Visby Class Corvettes Saab Kockums

S-LÄSS, 2020-11-17

Sten Vallbo

Surface ships by Saab Kockums

Hybrid Designs

Littoral Mission Vessel 2013

Visby GHOST® Corvette 2009

P28 Corvette Superstructure 2012

Stealth Designs

StanFlex Patrol Craft 2006

Smyge Stealth Craft 1991

Styrsö MCMV 1996

Bedok MCMV 1994

CG Patrol Vessel 2001

CG Patrol Craft 1995

StanFlex Multirole Vessel 1989

Landsort MCMV 1984

SPICA-IV corvette 1990

Composite Hull Designs

Haras Patrol Craft 1981

TV171 Patrol Vessel 1979

SPICA-III corvette 1984

Orion SIGINT / Patrol Vessel 1984

Steel/Alu Hull Designs

CG40 Patrol Craft 1980

SPICA-M FAC 1979

SPICA-II FAC 1976

Carlskrona Minelayer / Offshore Patrol Vessel 1982

Visby Class Corvette

“we have the right stuff”

”…doesn’t want to exercise with us, we are too silent”

“the ships have unique capabilities”

Length oa	73 m
Beam max	10.4 m
Displacement	600+ t
Speed	>35 kn
Crew	40

All-composite Carbon-fibre Sandwich hull structure

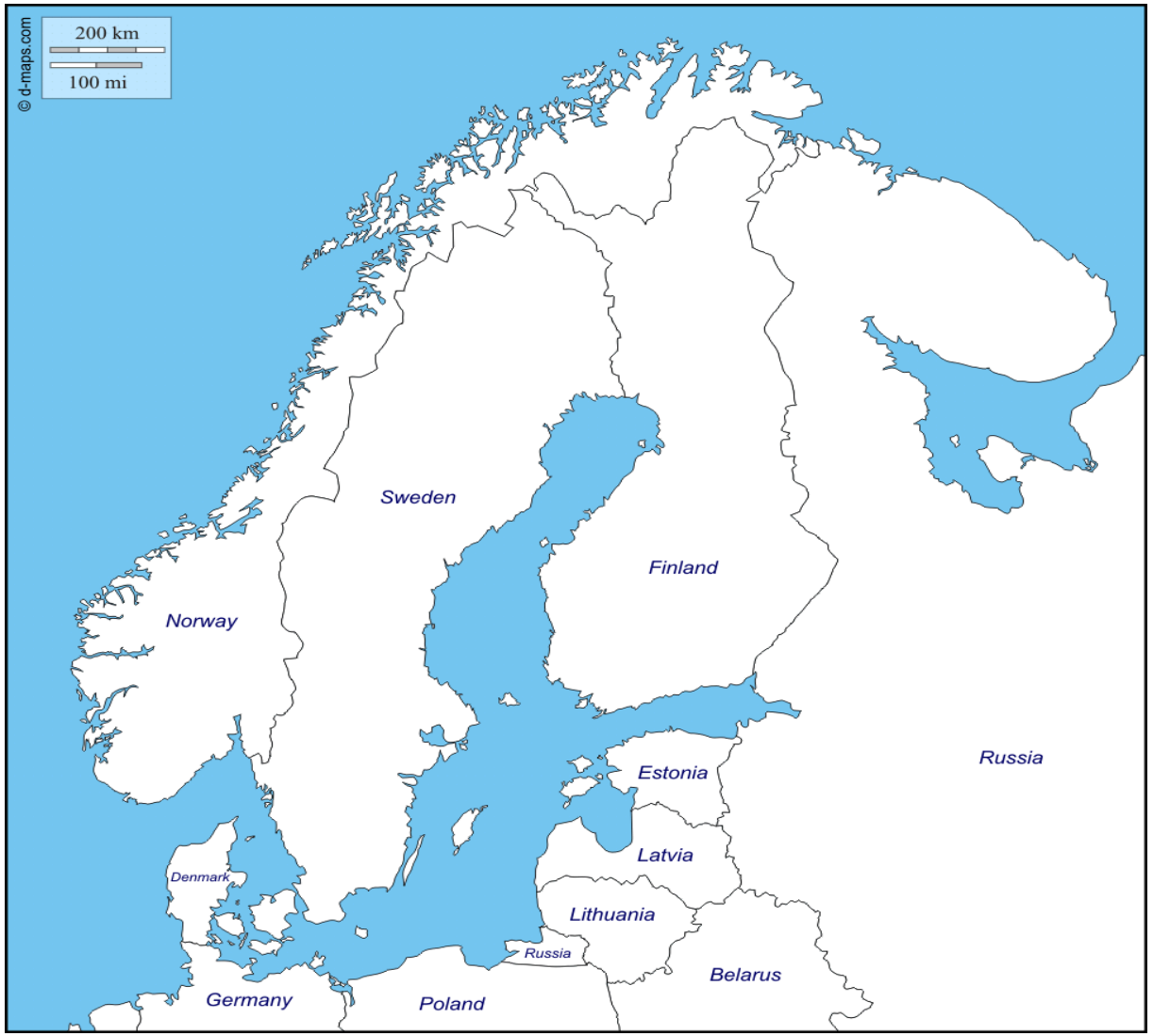
2600 / 16000 kW CODOG + Waterjet propulsion







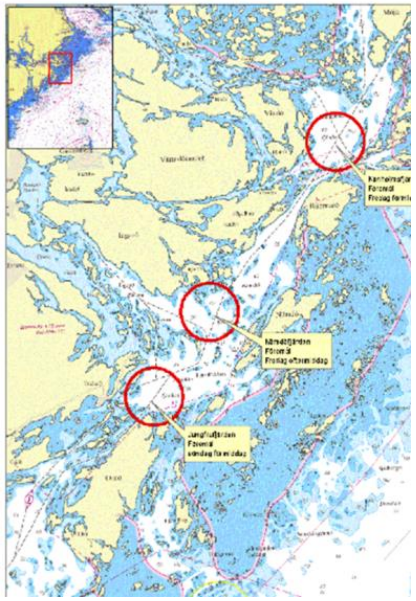

Why stealth?

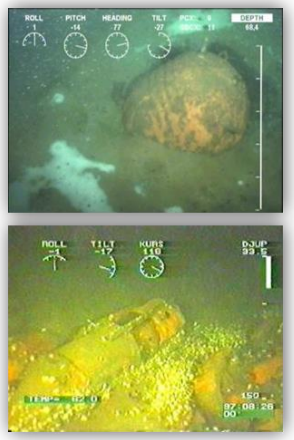


The Baltic Sea

- Shipping for 100 million people
- Complex littoral environment
- Heavy sea traffic
- Intensive surveillance
- Short distances
- Shallow water
- Mix of fresh and salt water
- Layers of salinity and temperature
- Some 100.000 mines and UXO

Stealth is important!





Introducing stealth in Sweden

Challenge:

- Littoral environment
- Multi-threat scenario
- Tight budgets

Simulations:

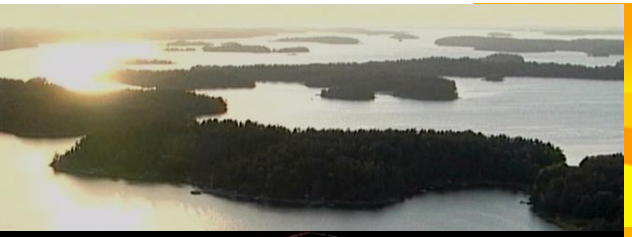
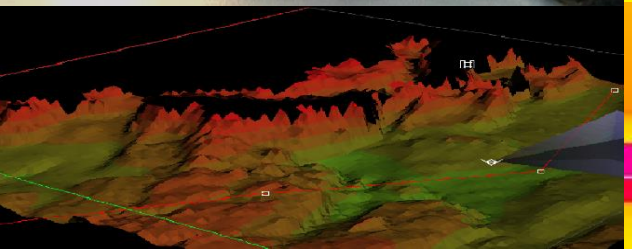
Stealth provides significant tactical advantages

Stealth demonstrator:

Ensuring that stealth works in real life

Implementation:

Stealth implemented to the Visby Class program

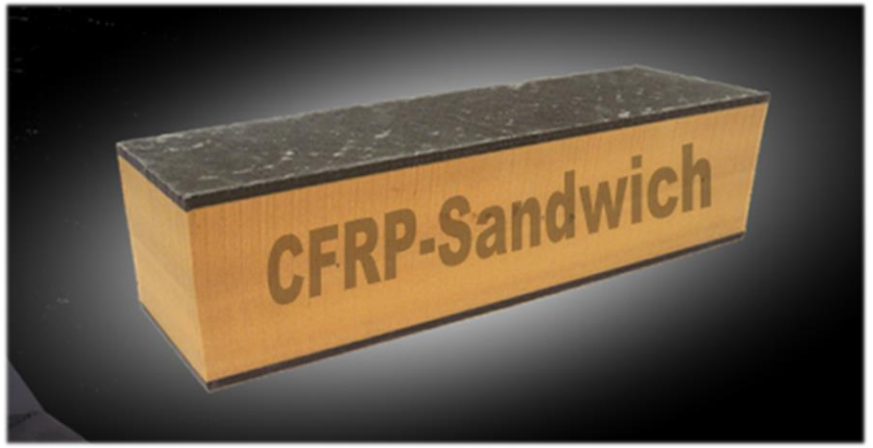


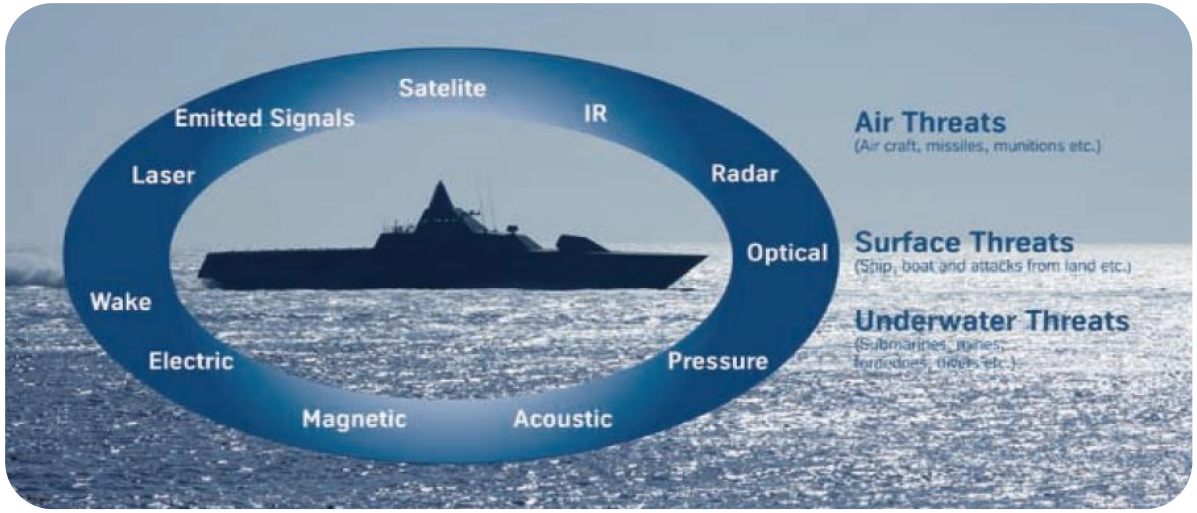
Why composites?

- Weight saving
  - Significant structural weight reduction
- Low life cycle cost
  - Low fuel consumption
  - No corrosion
  - Long life span
- Shock-resistance
  - Proven in live tests
- Stealth/signature reduction
  - Radar, IR, Acoustics, Pressure
  - Non-magnetic

Composites inherent stealth properties

- Radar – Extremely flat surfaces and electrically conductive
- Infrared (IR) – Hull-integrated thermal insulation
- Hydro-acoustic – Good noise and vibration damping
- Magnetic – A totally non-metallic / non-magnetic hull
- Pressure – Light-weight displacement

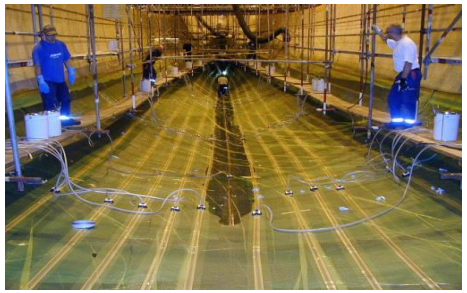


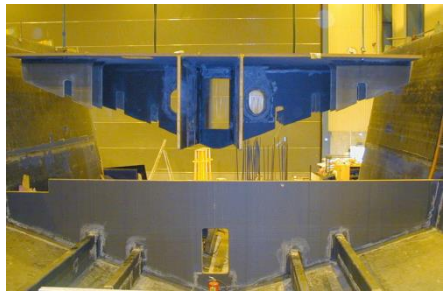


Stealth design

- External shaping and flatness
- Concealed external equipment
- Frequency selective surfaces
- Water-jet propulsion
- Radar Absorbing Material
- Machinery with water-cooled near-surface exhausts
- Enclosed engines with special designed foundations
- Resilient mounted equipment
- Hull wash-down system
- Degaussing system
- Non-magnetic materials

Producing ships in composite materials

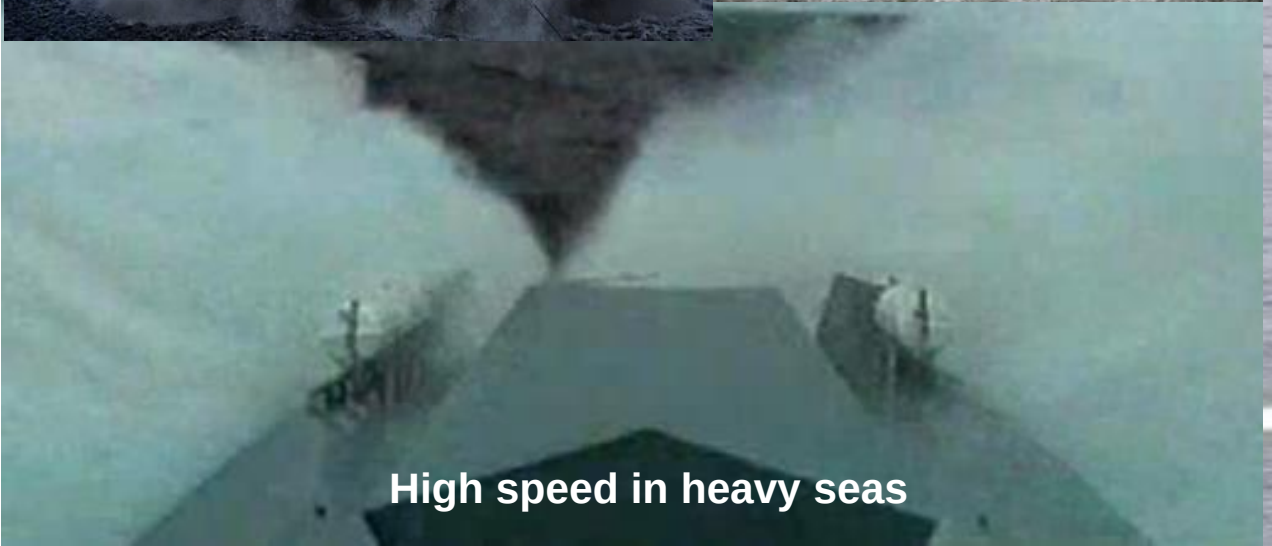
Validation of The Visby Class Corvettes


Full scale shock trials


Transit in icy waters

Trials in hot climate


Signature validation


High speed in heavy seas

Payload validation

Hybrid ships

Steel hulls - Composite superstructures

Conclusions

- From the unique Visby class corvettes we conclude that:
  - *Composites in naval applications are no longer new and exotic but **proven and mature***
  - *Composites provide **excellent stealth performances***

- Based on the good Visby Class experience we are now:
  - *Preparing for **upgrades** of existing ships*
  - *Preparing for the **next generation of ships***