

## MBS Research Project 2006 - 2010

**Dipl.-Ing. Axel Jäschke**  
Head of Subsea Division



## Content

- Subsea History (Decade 2000-2010)
- Research Project ISUP
- Multiphase Boosting Subsea MBS
  - > Power Transmission
  - > Power Enhancement
  - > Power Generation
- ISUP / MBS Demonstrator

## Subsea Pioneers

MPA 1997 - 2007



DEMO 2000 → Leyll 2005



## Subsea Future



MBS  
Demonstrator  
2009

Porsgrun  
2009



## Subsea Projects



CNRI – Lyell 2006



BP – King 2007



## Research Cooperation

Integrated System for Underwater Production  
of Hydrocarbons



**MBS (Bornemann)**  
Multiphase Boosting Subsea  
Power Handling

**CControl (IMPaC)**  
(SCADA System, Subsea Control Unit  
and Atomisation)

**ARPA (KIT)**  
(Availability and Remote Control of Process  
Control and Automation Systems)  
Subsea Control and Automation

**SubSeaWork (Wirth)**  
(Ground Based Subsea Manipulator Vehicle)  
Installation and Intervention

The ISUP Research Project is supported by



## Research Project MBS

### Power Transmission

- Simulation Model (Uni Karlsruhe, IEH)
- **Speed Variation – Hydrodynamic (VOITH TURBO)**
- Speed Variation – Hydrostatic (Uni Dresden, IFT)
- Water tolerant liquid filled E-Motor (RITZ)
- Subsea Control Structure (IMPac)

### Power Enhancement

- Two Stage Wet-Gas Compression- Jet Booster (Körting)
- Analyse of fluid composition of hydrocarbons (Uni Karlsruhe, ITTK)

### Power Generation

- Multiphase Twinscrew Motor MTM (Uni Hannover, IFT)

# MBS

Multiphase  
Boosting  
Subsea

## Research Project MBS

### Modular Test Bed

- Jet Booster
- Multiphase Twinscrew Motor
- Hydraulic Speed Variation (hydrostatic, hydrodynamic)
- Continuous Run Test SMPC Demonstrator

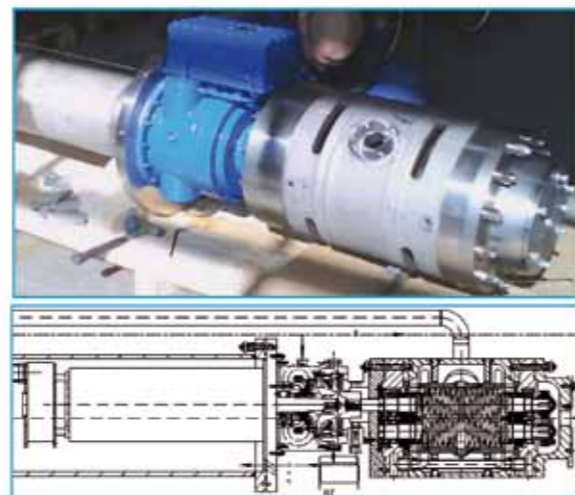
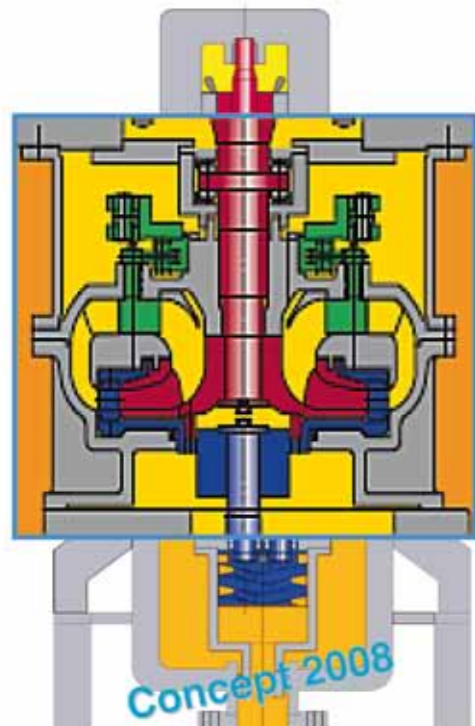
### Demonstrator

- **Multiphase Pump System with Hydraulic Speed Control**
- 100m<sup>3</sup> Test Tank
- **ISUP Integration Test - Hamburg Harbour (Dec. 2009)**

### Subsea Environment

- Deep Water Study (Biolab)
- Subsea Cooler (EPA)

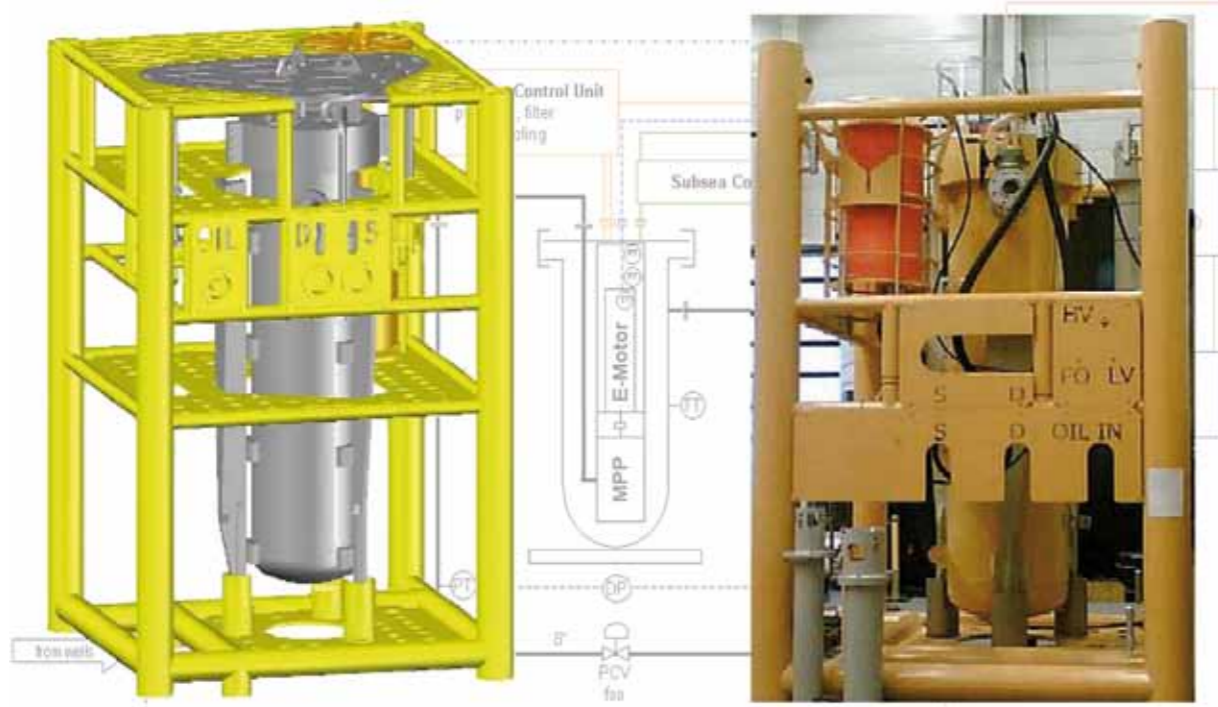
## Subsea Speed Variation



## Demonstrator



# Demonstrator



**Thank you for your attention!**

Multiphase Boosting Subsea  
**SMPC**

**Thank you to all ISUP Partners**  
*Impac, Wirth, Uni Karlsruhe IPR, IEH, ITTK, Uni Hannover IFT, Uni Dresden IFT, Ritz, Voith Turbo, Aradex, Körting, EPA, NSW, Westermann, Werthenbach, Bosch Rexroth, Artec Valves, Gisma, PG, ...*

**and all Bornemann Colleagues.**