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Better Software –
Simpler, Faster



HSR
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Simple Code

Regain Control over Software through Decremental Development

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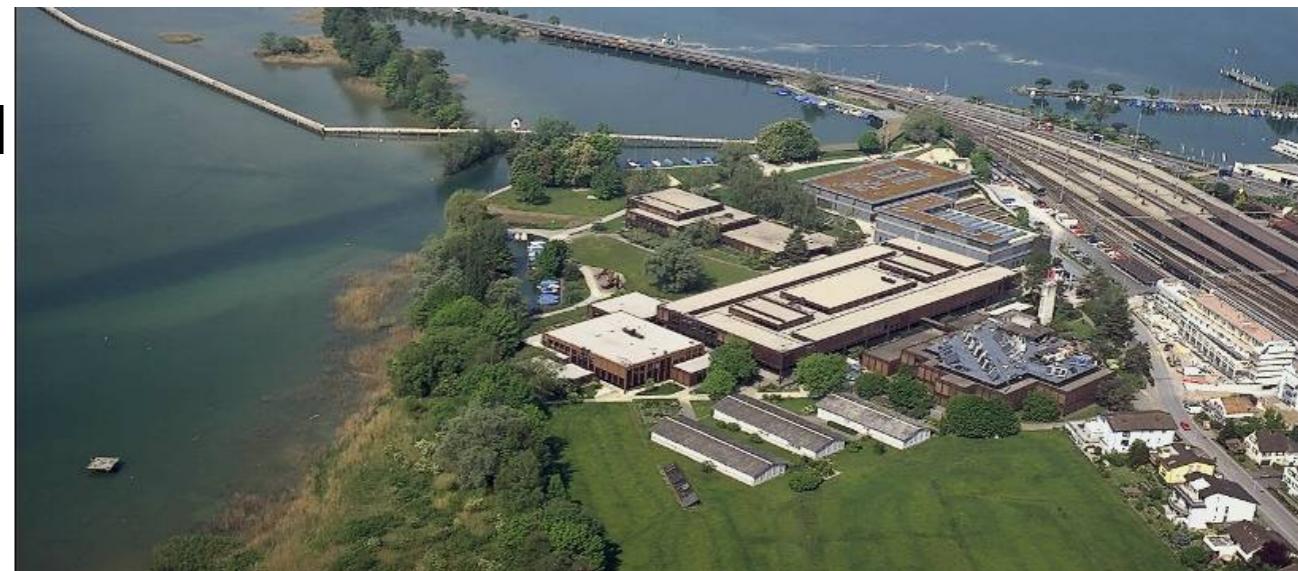
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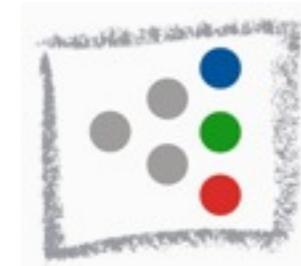
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- **Work Areas**

- Refactoring Tools (C++, Groovy, Ruby, Python) for Eclipse
- **Decremental Development**
(make SW 10% its size!)
- Modern Software Engineering
- Patterns
 - Pattern-oriented Software Architecture (POSA)
 - Security Patterns

- **Background**

- Diplom-Informatiker (Univ. Frankfurt/M)
- Siemens Corporate Research - Munich
- itopia corporate information technology, Zurich (Partner)
- Professor for Software HSR Rapperswil, Head Institute for Software

Credo:

- **People create Software**

- communication
- feedback
- courage

- **Experience through Practice**

- programming is a trade
- Patterns encapsulate practical experience

- **Pragmatic Programming**

- test-driven development
- automated development

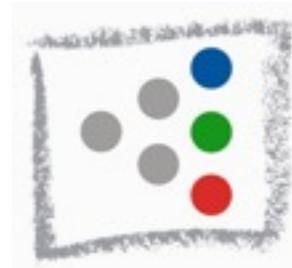
- **Simplicity: fight complexity**

Why we need Decremental Development



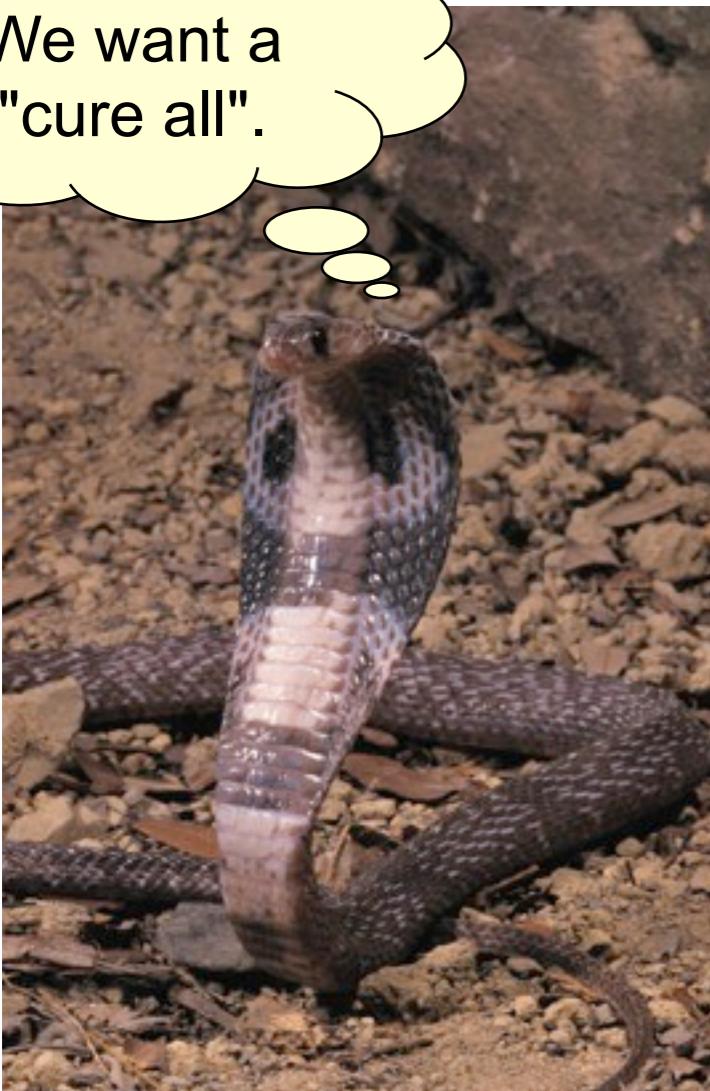
- **Problems solved by Software increase**
 - more problems
 - larger & more complex
- **“Good-enough” quality often isn’t**
 - when deployed (Beta-Release)
 - while maintained (updates breaking stuff)
 - with sometimes spectacular failures
- **Useful Software is used longer than intended**
 - pro-active maintenance often neglected
 - repeated bug-hunt-fix-patch deteriorates quality
 - need tools and methods to sustain software

Snake-Oil and Silver Bullets

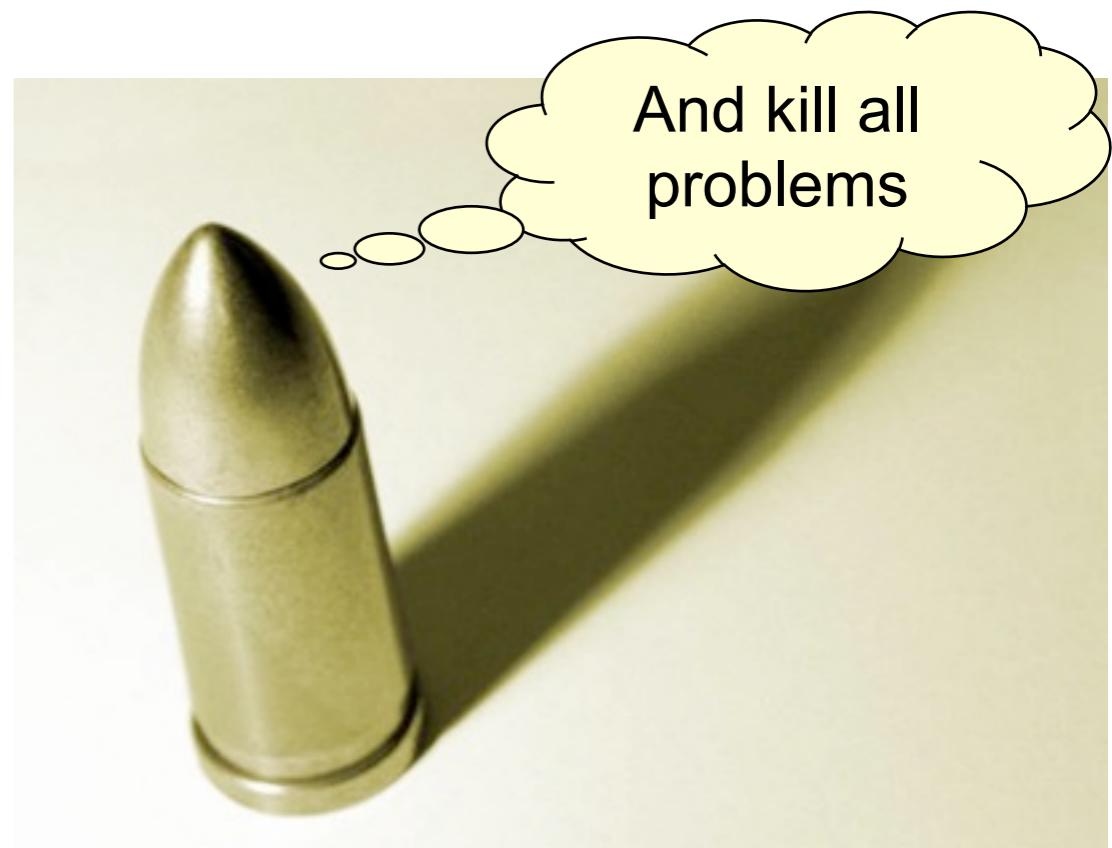


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We want a
"cure all".



- **Acronym Jungle**
 - CASE, OOP, CMM, SGML
 - more modern:
 - XML, EJB, .NET, UML, MDA
- **Technology Overload**
 - C++
 - Corba
 - Java
 - C#
 - VB
 - XSLT



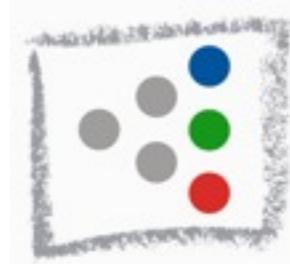
COMPLEXITY

Complexity is one of the biggest problems with software if not THE biggest.

It is much easier to create a complicated "solution" than to really solve a problem.

Much software complexity is accidental not inherent to the problem solved.

Some Reasons for Complexity



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● Young Guns

- "Hey, I learned so many complicated things, I want to use them now!"
- Coolness is important!
- Complex stuff is cool!
- Over-Engineering

● “Challenged” Programmers

- "I don't know how it works, but I made it run."
- Programming by Coincidence
- No idea of Abstraction
- Copy-Paste Reuse
- Under-Engineering

● Media/Conferences

- "There is this brand new stuff called XYZ, we tell you how to achieve productivity increase with it"
- sells only "newest" stuff

● Consultants

- "We must use XYZ for your problem" ... thinking "because it gives us more billable hours"

● Resume-oriented Developer

- "I'll use this cool new stuff, because it looks good on my resume"

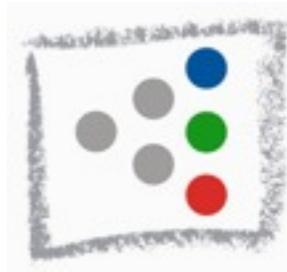
SIMPLICITY

**We need to value Simplicity much higher.
Our software needs to be simpler to solve more
complex problems.**

**Simple software requires work and skill but
pays off in the long run.**

Less Code
=
More Software

Unnecessary Complexity Starts in the Small



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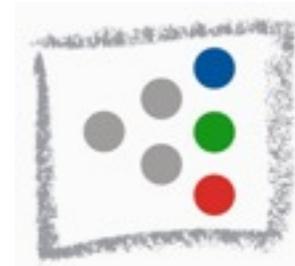
- ignorance of boolean logic and shortcuts:

```
if(isOldest)
{
    if(timeLastAccessed< cutOffTime)
    {
        return true;
    }
    else
    {
        return false;
    }
}
else
{
    return false;
}
```

return isOldest && timeLastAccessed < cutOffTime;

A photograph of a green outdoor trash can or dog waste bin. The bin has a black metal frame and a small vent on top. The main body is light green with a blue panel featuring a drawing of a dog and a bone, with the word "robidog" written below it. The bin is situated on a gravel surface next to a stone wall.

Cultural Reasons

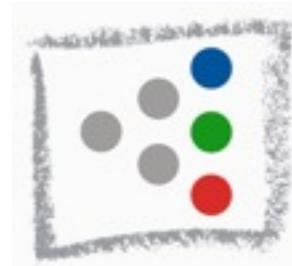


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- **Project culture favors delivery of bad software**
 - hard to judge investment in future
 - fire-and-forget orders
 - deployment date fixation
 - manual testing still mainstream
- **“Maintenance” is for janitors**
 - low-profile job
 - no one wants to clean the crap
 - no budget for creating better abstractions/code
 - only adding code or fixing bugs, as little change as possible, because of risk of breaking something
- **lack of feedback, lack of reaction to feedback**



Project Perspective



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In project management a **project** consists of a **temporary** endeavor undertaken to create a **unique** product, service or result

PMBOK Guide

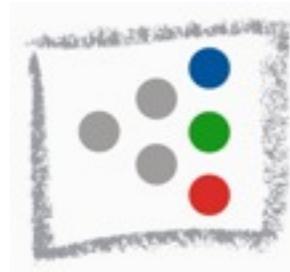


- **calls for “shortcuts” through defined ending**
 - “we fix it later” means “never”!
 - initial design debt owed
- **useful software lives long** (not only temporary)
 - multiple releases require long term commitment
 - interest to be payed, design debt often increases
- **Complexity gets introduced from the beginning**
 - Abstraction seems to only pay-off long term
- **more “billable hours” with bad code!**



Long term problems

Dirty Code

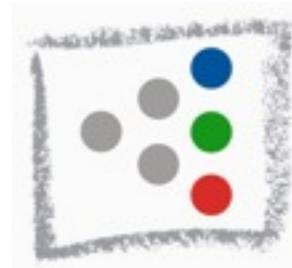


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- **Dirty Code requires clean up**
 - sometimes covering up is insufficient
 - see pictures!
- **Changing Dirty Code is hard**
 - hard to distinguish valuable remains from
 - crap
 - Cleaning requires change
- **Release cycles get longer and longer**
 - with fewer and or more buggy features
 - can bring down companies or departments
 - worst case: brings down customer!
 - “We will redesign later” (**means never**)

removal
of highly
toxic
waste at
SMDK
Kölliken,
CH

Decremental Development

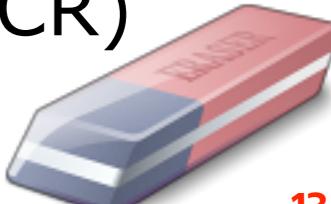


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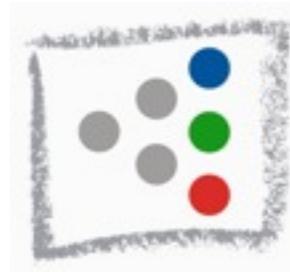
- **Reduce software size TO 10%**
 - while keeping required functionality
 - while improving its quality
 - while improving its design



➤ measure productivity by Lines of Code removed (LoCR)

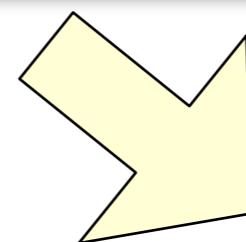


One means of reduction -> choice of tool



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```
using System;  
  
class HelloWorld  
{  
    public static int Main(String[] args)  
    {  
        Console.WriteLine("Hello, World!");  
        return 0;  
    }  
}
```



Just think of XML if you need to
think of complexity in syntax

puts "Hello, World!"

Hiding + Knowledge

```
a=[42, 1, 7, 2, 34, 64, 29, 2]
```

```
for i in 0..a.length-1 do
  for j in i+1...a.length do
    if (a[i] > a[j]) then
      x = a[i]
      a[i] = a[j]
      a[j] = x
    end
  end
end
puts "a:"
puts a
```

```
de
```

```
en
```

```
fo
```

```
for
```

```
if
```

```
en
```

```
en
```

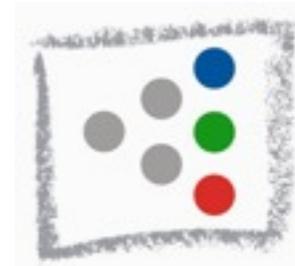
```
en
```

```
en
```

```
for i in 0..a.length-1 do
  for j in i+1...a.length do
    if (a[i] > a[j]) then
      a[i], a[j] = a[j], a[i]
    end
  end
end
end
```

Use existing stuff from libraries

-> Knowledge



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```
a=[42, 1, 7, 2, 34, 64, 29, 2]
```

```
for i in 0..a.length-1 do
  for j in i+1...a.length do
    if (a[i] > a[j]) then
      a[i], a[j] = a[j], a[i]
    end
  end
end
puts "a:"
puts a
```

```
a=[42, 1, 7, 2, 34, 64, 29, 2]
puts "a:"
puts a.sort
```

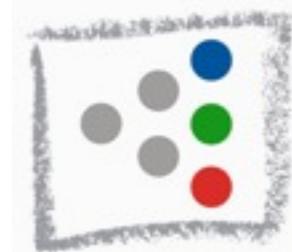
Developer Means for Decremental Development



- **Refactoring**
 - requires (test-) automation
 - higher-level restructuring still missing in tools
 - yet to be implemented (TBI), ideas but no tools yet
- **Code generation**
 - as simple as possible, for getting “DRY” code
 - shouldn’t require complex XML :-)
- **Code-smell detectors (new ideas, TBI)**
 - lint, FindBugs, metrics etc. are only the beginning
 - even better: Design-odor detectors
 - with automatic deodorant application :-)



Cultural Means

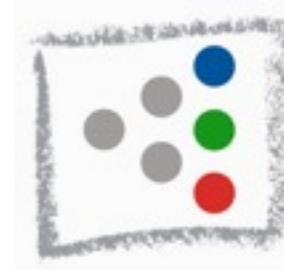


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- **Crisis might allow for change in Value System**
 - short term profit no longer fashionable, when it means increased risk
- **Simplicity vs. Techno-hype**
 - hard to establish, doesn't mean not using hi-tech
- **Learning and valuation of skill**
 - no 1000 monkeys with a keyboard
- **Maintenance by best skilled people**
 - who would you hand a valued painting for restoration? the brand new apprentice?
- **Leadership by software experts**
 - not only "management of resources"

What we are doing at IFS

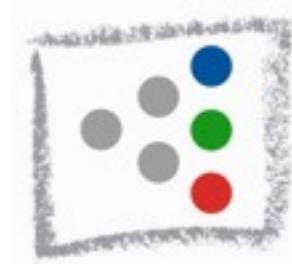
Decremental Development



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- **Create better tools for automated Refactoring**
 - for languages lacking support, but with large code bases, i.e.,
 - C/C++, Java, PL/I, Ada, COBOL(?)
 - Groovy, Ruby, javascript, PHP, ...
- **Develop new approaches for higher-level software simplification**
 - beyond Refactoring
 - i.e., detecting potential for simplification
- **Increase valuation of Simplicity**
 - as a software design goal
 - articles, presentations, case studies, talks

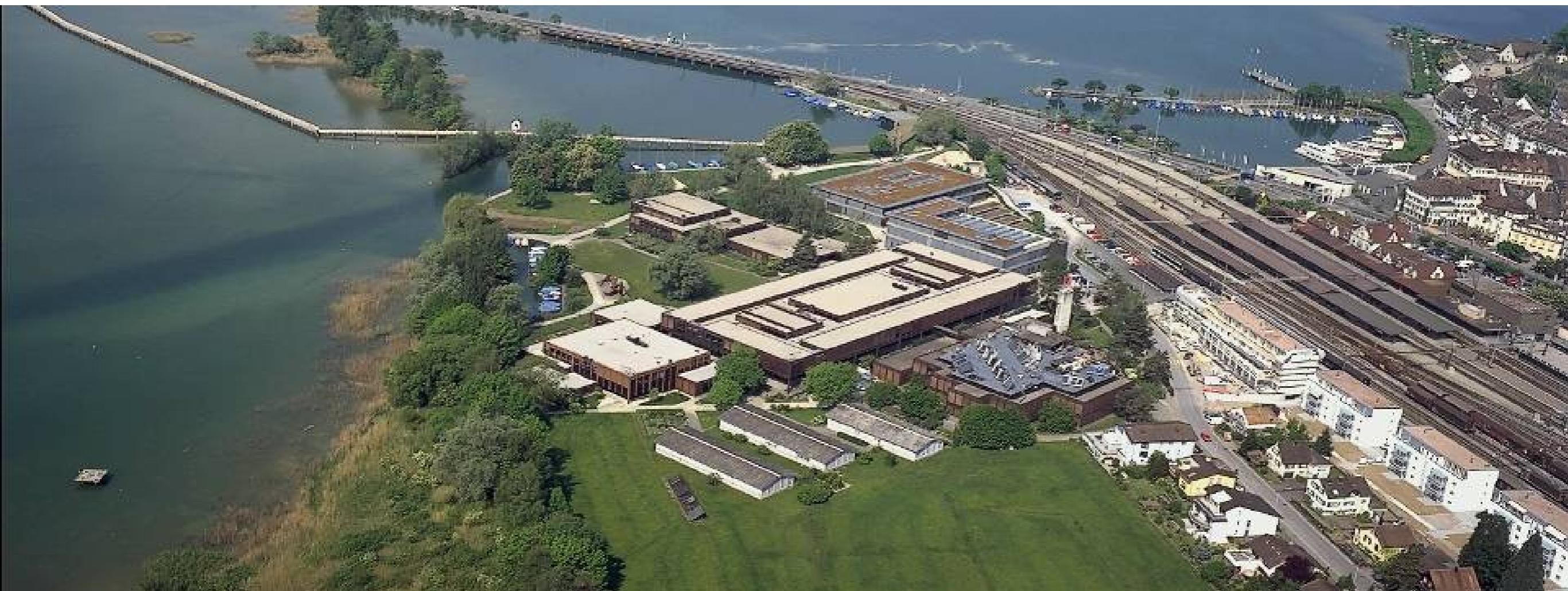
How do we all get there?



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- **What can YOU do today or tomorrow?**
 - Value Simplicity and Simple Code
 - Establish and improve developer skills
 - Clean Code attitude (see Bob Martin's book)
 - SOLID design principles
 - Continuous design improvement
 - Refactoring
 - Test automation with GUTs
 - Software lifetime perspective beyond initial project
 - join in at <http://wiki.hsr.ch/SimpleCode>
- **Start NOW!**

Questions?



- join in at <http://wiki.hsr.ch/SimpleCode>
- or contact me at **peter.sommerlad@hsr.ch**