

SiSy[®] XMC

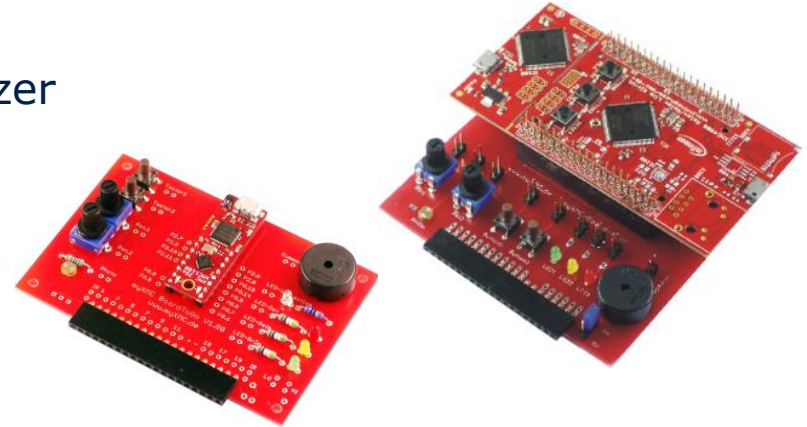
full cycle software engineering mit der UML

XMC Developer Day 2014, München

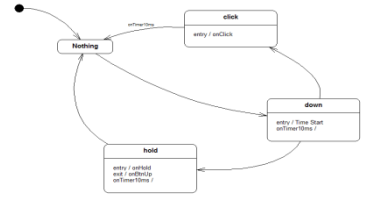


Laser & Co. Solutions GmbH

- gegründet 1991, Sachsen, 15 Mitarbeiter,
- mehr als 20.000 Kunden und Werkzeugnutzer
- Produkte:
 - Modellierungs und UML Tool SiSy®
 - Mikrocontroller Evaluierungsboards
 - Lernsysteme und Zubehör
- Partner:
 - Infineon, Segger, Willert, HERA Laborsysteme, ...
 - CONRAD, ELV, Christiani, Silica,
 - www.sisy.de , www.myXMC.de, www.laser-co.de , ...
- Kontakt:
 - Alexander Huwaldt, a.huwaldt@sisy.de
 - Toralf Riedel, t.riedel@sisy.de



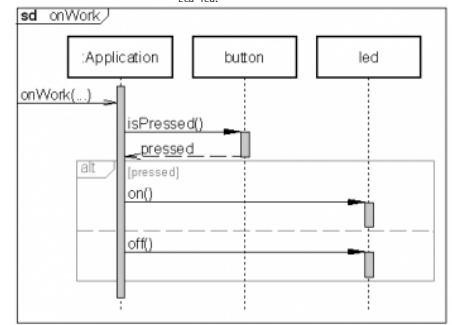
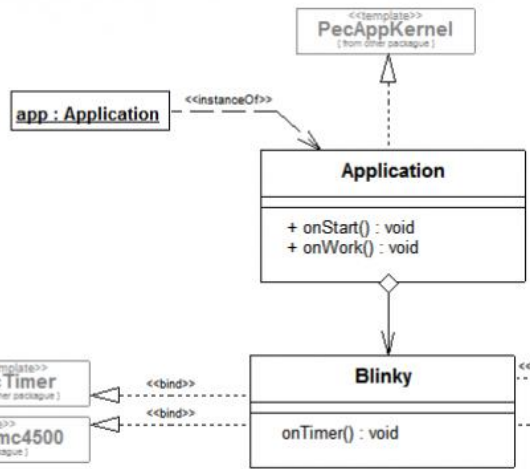
- UML Werkzeug für den gesamten Entwicklungszyklus
- Quelltextgenerierung unter anderem aus
 - Klassendiagrammen
 - Zustandsdiagrammen
- just in time Generierung von Sequenzdiagrammen
- Quelltextvervollständigung und Syntaxeinfärbung
- Model-Level-Debugging
- Klassenbibliotheken für
 - low level driver,
 - portable middleware,
 - online libstore
- und vieles mehr...



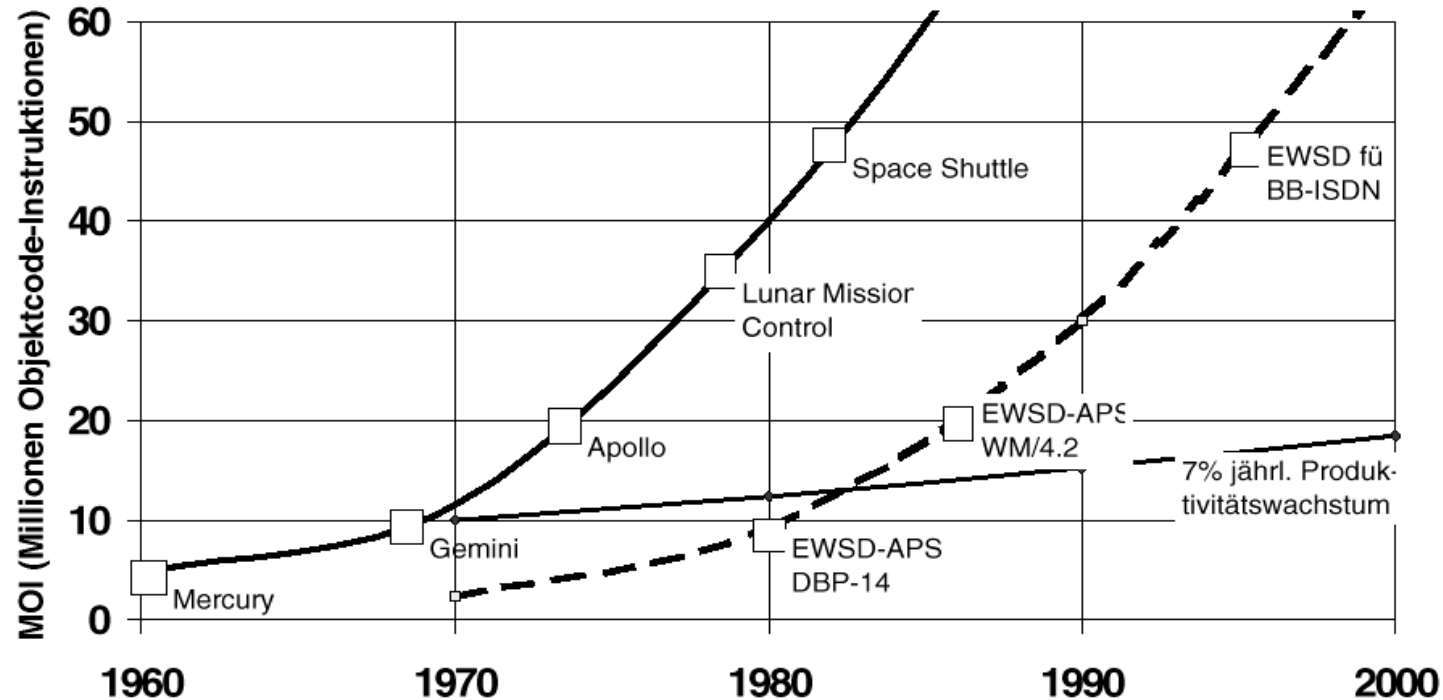
```

////////////////////////////////////////////////////////////////
// Diese Quelldatei wurde automatisch erzeugt.
// SiSy UML CodeGenerierung
////////////////////////////////////////////////////////////////
// <ObjectNumber>=897</ObjectNumber> GoToSiSy: d: 896
////////////////////////////////////////////////////////////////
#ifndef defined(PL_Application)
#define PL_Application
#include <stddef.h>
#include "xmc1200.h"
#include "Led.h"
#include "PecAppModul.h"
#include "Pec_TInOut.h"
#include <stddef.h>
#include <stdint.h>
#include "xmc1200.h"
#include "myArm.h"
class Application : public PecAppModul
{
public:
// onwork() GoToSiSy: d: 896 | o: 896
void onwork();
// onStart() GoToSiSy: d: 896 | o: 899
void onStart();
// onsysTick() GoToSiSy: d: 896 | o: 897
void onsysTick();
// main() GoToSiSy: d: 896 | o: 897
void main();
// Anzahl der Sekunden seit Systemstart
uint32_t systimeSec;
// 0...99 als Spruchteil einer Sekunde
uint8_t systimeSec0;
Led led;

```



Zunehmender Umfang der Software

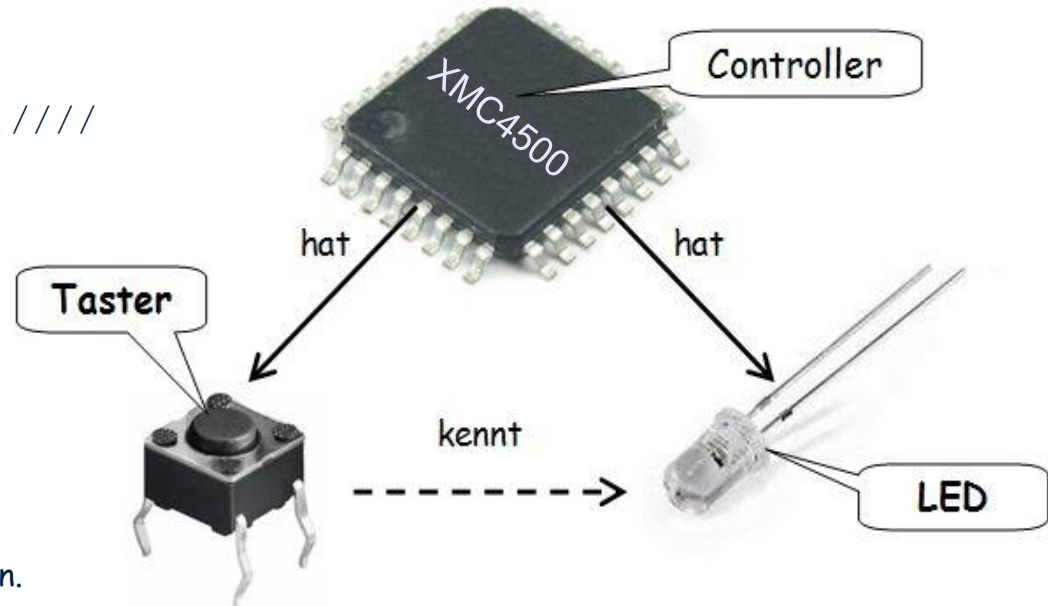


Quelle: Boehm /Productivity /43-57; Siemens (Unterlagen zum Seminar Industrielle Software-Technik, Deutsche Informatik-Akademie Bonn 5/88 zitiert nach Balzert /Lehrbuch der Software-Technik /30

UML Unified Modeling Language

```
// "klassische" Schreibweise //////////////////////////////////
PORT0->IOCR4 &= ~0x0000f800UL;
PORT0->IOCR4 |= 0xC0U << 8;
PORT0->OMR = 0x00200020UL;

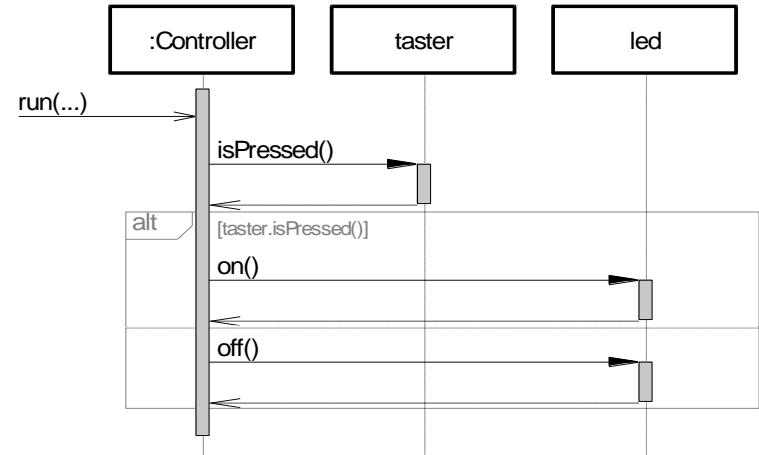
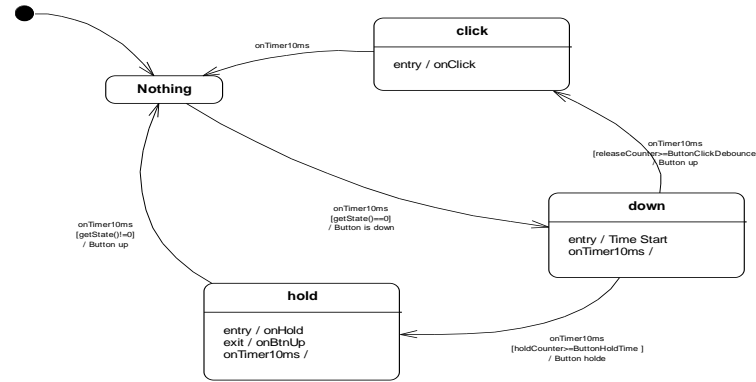
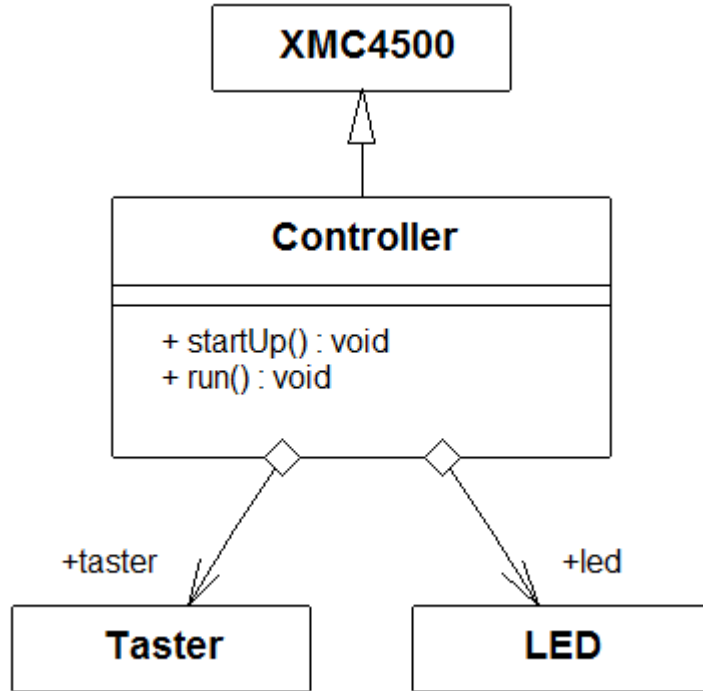
// objektorientierte Schreibweise ////
Led led;
led.config(PORT0, 5);
led.on();
```



Wenn der Taster gedrückt ist schalte die LED an.
 If the button is pressed the LED will turn on.

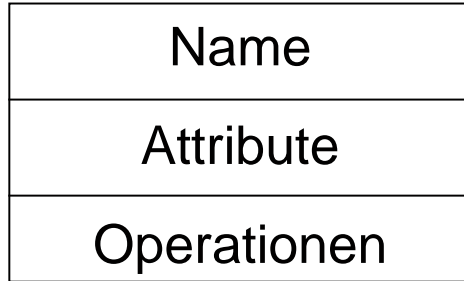
```
if ( button.isPressed() ) led.on();
```

UML Unified Modeling Language



UML Unified Modeling Language, Strukturmodell

Klasse



Objekt



Komponente

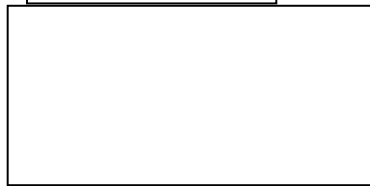


Sichtbarkeit:

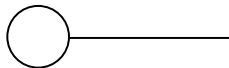
- + *public*
- *private*
- # *protected*

{...} *Constraint*

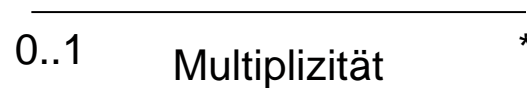
Package



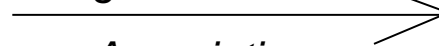
Interface



Assoziation



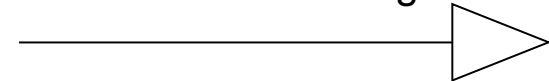
gerichtete Assoziation



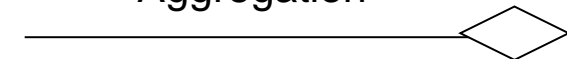
Assoziation



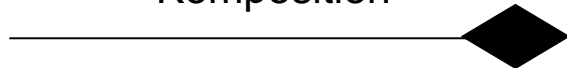
Generalisierung



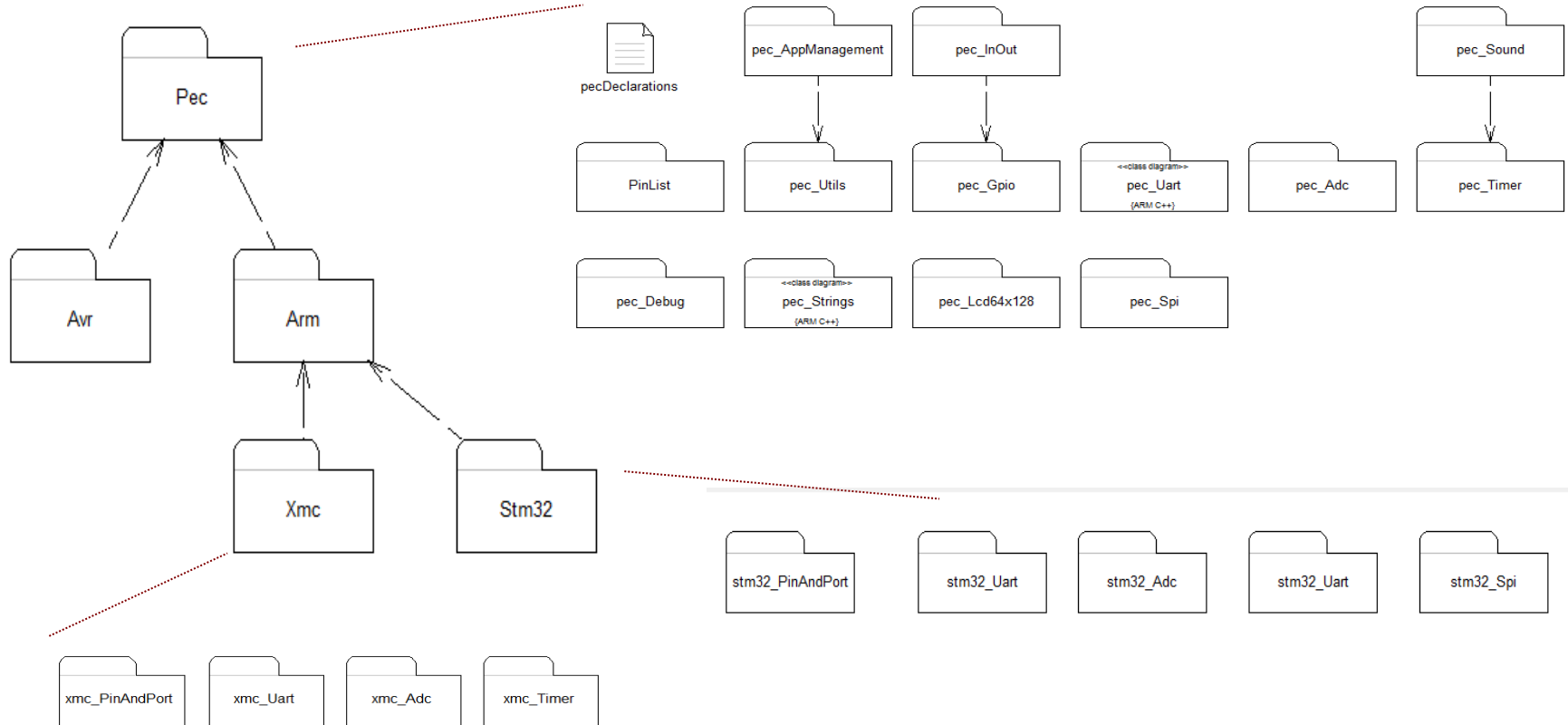
Aggregation



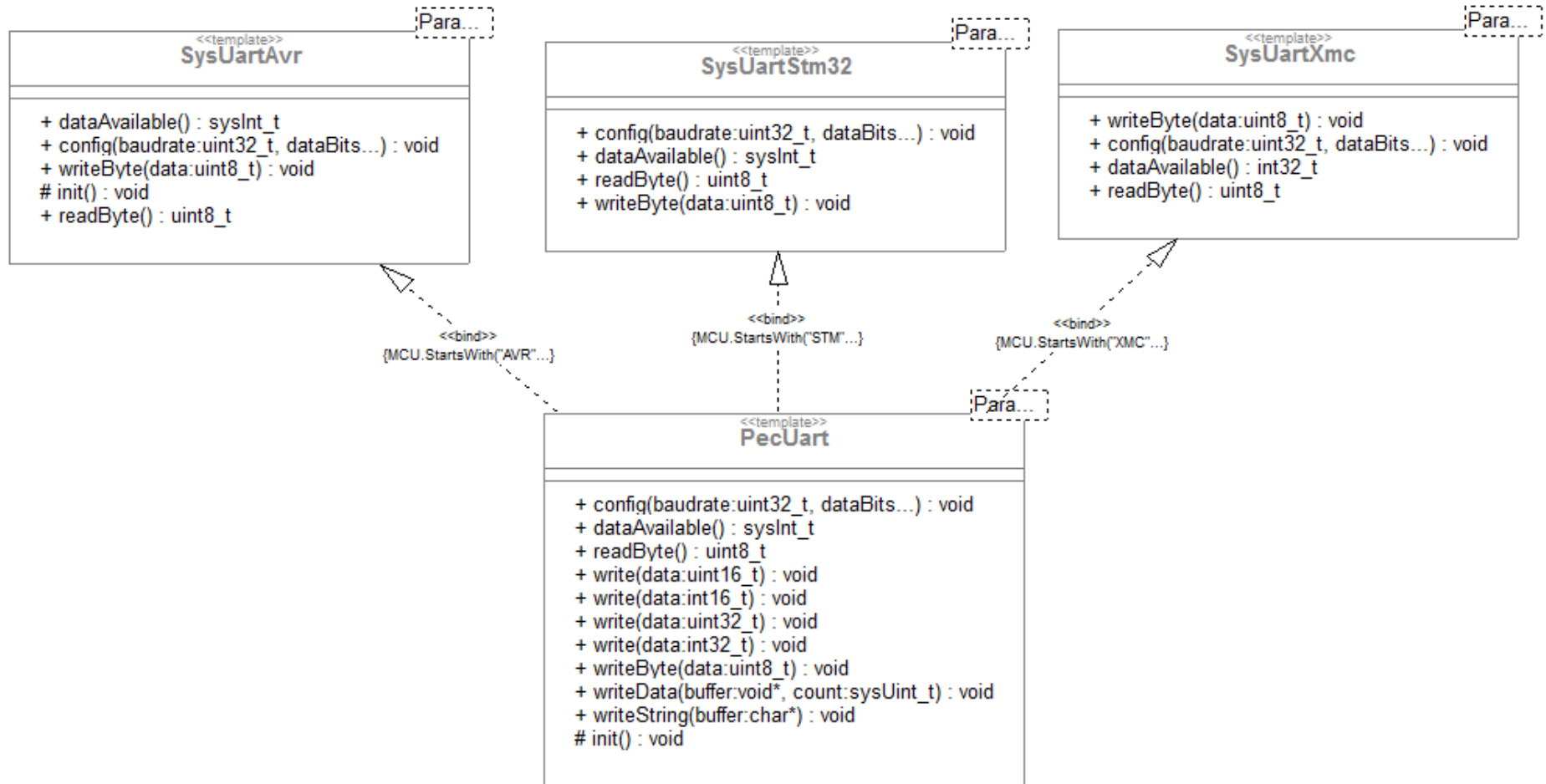
Komposition



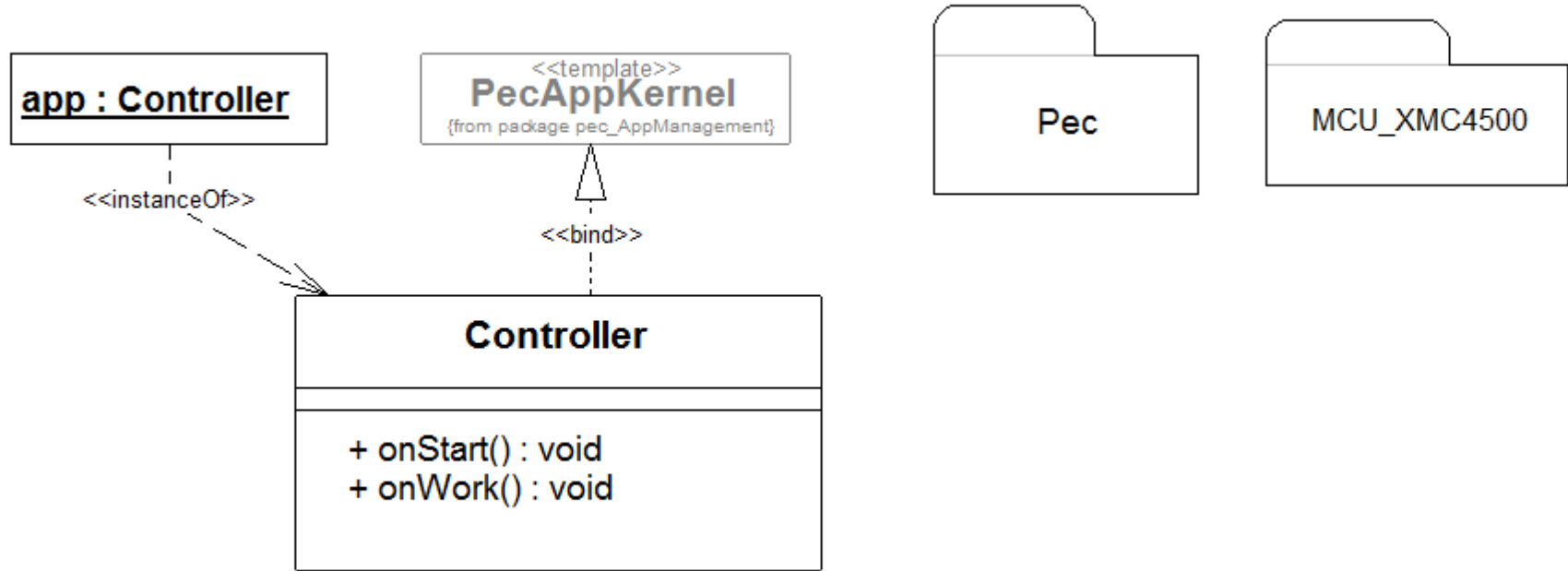
PEC Portable Embedded Classes



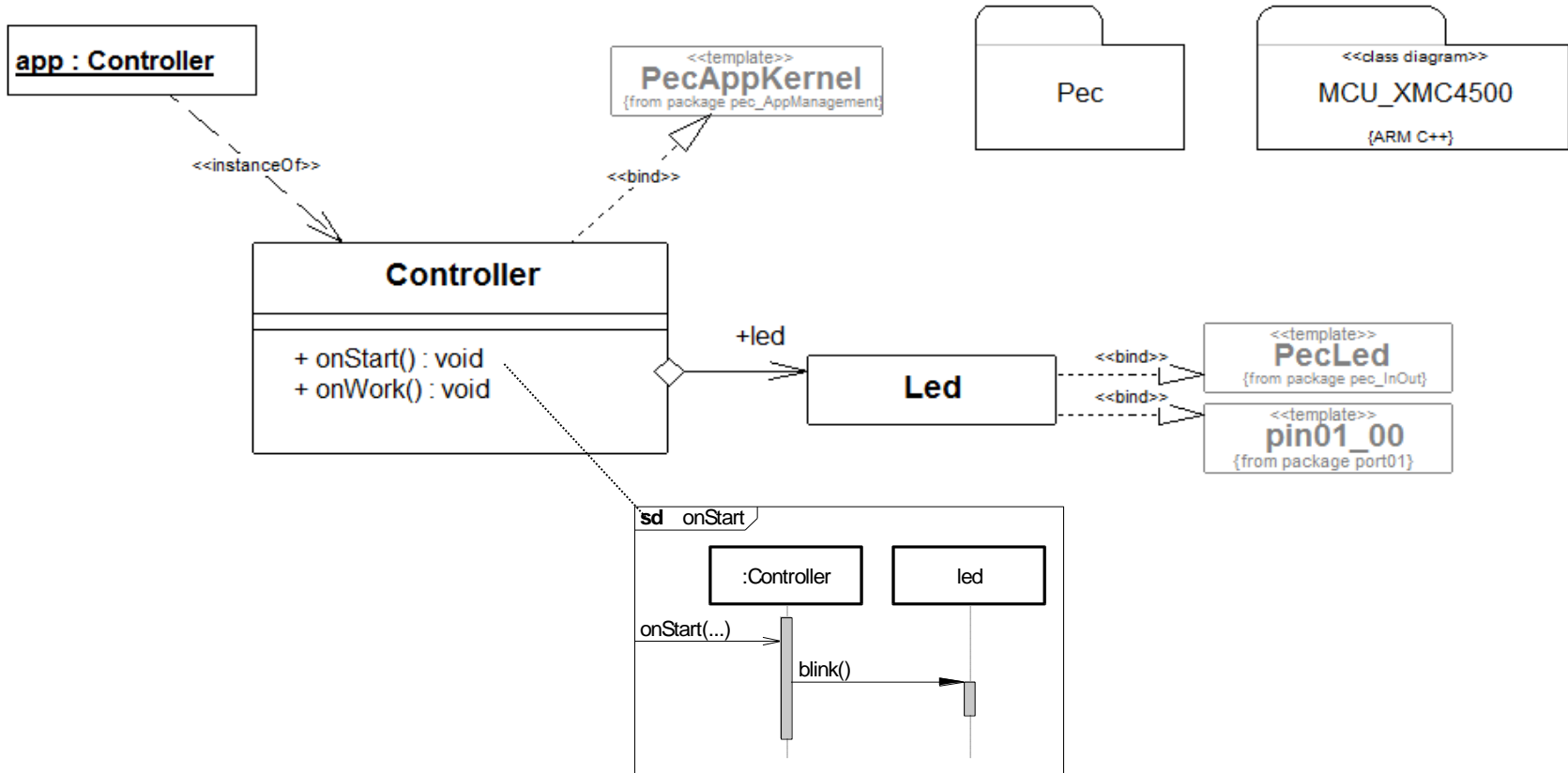
Variation Points



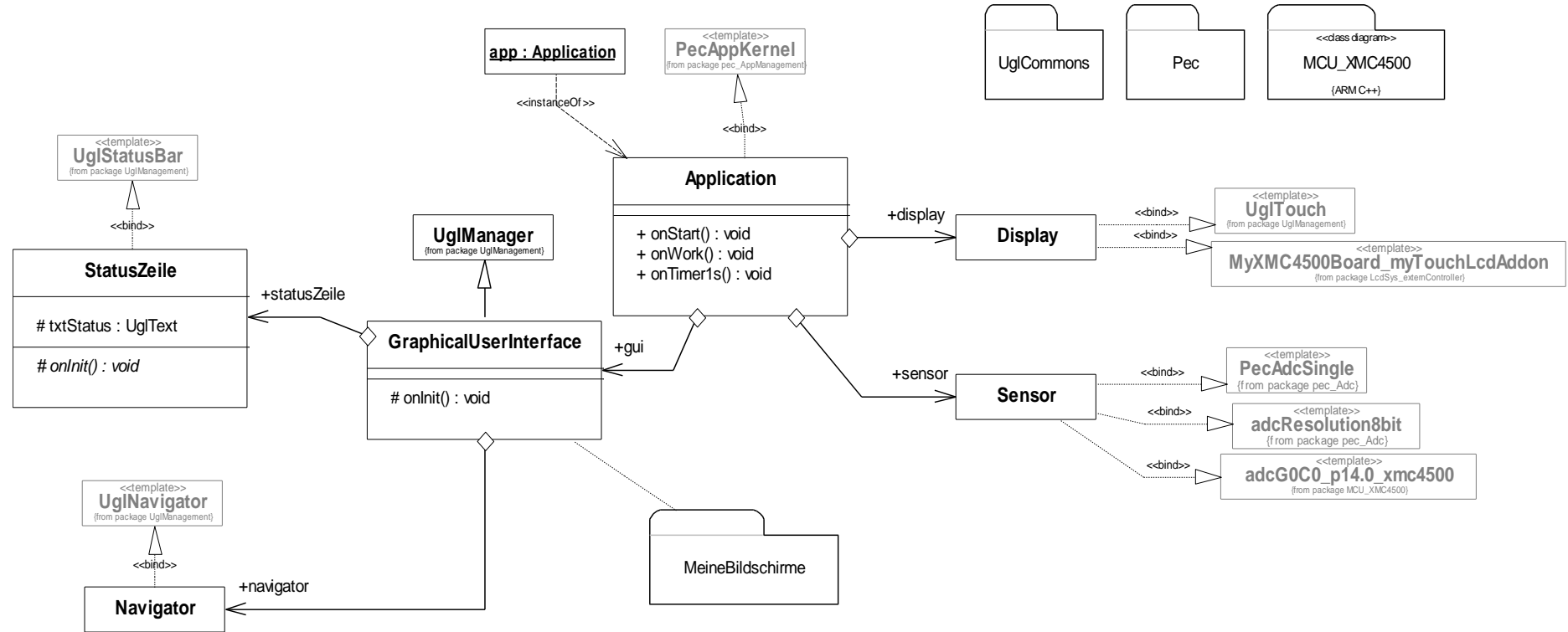
Grundstruktur einer PEC-Application



einfaches Anwendungsbeispiel



komplexes Anwendungsbeispiel



Aus dem Klassendiagramm in den FLASH

```

////////////////////////////////////
//
// Diese Quellcodedatei wurde automatisch erzeugt.
// SiSy UML CodeGenerierung
//
////////////////////////////////////

```

```

//<ObjektNummer>3522</ObjektNummer>
GoToSiSy:d:3521

```

```

#if !defined(h_Application)
#define h_Application

#include "Display.h"
#include "GraphicalUserInterface.h"
#include "Sensor.h"
#include "PecAppModul.h"

#include "Pec.h"
#include "MeineBildschirme.h"
#include "UglCommons.h"
#include "MCU_XMC4500.h"

```

```

#include <stddef.h>
#include <stdlib.h>
#include "xmc4500.h"
#include "myArm.h"
// aus Artefakt:xmcTypes.h GoToSiSy:o:947
#ifndef xmcTypes_h
#define xmcTypes_h

```

```

//LLD-Treiber
// in: Compiler/arm/arm-gcc/Infineon
#include "..\..\xmc_ild.h"

```

```
typedef void* port_t ;
```

```
#endif
```

The screenshot shows the SiSy IDE interface. At the top, there's a menu bar with 'Projekt', 'Bearbeiten', 'Werkzeug', 'Ansicht', 'Einstellungen', and 'Fenster'. Below it is a toolbar. The main workspace is divided into several panes:

- Navigator:** Shows a tree view with 'Schnellzugriff' and 'Ugl_4500'.
- Code Editor:** Displays C++ code for 'void Application::onStart () { ... }'. A comment at the top reads '61 // // Festlegen der ersten anzuzeigenden Seite'.
- SiSy-Konsole:** Shows a log of system messages, including 'Cortex-M4 identified', 'Target interface speed: 100 kHz', and 'Reset type RESETPIN: Resets core & peripherals using RESET pin.' A red box highlights the message 'Bitte warten: Brenne!'.
- SEGGER J-Link V4.781 - Flash download (112 KB):** A progress dialog box showing the status of a flash download. It includes a table:

Operation	Progress	Time
Compare	100.0%	0.037s
Erase	100.0%	2.495s
Program	10.9%	1.691s
Verify	0.0%	
- UML Class Diagram:** Shows the class structure. 'Application' is the central class, with associations to 'StatusZeile', 'GraphicalUserInterface', 'Display', and 'Sensor'. 'GraphicalUserInterface' has an association to 'MeineBildschirme'. 'Sensor' has an association to 'UglTouch'. 'UglTouch' has an association to 'MyKMC4500Board_myTouchLodAddon'. 'UglTouch' also has an association to 'Pec'. 'UglCommons' is associated with 'Pec'. 'MCU_XMC4500' is associated with 'UglTouch'. 'UglNavigator' is associated with 'Application'.

auf Modellebene debuggen

SiSy@[PEC_Test1.spr]

Projekt Bearbeiten Werkzeug Ansicht Einstellungen Fenster Hilfe

Debug | C:\tr\PEC_Tes...

Debug: MeineBildschir... MeineBildschirme

Animation Programm ist angehalten...

Variablen-Überwachung

Variable	Wert
wert	31 '\037'
oldValue	0 '\000'

Aufrufliste

Funktion	Zeile	Datei	P.
StartForm::onWork	119	C:\tr\PEC_Test...	th
Application::main	197	C:\tr\PEC_Test...	th
main	175	C:\tr\PEC_Test...	

Nächster Befehl: C:\tr\PEC_Test1\UGL_4500\temp_src\StartF...

Unterbrechungspunkte

Datei	Zeile	Funktion
C:\tr\PEC_Test1\UGL_...	167	main()
C:\tr\PEC_Test1\UGL_...	119	StartForm::onWork()

```

090     } app.gui.show( msgb
091   }
092
093
094 }
095 ///////////////////////////////////////////////////////////////////
096 // onTimer100ms() GoToSi
097 ///////////////////////////////////////////////////////////////////
098 // onWork() GoToSiSy:d
099 ///////////////////////////////////////////////////////////////////
100
101 void StartForm::onTimer100
102 {
103
104     wert = app.sensor.getV
105
106 }
107 }
108 ///////////////////////////////////////////////////////////////////
109 // onWork() GoToSiSy:d
110 ///////////////////////////////////////////////////////////////////
111 ///////////////////////////////////////////////////////////////////
112 ///////////////////////////////////////////////////////////////////
113
114 void StartForm::onWork()
115 {
116     static uint8_t oldValue
117     if (wert!=oldValue)
118     {
119         progress.setValue(
120         progress.paint();
121         oldValue=wert;
122     }
123
124
125 }
126 ///////////////////////////////////////////////////////////////////
127 // destroy() GoToSiSy:d
128 ///////////////////////////////////////////////////////////////////
129 ///////////////////////////////////////////////////////////////////
130 ///////////////////////////////////////////////////////////////////
131
132 void StartForm::destroy()
133 {
134     // aus Template: UglF
135     delete this;
136
137     // GoToSiSy:d:3535|o:3
138
139

```

```

void StartForm::onWork () {
116 static uint8_t oldValue=0;
117 if (wert!=oldValue)
118 {
119     progress.setValue(wert);
120     progress.paint();
121     oldValue=wert;
122 }
123

```

sd_onWork

```

sequenceDiagram
    participant StartForm as :StartForm
    participant progress as progress
    StartForm->>progress: setValue(wert)
    Note over StartForm, progress: [wert=oldValue]
    StartForm->>progress: paint()
    progress-->>StartForm: 

```

Objektbibliothek

- Klasse
- Attribut
- Operation
- Objekt

```

classDiagram
    class StartForm {
        # txtWelcome : UglText
        # btnTest1 : UglButton
        # wert : uint8_t = 0
        # onInit() : void
        + onEvent(nr: eventNr_t) : void
        + onTimer100ms() : void
        # onWork() : void
    }
    class UglProgressBar {
        (from package UglControls)
    }
    StartForm o-- UglProgressBar : +progress

```