STARS 2001
Software Engineering Lecture
Software Engineering Praktikum

Prof. Bernd Bruegge, PhD

TUM Kickoff Meeting

19 October 2000

Software Engineering

- Software systems are complex
  - Impossible to understand by a single person
  - Many projects are never finished: "vaporware"
  - The problem is arbitrary complexity
- 1968 Definition:
  - Software Engineering means the construction of quality software with a limited budget and a given deadline

Software Engineering (2)

- Our definition:
  - Software Engineering means the construction of quality software with a limited budget and a given deadline in the context of constant change
- Emphasis is on both, on software and on engineering

SE Project Course format

- Lecture+Praktikum = Single Project Course
  - Lectures: Theoretical foundations and background
  - Tutorials:Learn individual tools
  - Praktikum: Learn how to apply them in practice
- Participation
  - Lecture attendees are invited to register for the Praktikum
  - Praktikum attendees are strongly recommended to attend the lectures.

AR Praktikum

Augmented Reality Prakitkum
by Prof. Gudrun Klinker

- Focus on computer vision and 3D rendering
- Will develop the AR subsystem of STARS
- Will work closely with UI team of STARS

- Participants of the AR Praktikum are invited to attend the SE lecture.

Agenda for today's meeting

Bernd Bruegge:

- Introduction to Software Engineering

Erwin Rusitschka:

- Client requirements

Rafael Kobylinski:

- STARS Scenario & Architecture
- Registration

All:

- Discussion

Objectives of this course (1)

- Acquire technical knowledge
  - Understand difference between program and software product
  - Be able to reconstruct the analysis and design of an existing software system
  - Be able to design and implement a subsystem that will be part of a larger system

Objective of this course (2)

- Acquire managerial knowledge
  - produce a high quality software system within budget & time
  - while dealing with complexity and change

Emphasis on team-work

- Participate in distributed development with developers in different locations and different time zones
- Work as a member of a project team while assuming various roles
- Create the full range of documents associated with a software product
- Complete a project on time

How can we accomplish this?

- The 4 R's:
  - Real Problem: Info Service
  - Real Data: Data from a Nuclear Powerplant
  - Real Deadline: 9 February 2001
  - Real Client: Erwin Rusitschka, Siemens KWU

- STARS Project
  - Sticky Technology for Augmented Reality Systems

The Problem

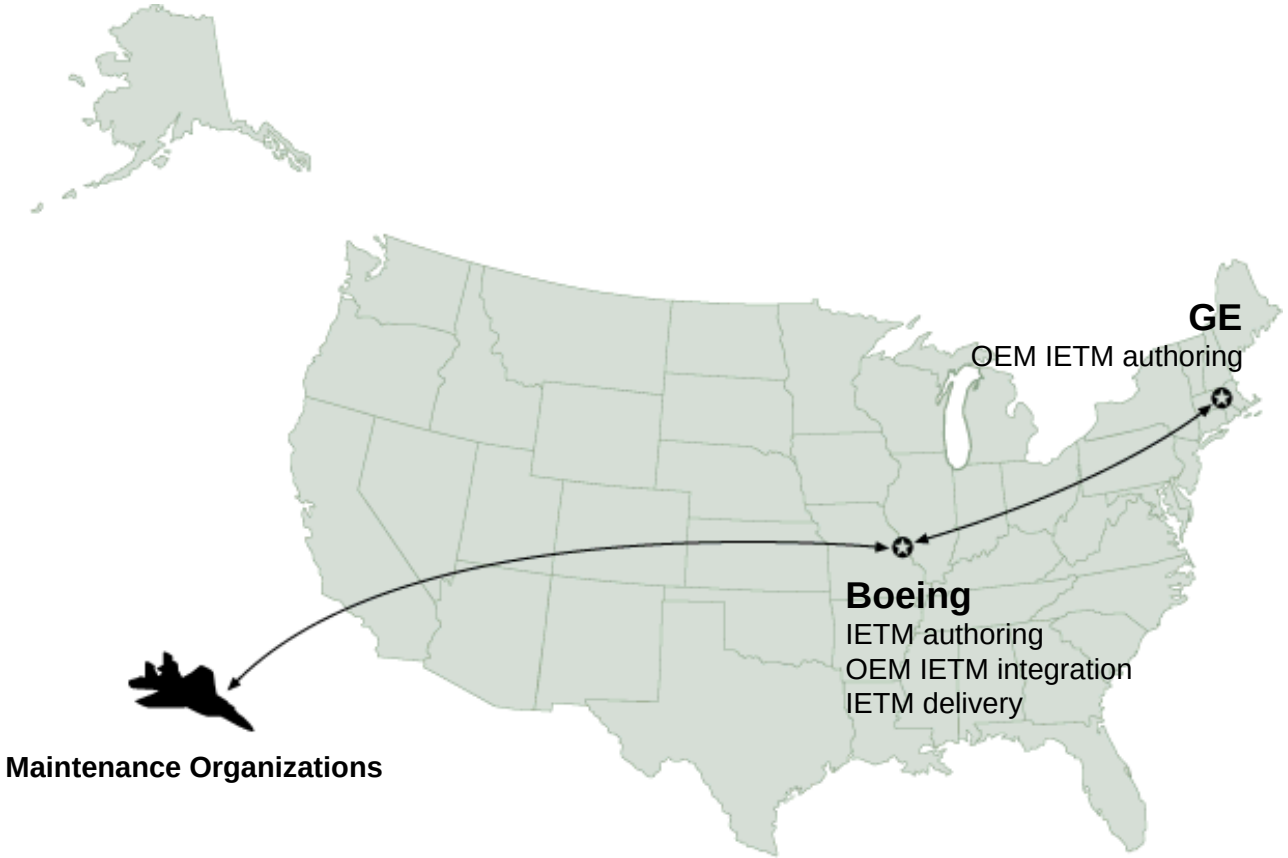
With the increasing complexity of systems such as nuclear power plants, access to maintenance procedures at the place of work is essential. Current maintenance procedures for these systems are costly and inefficient.

The main problem areas are:

- Most of the documentation is paper-based
- Information is often out-of-date
- Is not accessible at the place where it is needed
- The maintenance information is not tailored to the work order
- Expert knowledge is not easily deployable worldwide

STARS@CMU: IETM Management

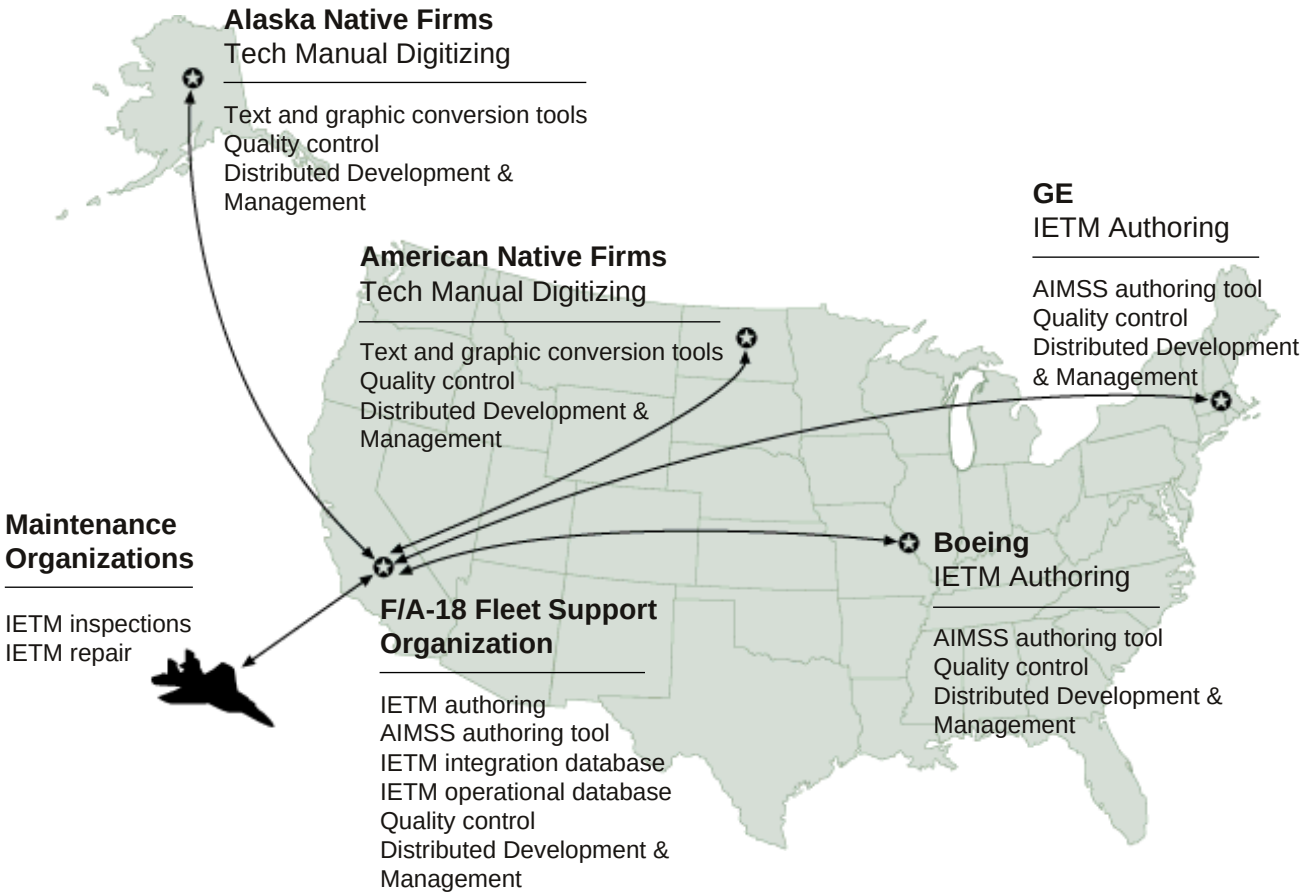
Current IETM Development
& Management



IETM = Interactive Electronic Technical Manual

STARS@CMU: New Process for IETM Management

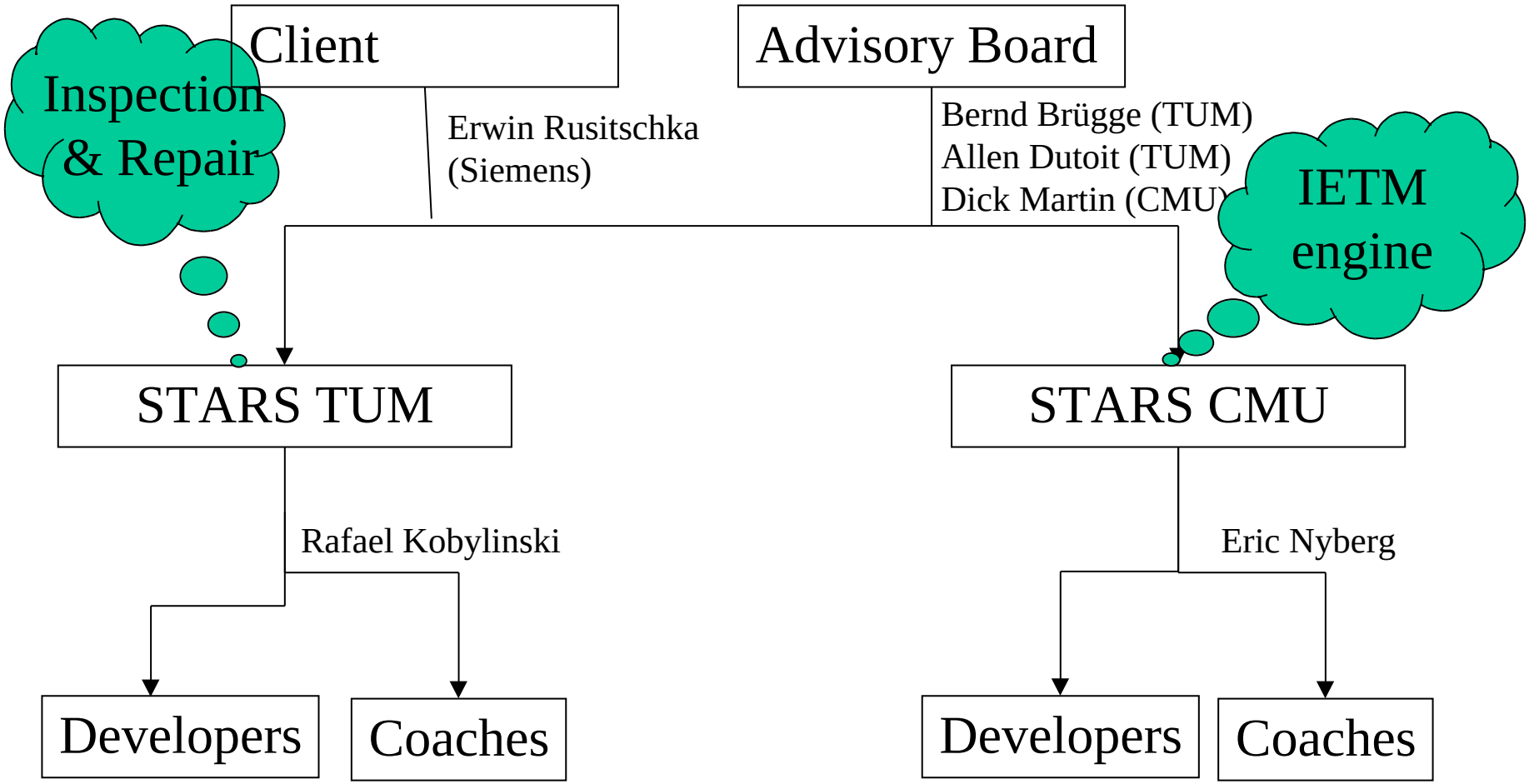
Distributed IETM Development & Management Concept of Operations



STARS@TUM: Inspection & Repair Services

- Dynamic, on-demand communication with stationary/mobile experts
- Additional data layers in the local technician‘s viewing area
- Location and tracking
- Caching and prefetching
- Capture and transmission of current plant data

STARS Project Organization Chart



Example: Augmentation of a critical room in a power plant

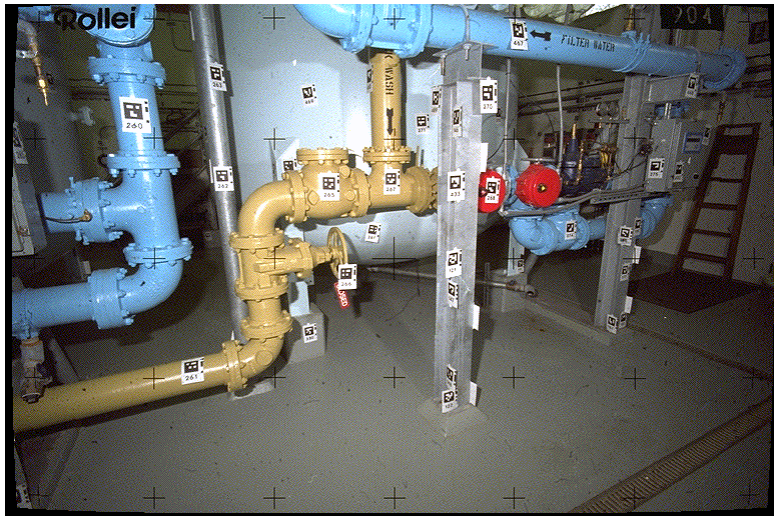
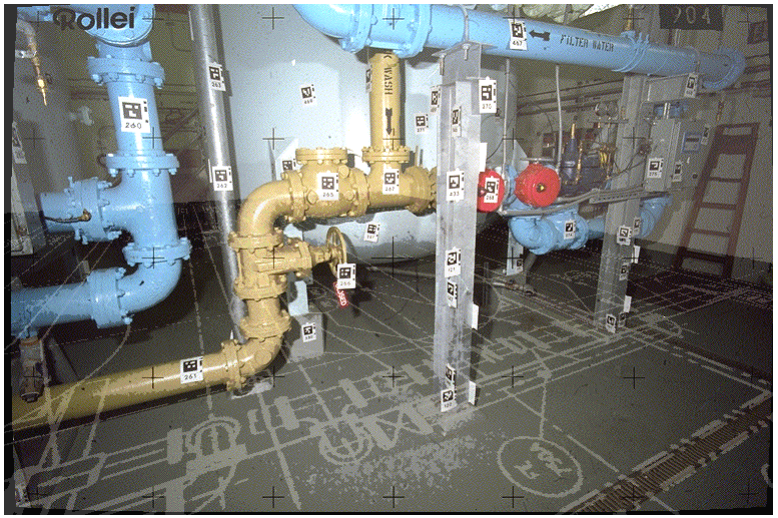


Image of a room in a powerplant

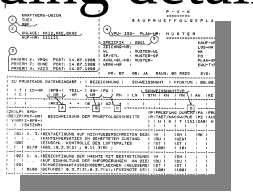


Room “augmented” with the CAD drawing of a floorplan

Abundance of possible data fusion in nuclear power plants

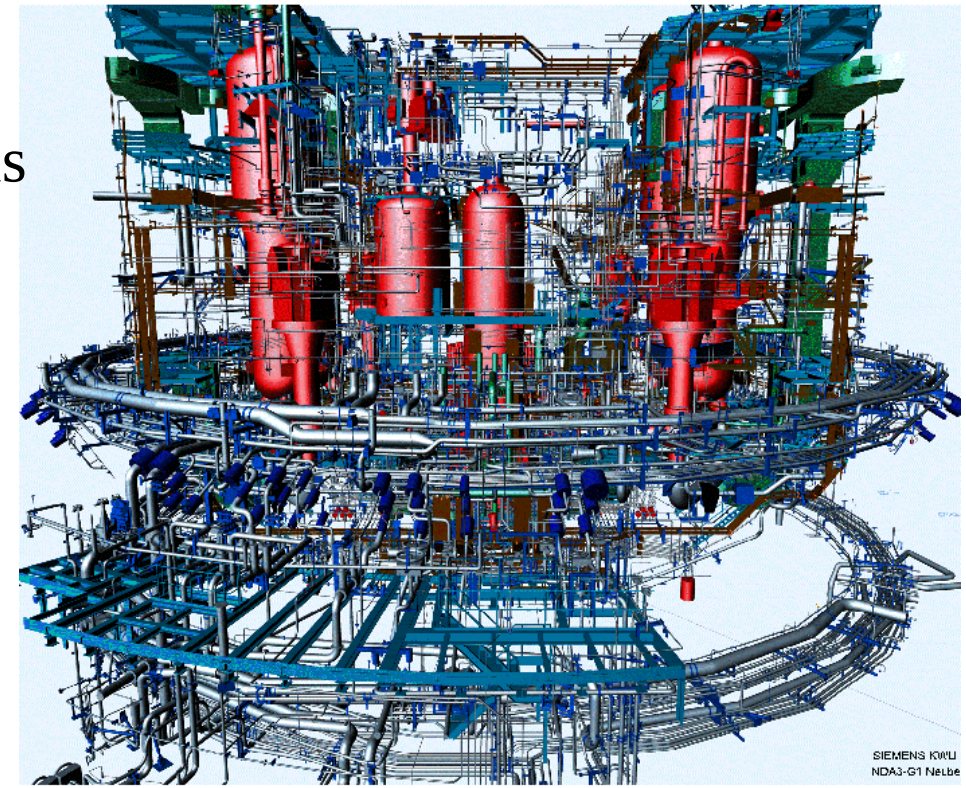
Floorplan

Welding details

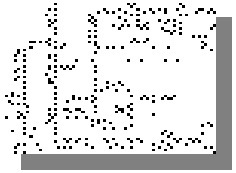


X-Ray

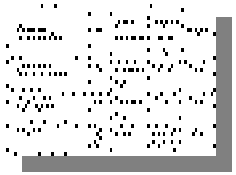
3-D Drawing

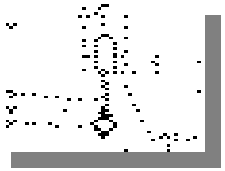


Circuit diagram



Parts Catalog





2-D Drawing

Development Environment for Praktikum

- **Development Machine:**
  - PowerMac G3 w/ Mac OS X
- **Programming Environment**:
  - Java 1.2
- **System Modeling:**
  - UML / Together J
- **Data Capture Tools**
  - Video cameras / QuickTime for Java
- **Configuration Management:**
  - CVS
- **Communication:**
  - Lotus Notes Bboard

Target Environment

- Software Engineering Lab H-3175 using pipes and other material from Baumarkt

Client Acceptance Test

- Client: Erwin Rusitschka, Siemens KWU
- Successful demonstration of key scenarios from problem statement
- Key scenarios and acceptance criteria to be negotiated between client and project participants

Course Schedule

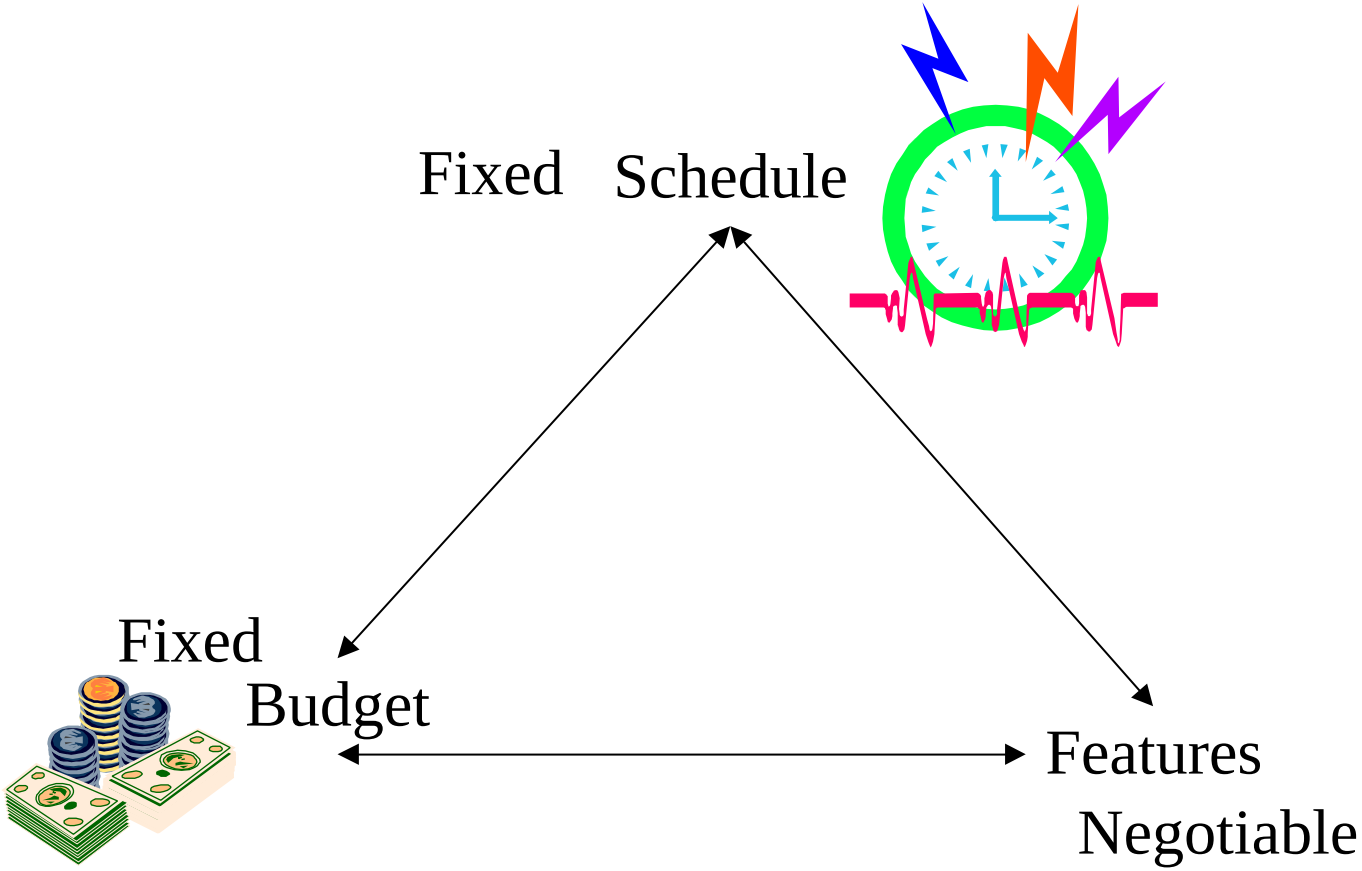
- Software Engineering Lecture
  - Fundamentals: Thursdays, 14:30, Rm: S1128
  - Tutorials: Fridays, 11:15, Rm: S1128
- Praktikum
  - Weekly team meetings to be arranged with coaches
  - Reviews on selected Mondays 14:15, Rm:-3175
- Sprechstunde
  - Mondays without reviews, 14:15, Rm:-3175

Preliminary List of Deliverables

- Software Project Management Plan (SPMP)
- Requirements Analysis Document (RAD)
- System Design Document (SDD)
- Object Design Document (ODD)
- Test/User/Installation Manuals

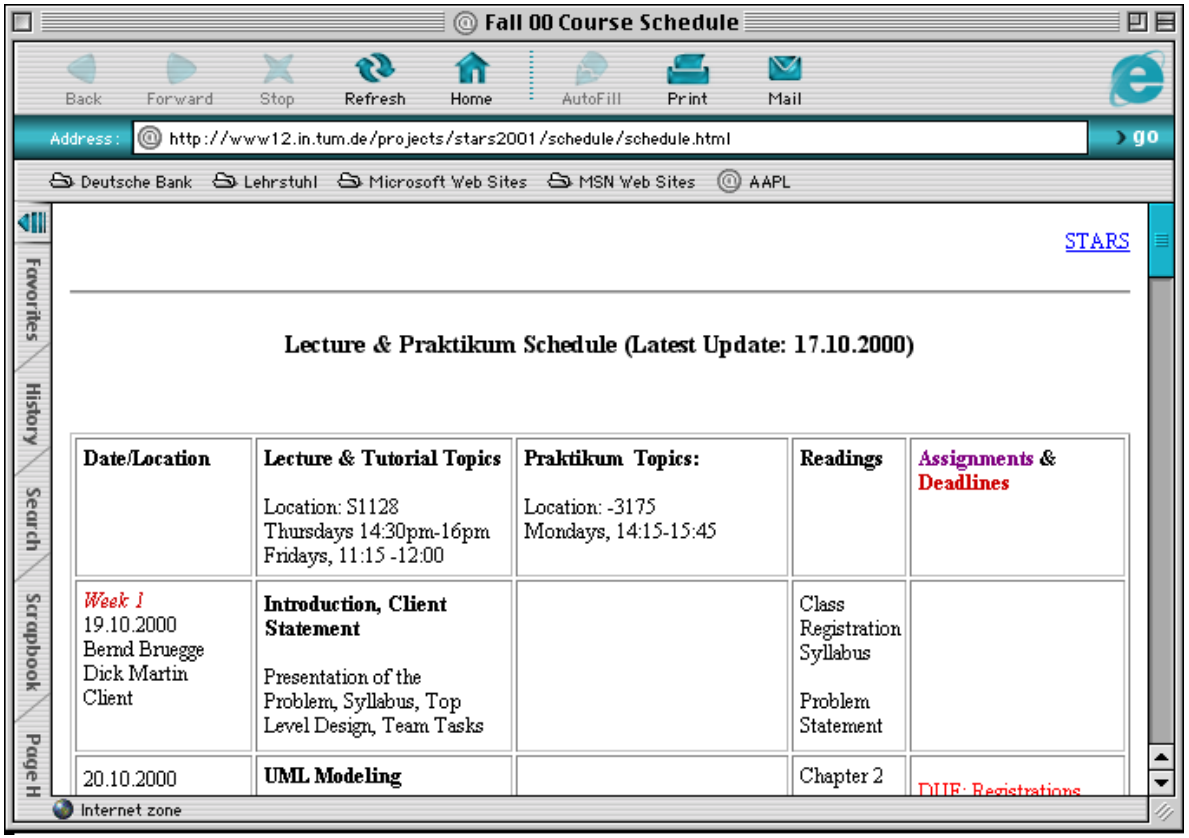
- 4 increasingly more complex system builds

„Bermuda Triangle“ of Project Management



Schedule

http://www12.in.tum.de/projects/stars2001/schedule/schedule.html



Fall 00 Course Schedule

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Address: http://www12.in.tum.de/projects/stars2001/schedule/schedule.html go

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STARS

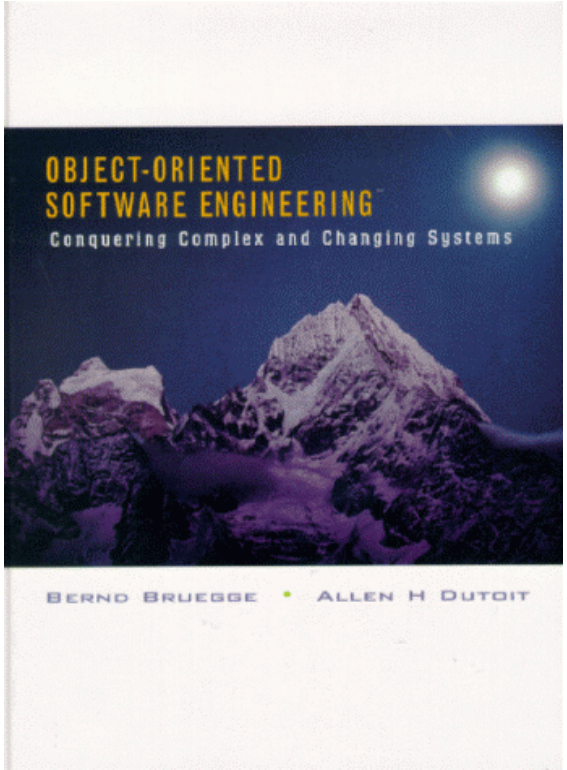
Lecture & Praktikum Schedule (Latest Update: 17.10.2000)

Date/Location	**Lecture & Tutorial Topics** Location: S1128 Thursdays 14:30pm-16pm Fridays, 11:15 -12:00	**Praktikum Topics:** Location: -3175 Mondays, 14:15-15:45	**Readings**	**Assignments & Deadlines**
Week 1 19.10.2000 Bernd Bruegge Dick Martin Client	**Introduction, Client Statement** Presentation of the Problem, Syllabus, Top Level Design, Team Tasks		Class Registration Syllabus Problem Statement	
20.10.2000	**UML Modeling**		Chapter 2	DUE: Registrations

Internet zone

The Book

B. Brügge, A. Dutoit:
Object-Oriented Software Engineering,
Prentice Hall, 2000.



Next presentations:

Erwin Rusitschka:

- Client requirements

Rafael Kobylinski:

- STARS Scenario & Top Level Design
- STARS Teams
- Registration