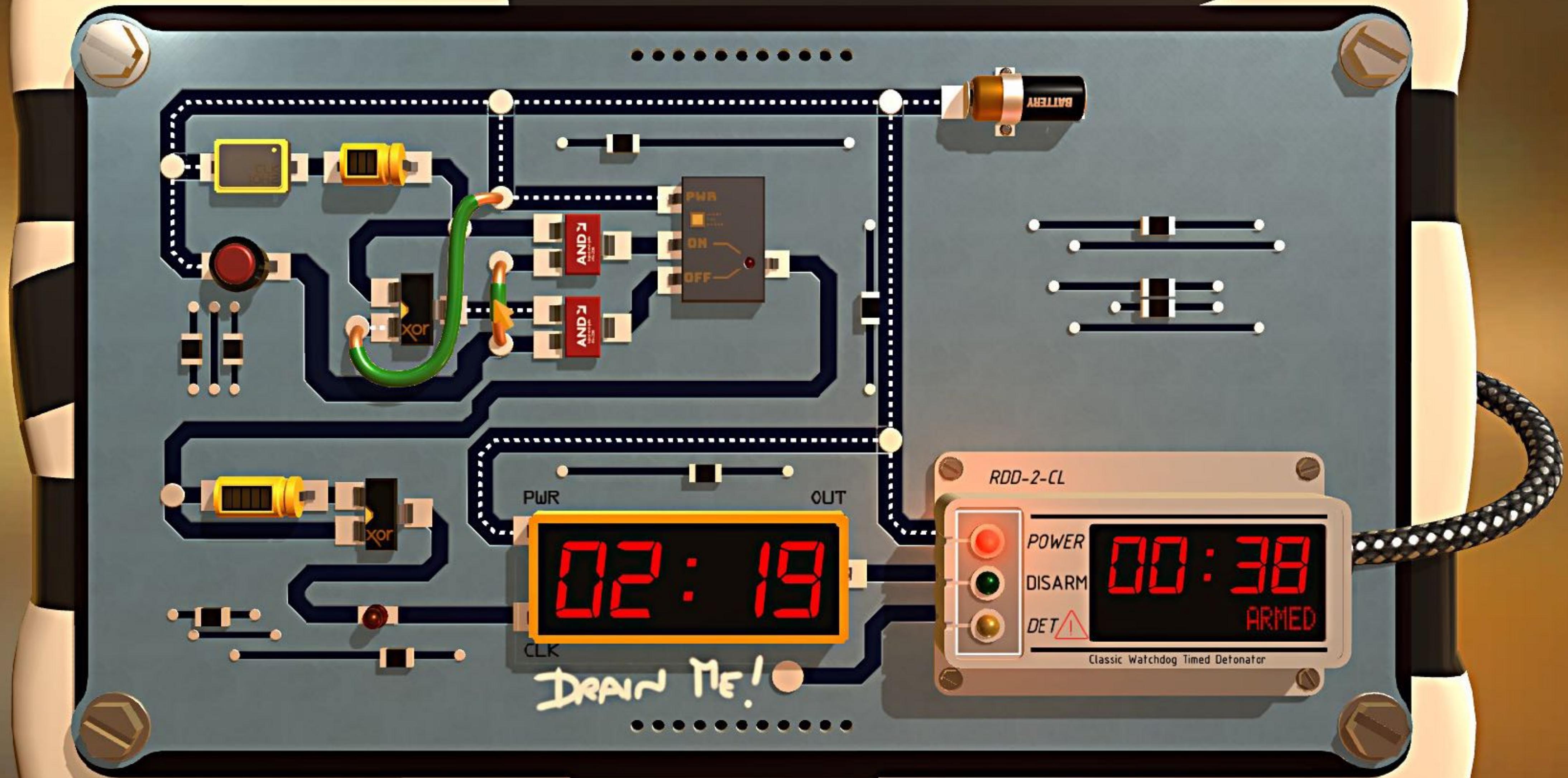
m/s²

km/s

# Virtual Battlefield Systems



Bohemia Interactives *Operation Flashpoint* (2001) wird 2002 zum Virtual Battlefield System 1 und 2011 zu ARMA: Cold War Assault

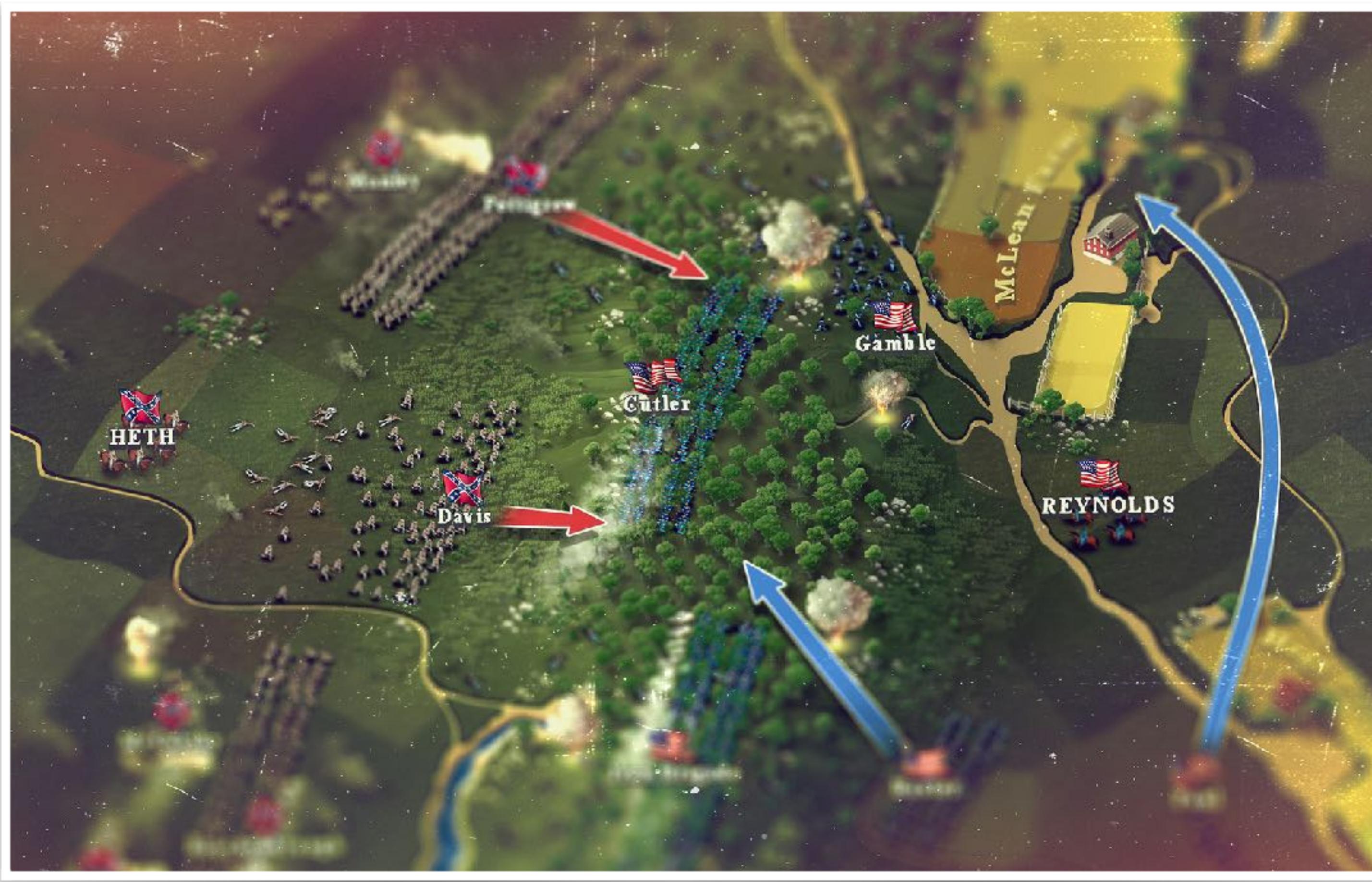




SportsBar VR (2016)

# Konflikte

s. VL Strategiespiele



Ultimate General: Gettysburg

# Sport



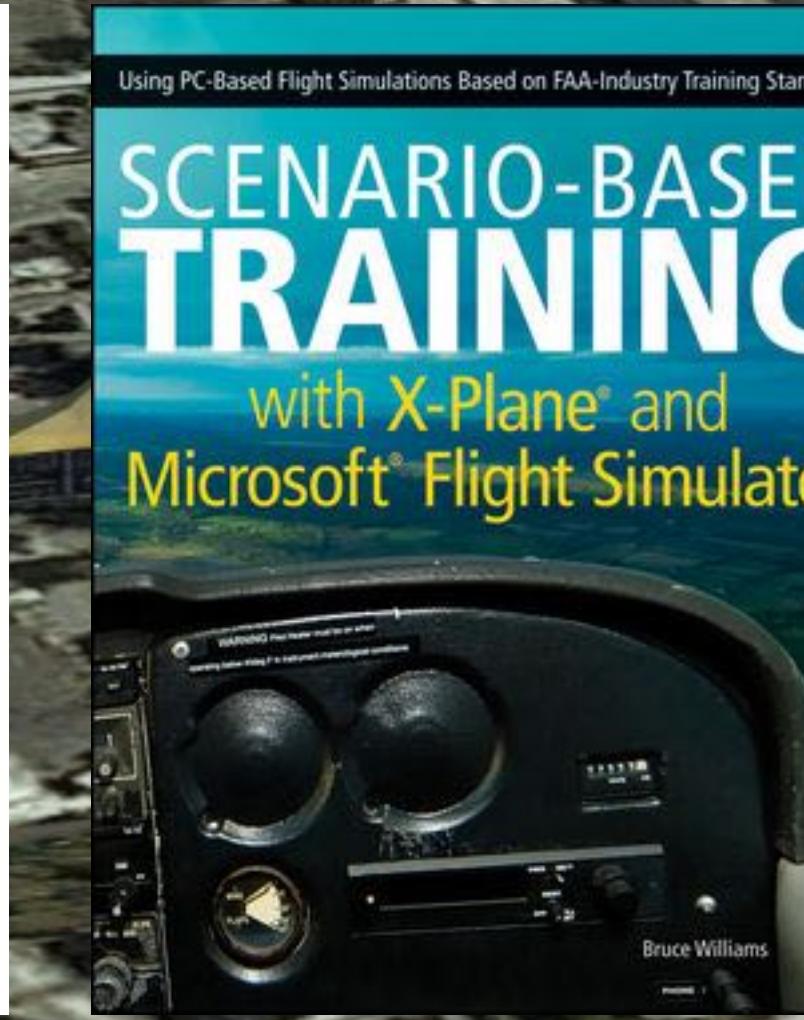
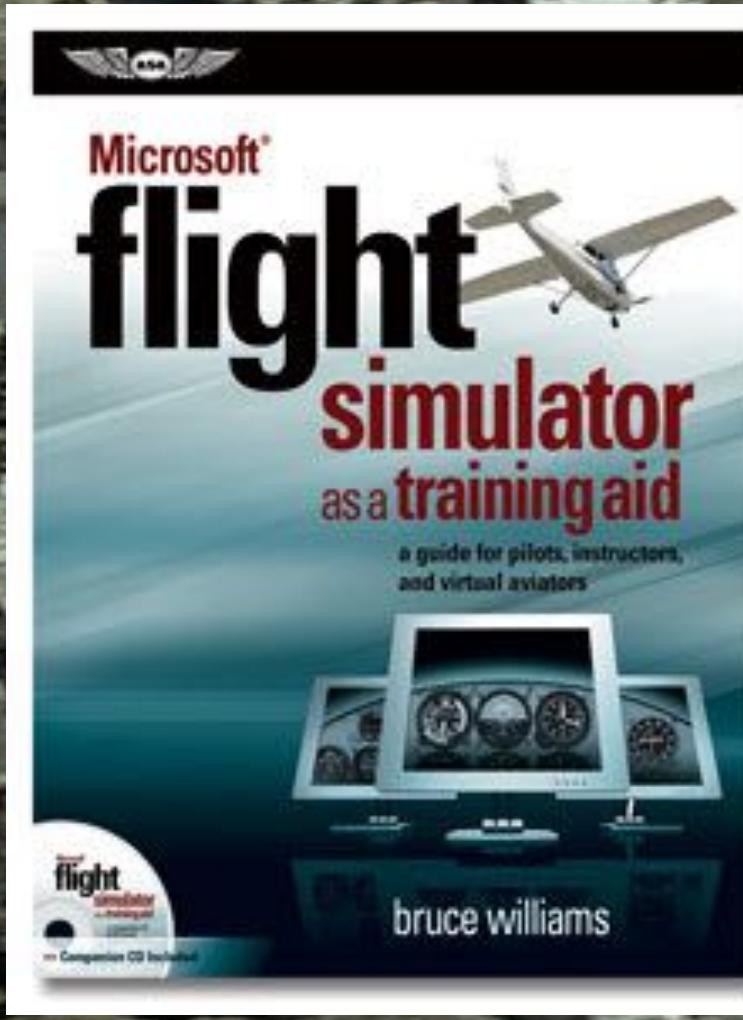
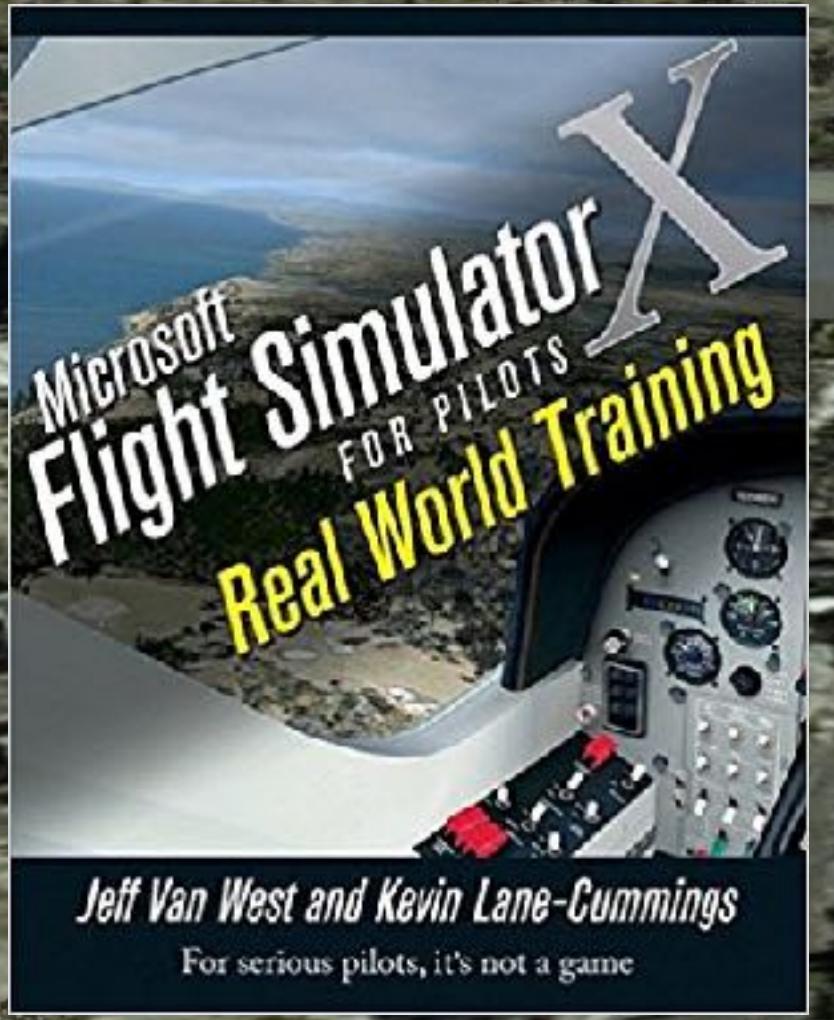
s. VL Sport

# Fahrzeuge



Project CARS (2015)

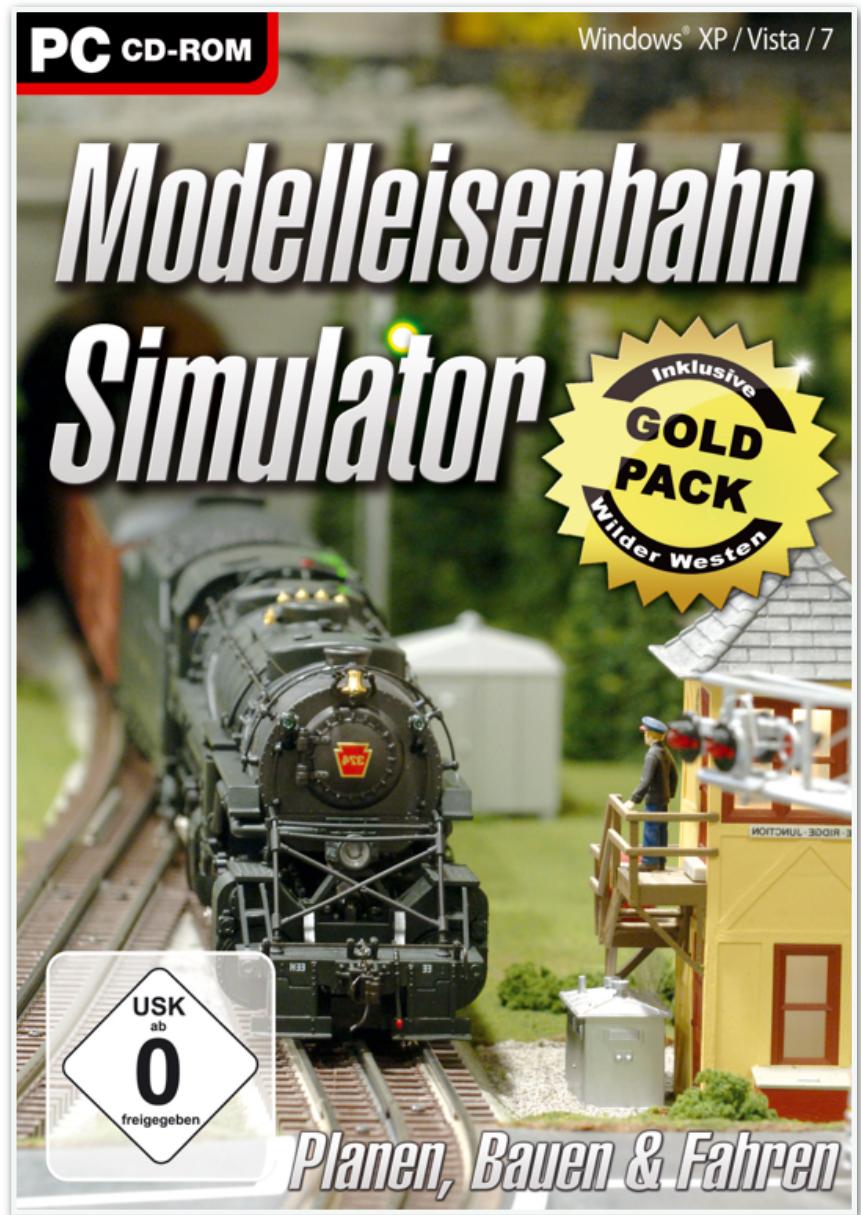
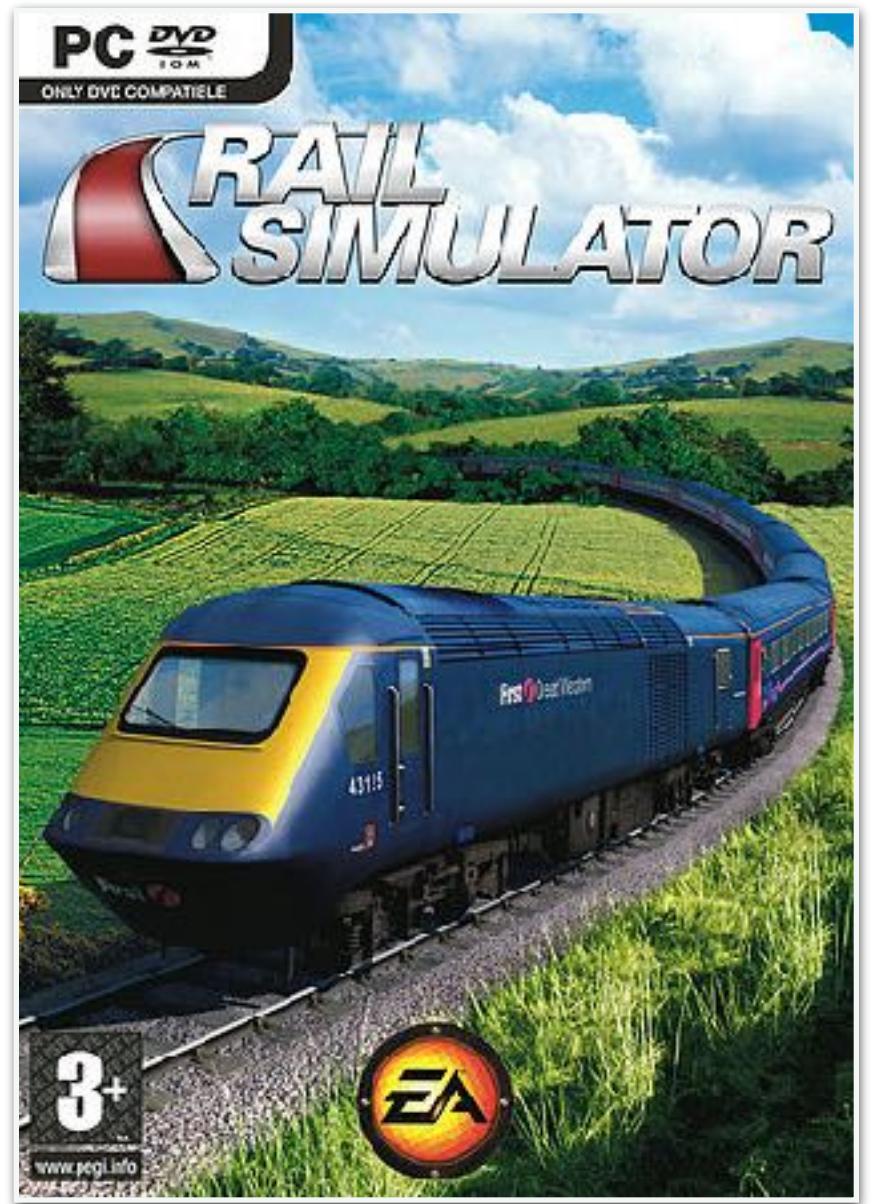
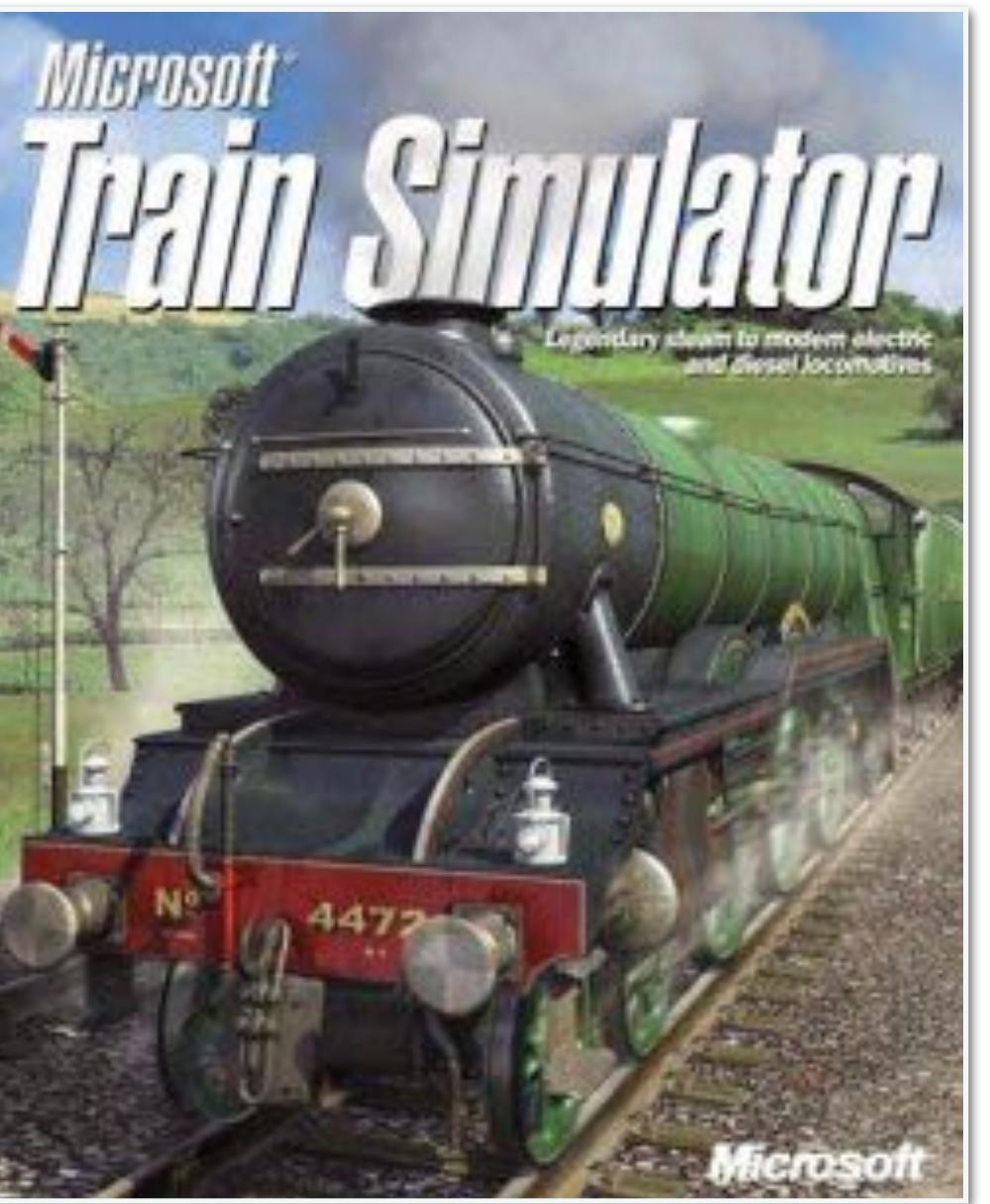
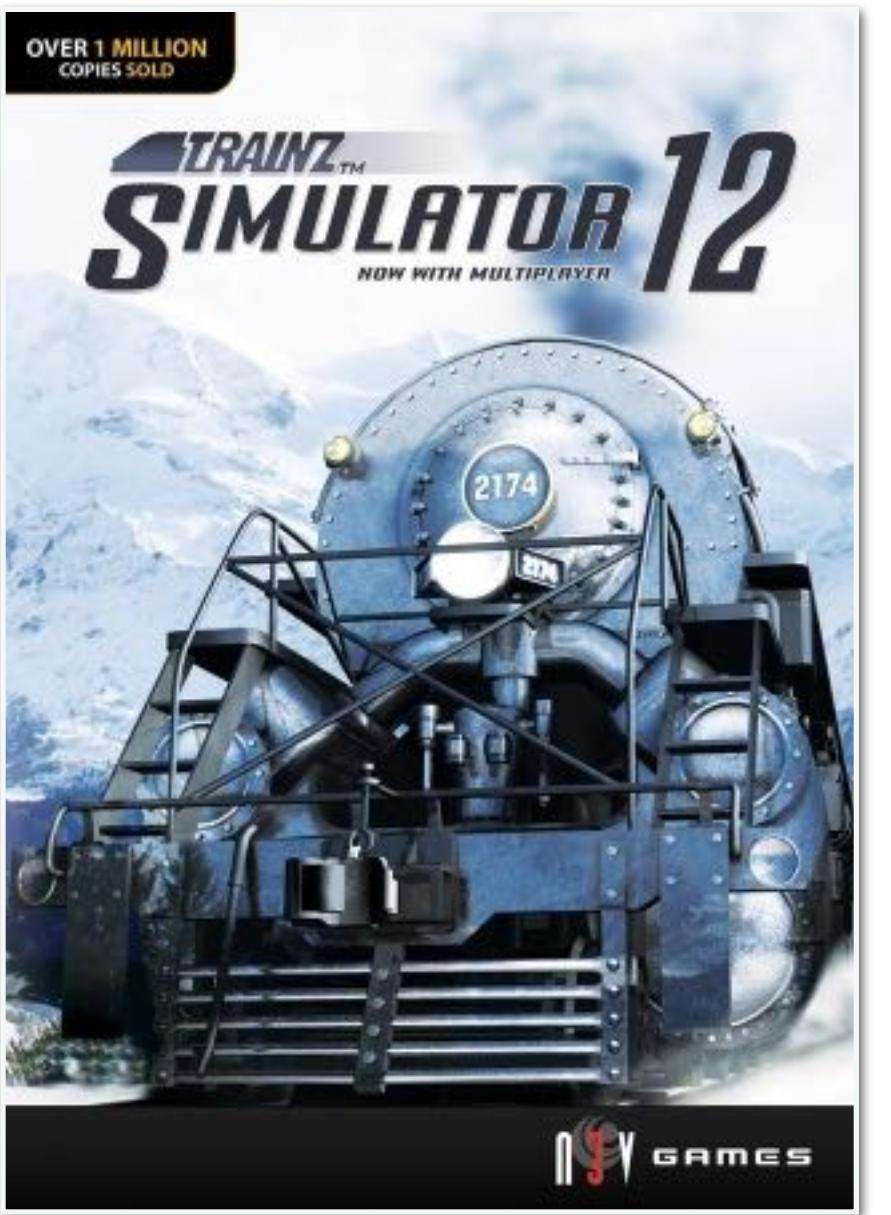
Rennwagen  
s. VL Rennspiele



Flight Simulator X (2006)

## Elite: Dangerous (2014)





openBVE 1.4.2

# Berufe



Landwirtschaftssimulator 2017



Euro Truck Simulator 2