Task 3.2: Advanced intelligent turbocharger

Objectives:

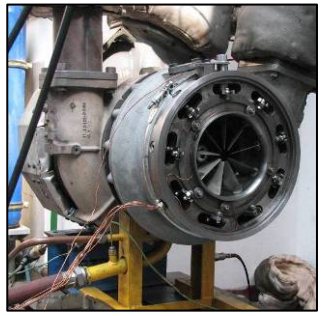
Two-stroke marine Diesel engines

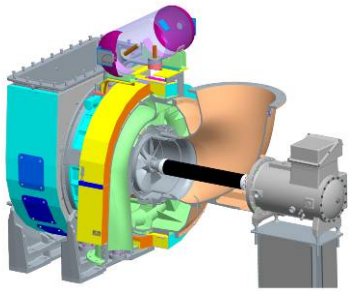
- Two-stage turbocharging
- PTI/PTO unit – total SFOC improvement 2-3%

Four-stroke marine Diesel engines

- Two-stage turbocharging, variable flow areas, PTI
- 30 bar mean effective pressure yielding 50% savings in NOx emissions with at least the same fuel efficiency compared to IMO Tier I limits

High-speed motor, frequency converter & regenerating unit

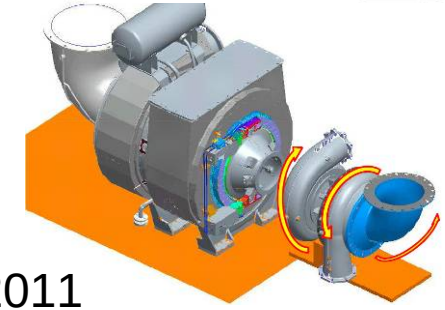




Preliminary and final VIGV cascades

Achievements and highlights:

- Integrated PTI/PTO unit coupled to turbochargers for two-stroke and four-stroke engine applications



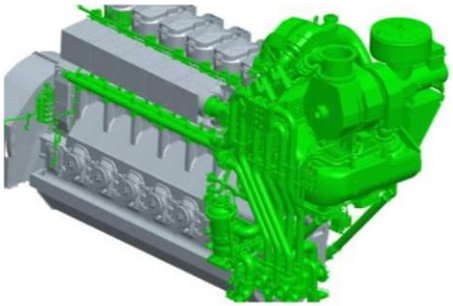
- Two-stage turbocharging applied to a two-stroke marine Diesel engine in progress
- Two-stroke engine tests scheduled July-August 2011
- Variable Inlet Guide Vane facility for com-pressors in TCs, final tests May 2011

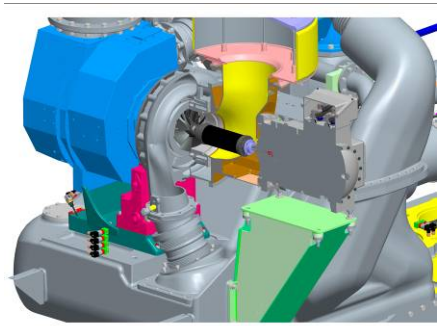
PTI/PTO: Synchrony

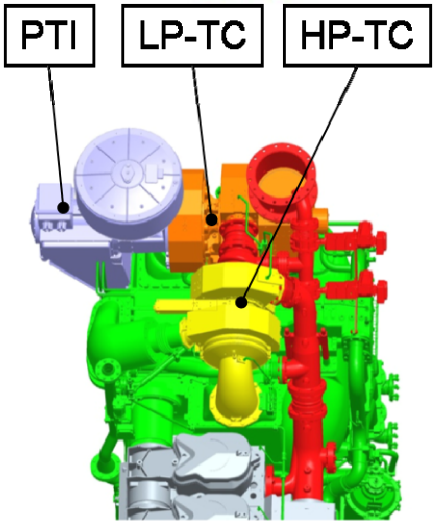
Partners: MAN, PBS Turbo

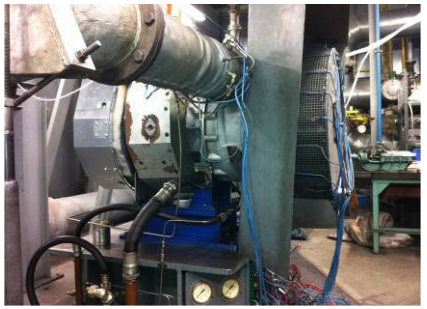
Achievements and highlights:

- Upgrade of four-stroke Tier I towards Tier II marine Diesel engine
- FEA of full engine; FEA + strain gauge validation of cylinders, connection rods & attachment of two-stage TC system
- Minimum increase in size compared to single-stage TC, no external frame
- Great variety of operating conditions due to charge air bypass, VTA and separate waste gates for both TCs
- LP- and HP-cooler independently controlled
- Operation without/with PTI
- Engine tests scheduled May-August 2011









6L32/44 CR T2 engine with 1- & 2-stage TC+VTA+PTI

PTI/PTO: Synchrony

Partners: MAN 13 PBSturbo