

# Advances in Subsea Electronics - Critical Component Technology for next generation subsea fields



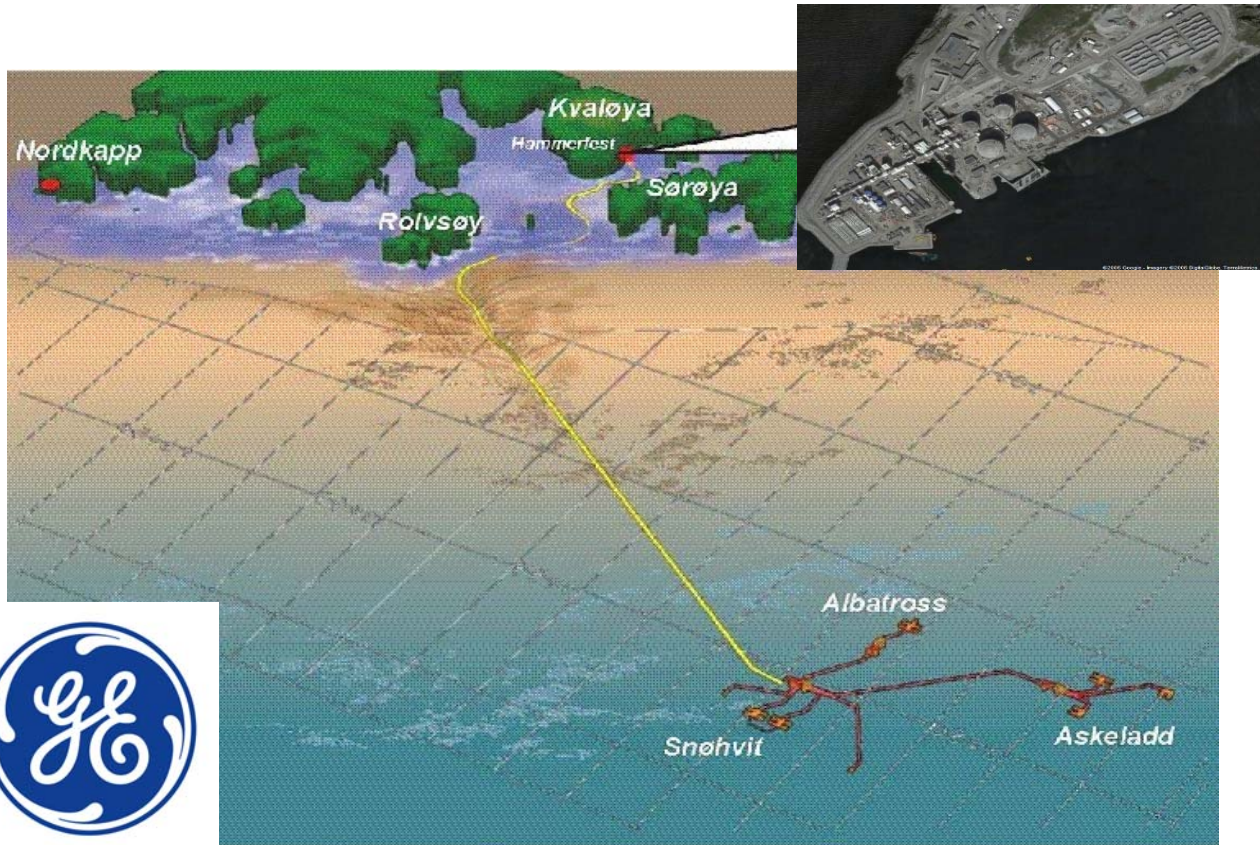
Society of Underwater technology

12<sup>th</sup> August '09, Perth

Advances in Subsea Control System technology

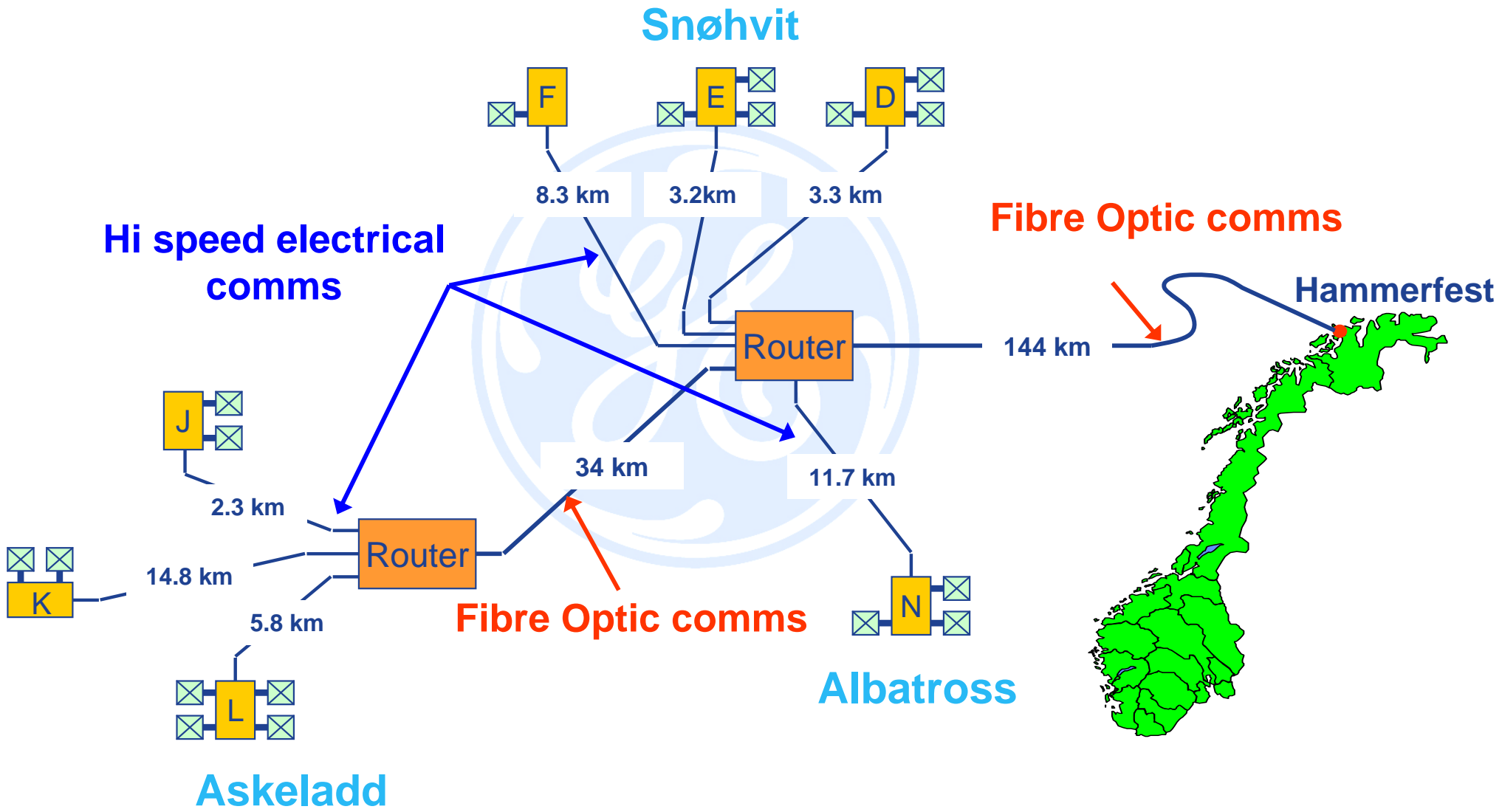


# StatoilHydro's 'Snohvit' Project



world's longest  
offset subsea  
control system  
by GE-Oil & Gas.  
First Gas –  
20<sup>th</sup> August 2007  
[220Km design]

# Subsea Communications Router Technology – Distributing Power and Data



Web Interfaces  
The Digital Oilfield



Topside Supervisory System  
(SCADA/DCS/ICSS)



Subsea  
Control  
Station



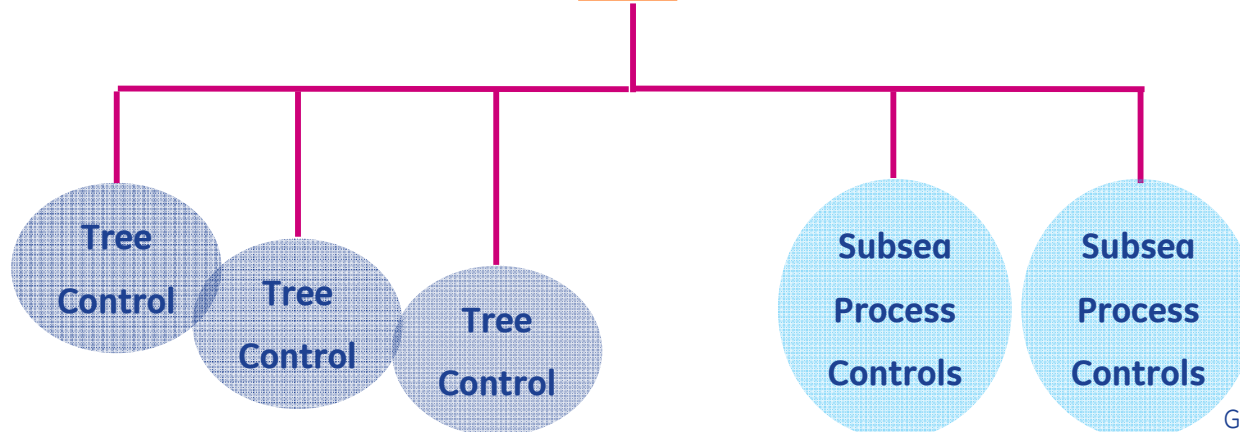
3<sup>rd</sup> Party  
Interfaces  
(Downhole)



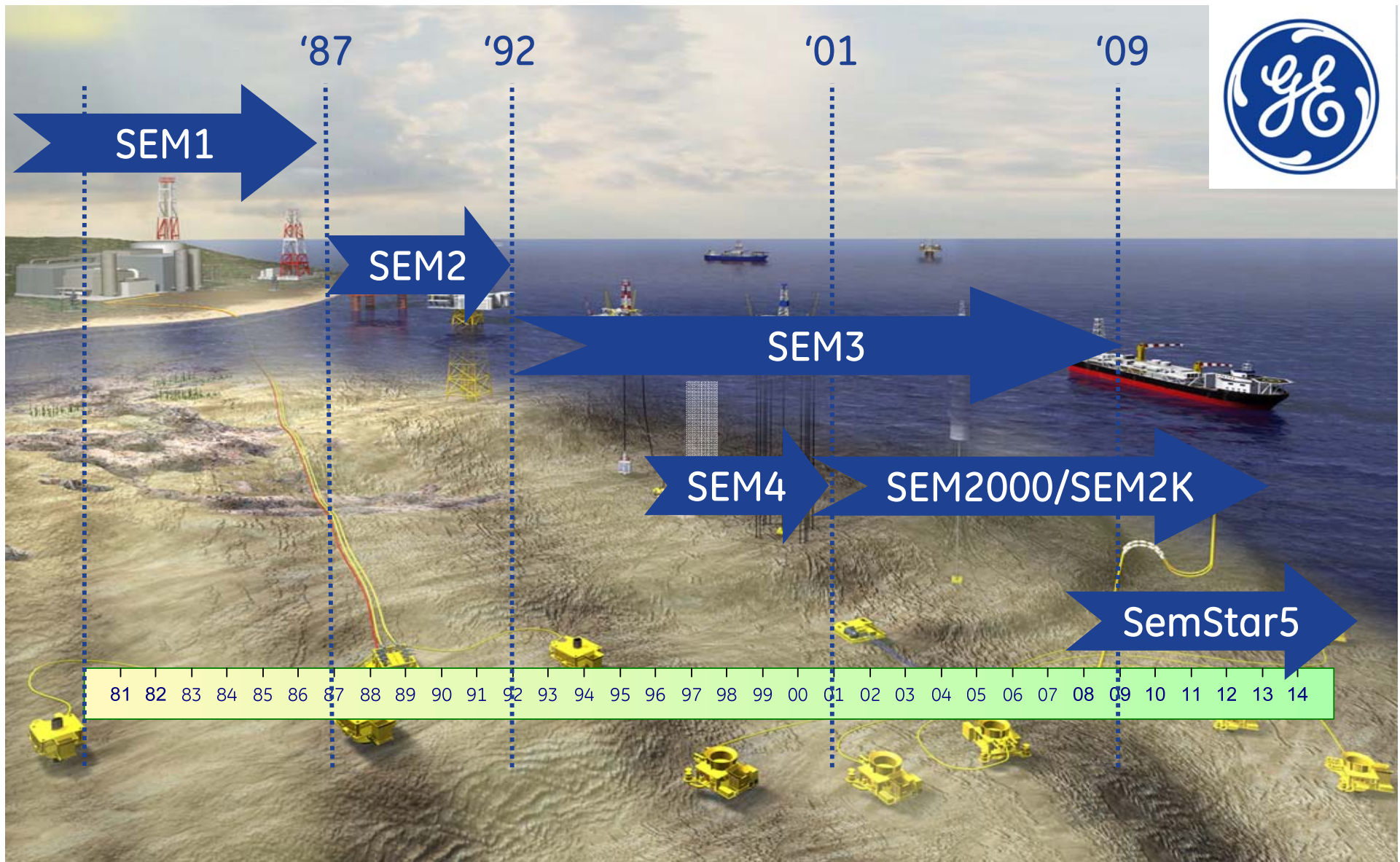
Subsea  
Data  
Router



3<sup>rd</sup> Party  
Interfaces  
(Subsea)



# Subsea Electronics evolution



# The SemStar5

Fully Modular approach  
with Backwards Compatible  
& Obsolescence  
Management built into  
design

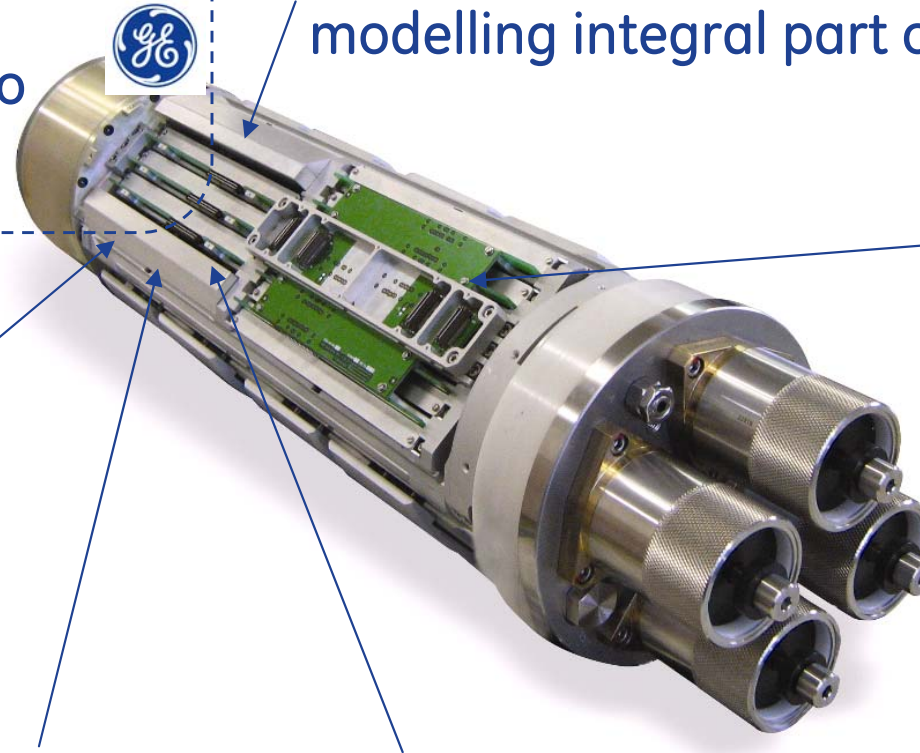
Thermal management and  
modelling integral part of design

Full Range of  
Communications  
Options :  
Optical, Low,  
Medium, high  
Speed options

Simplified  
motherboards for  
greater quality  
control and  
improved reliability

Leverage GE  
Technology

Common Processing Power where  
needed : Any Card Any Slot "Plug &  
Play" Architecture

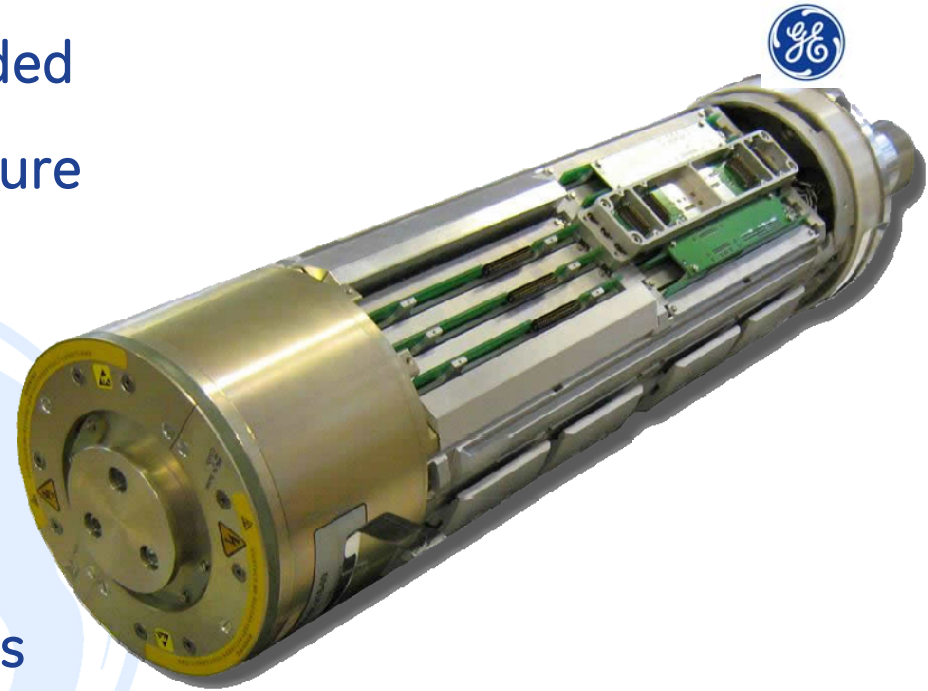


# Flexibility & Modularity

- Common Processing Power where needed
- Any Card Any Slot Plug & Play Architecture
- Cards Split By Functionality
- 1, 2 & 3 Bay Variant

## Support

- Traditional DCV & 4-20mA interfaces
- HIPPS
- Communication Routing
- Subsea Power Switching
- SIIIS (Levels 1, 2 & 3)
- IWIS (Options 1, 2 & 3)



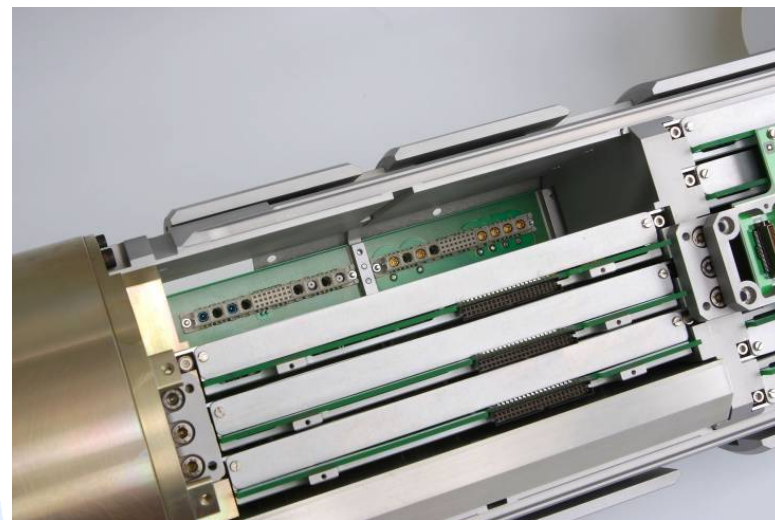
# Communications Capabilities

## Features

- IP Enabled
- Cross Strapping Support
- Plug & Play Subsea LAN

## Modems

- Optical TCP/IP Modem
- Long Offset Fibre Optic TCP/IP Modem – 200km
- Broadband DSL Infield Distribution
- Ethernet on Manifold Communications
- RS422 Long Range on Manifold Communications
- VSCM – Medium speed – SEM2K backwards compatibility & Multidrop
- LSCM – Low Speed Long Offset – SEM3 & SEM2K backwards compatibility & Backup

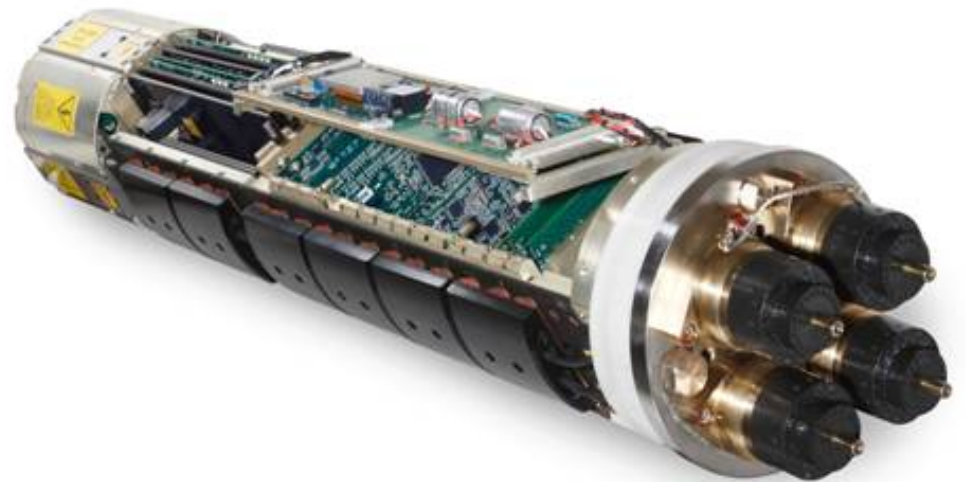


# Obsolescence Management

- High Risk Component Grouping
  - Daughter Module
- GE Buying Power
  - Selected Processor Used By GE Energy
- Component Obsolescence Monitoring Program
- SpareShare Support Integrated With Global Service Package

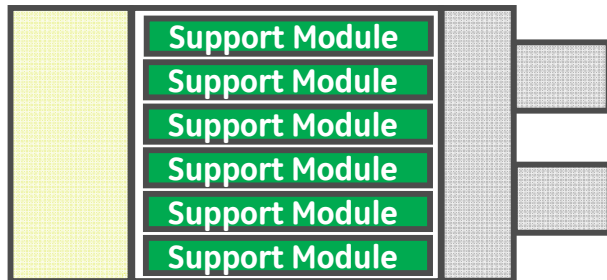
## Backwards Compatibility

- With Legacy VetcoGray Designs



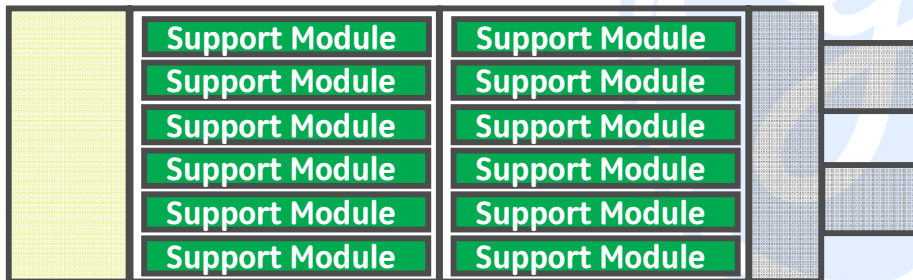
# Example SemStar5 Applications

## SemStar5 as a: Traditional SCM local Microcontroller



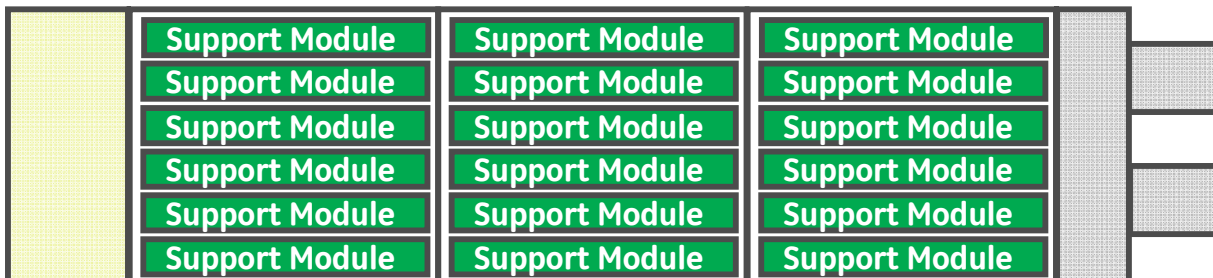
### 1 Bay (Mini) Configuration

- Essential Functionality
- Use as an i-SEM (Example - DHPT)



### 2 Bay (Midi) Configuration

- Meets 80% of Applications
- Typically up to 32 Controlled Functions



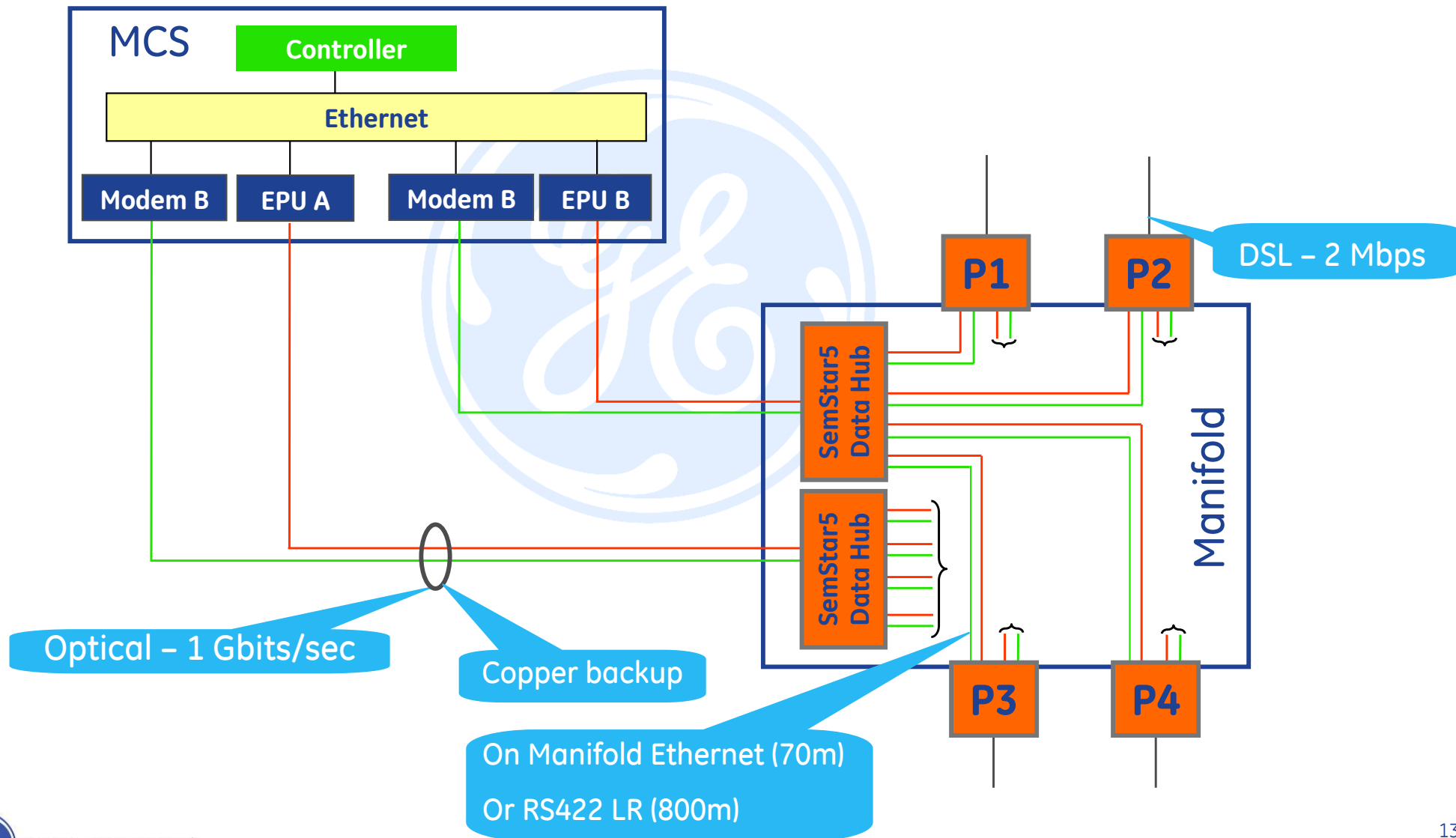
### 3 Bay (Maxi) Configuration

- Offers Maximum Flexibility
- Support Multirole Applications



# Example SemStar5 Applications

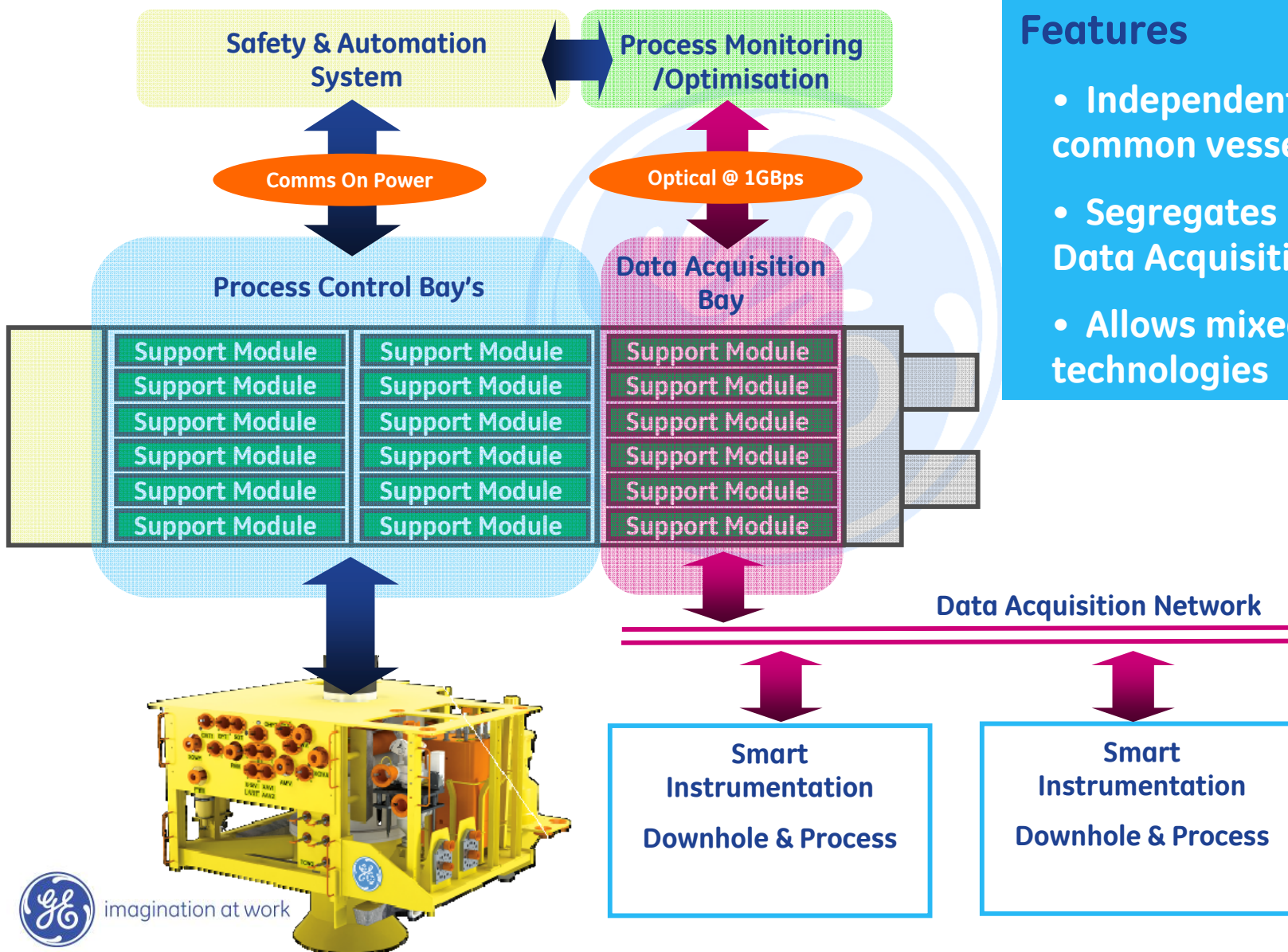
## SemStar5 as a: As a communications hub





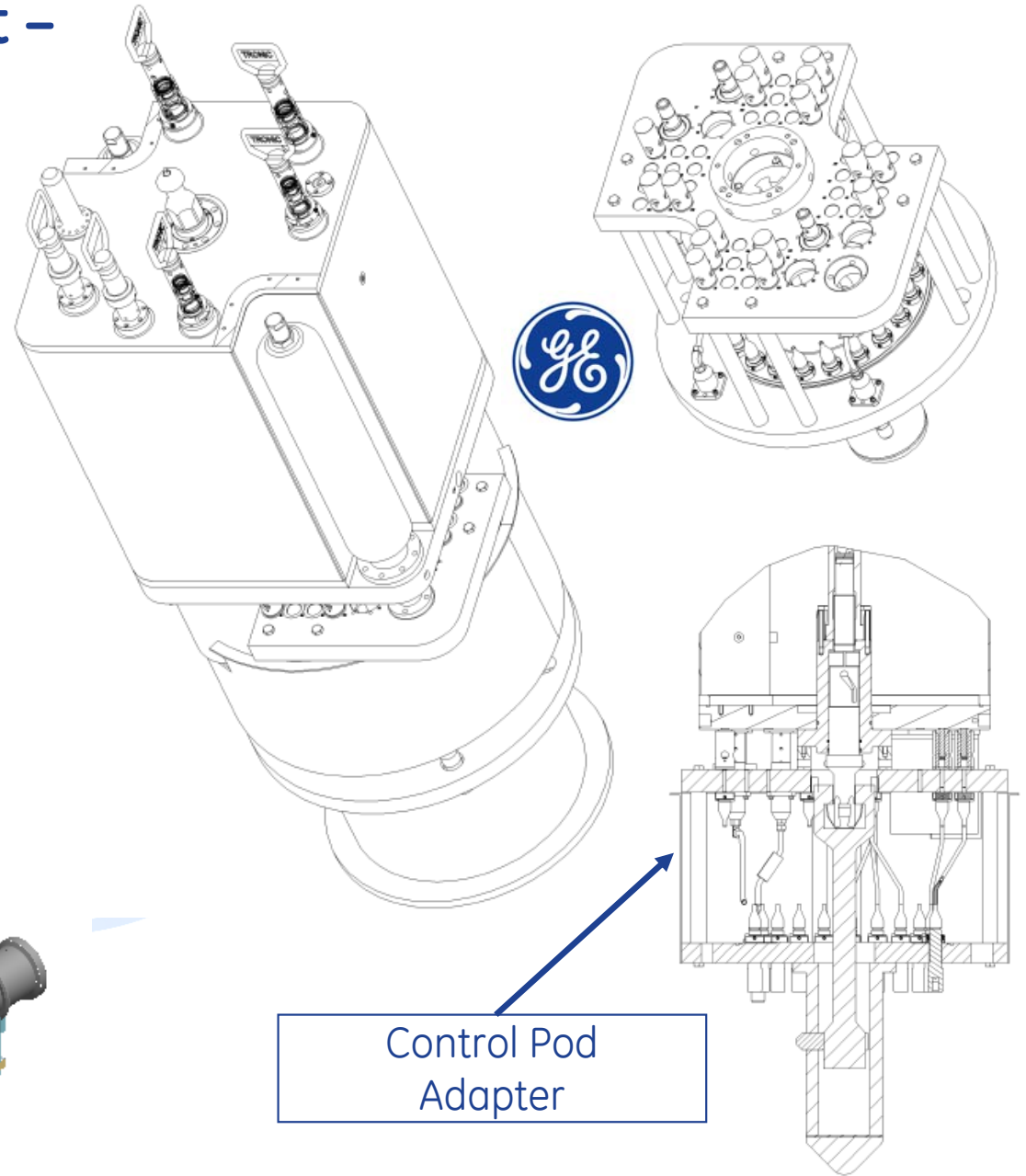
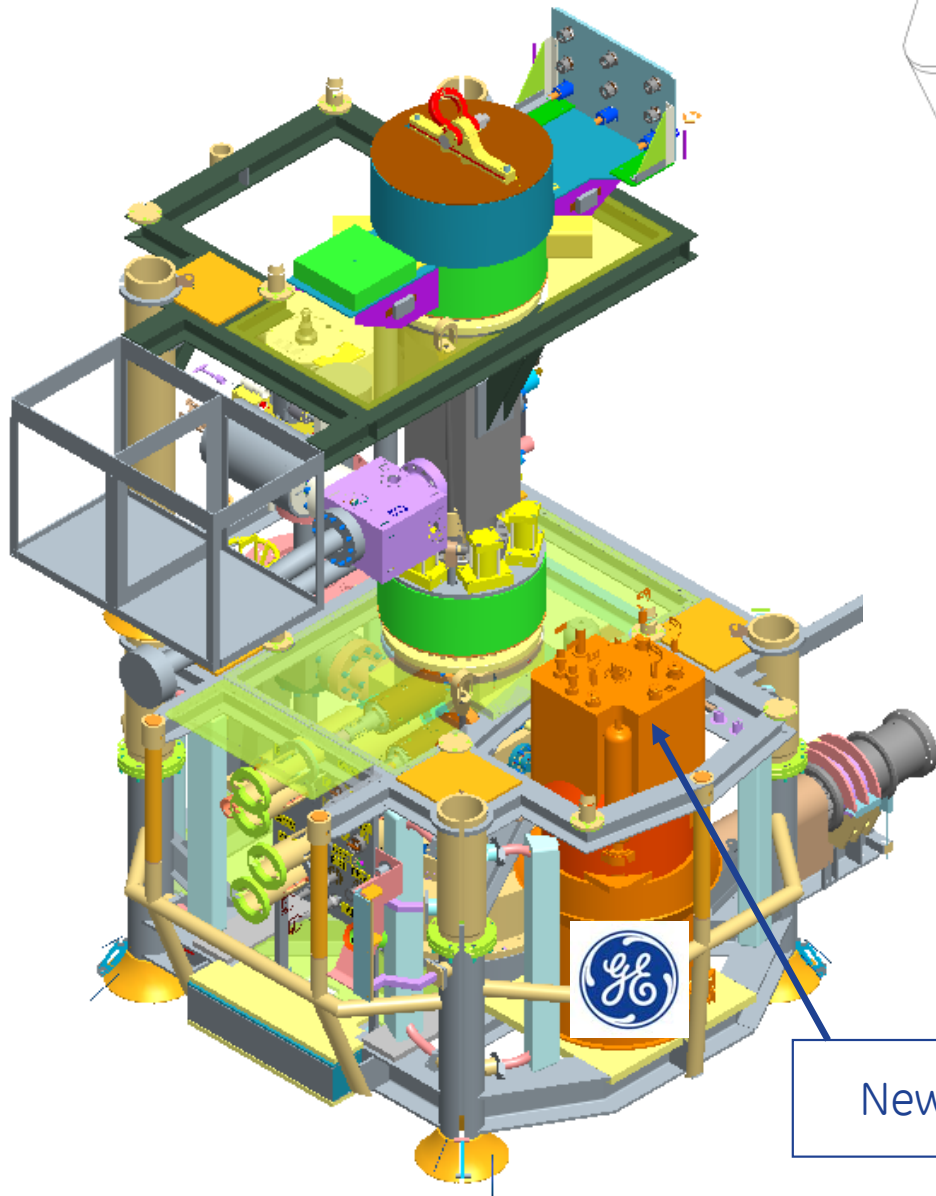
# Example SemStar5 Applications

**SemStar5 as a:** Hybrid System (local control and a data hub)



- ### Features
- Independent Networks within common vessel
  - Segregates Process Critical & Data Acquisition traffic
  - Allows mixed comms technologies

# SemStar5 first deployment - StatoilHydro TVCM

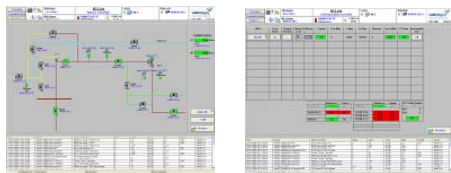


New Control Pod

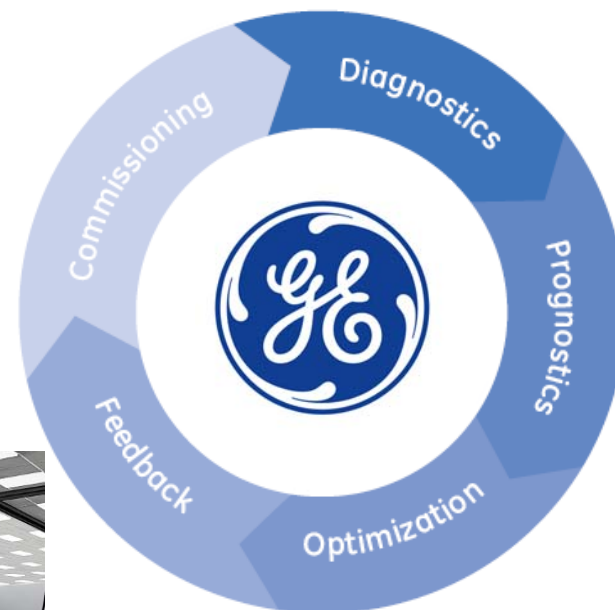
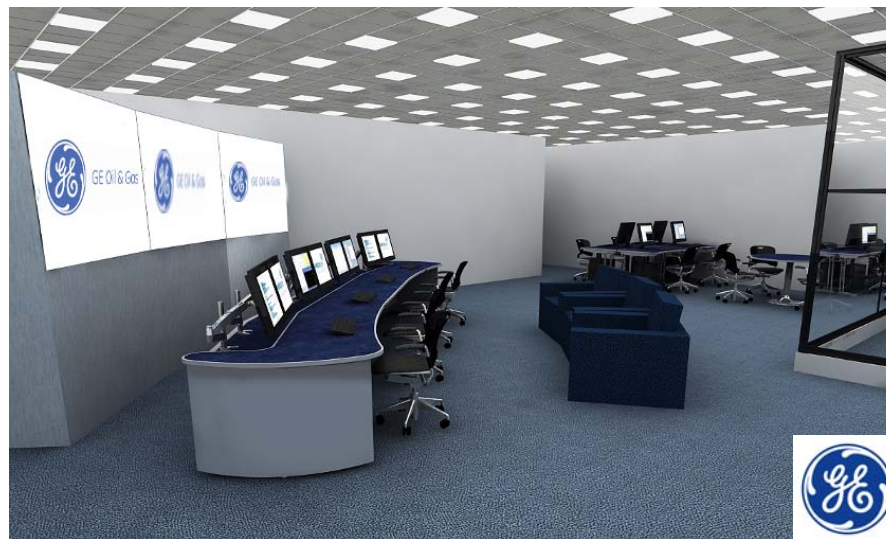
Control Pod Adapter

# SmartCenter

Remote Connectivity to the Field



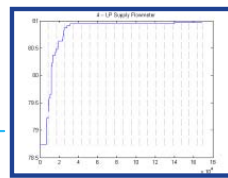
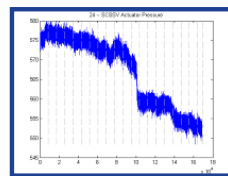
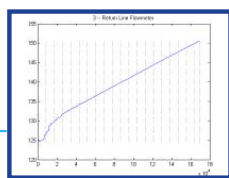
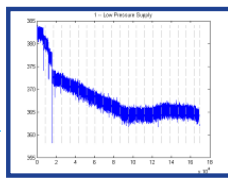
Support Major start – up & commissioning exercises



Prediction of intervention/maintenance action

Production optimisation scenario planning

Health Monitoring & Trend diagnosis



Support On line Flow Assurance Tools to deliver flow regularity improved system availability





Thank you for listening!  
Any Questions?

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