

# Visby Class Corvettes

E-LASS, January 27<sup>th</sup> 2021

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Sten Vallbo







# Surface ships by Saab Kockums



## Composite Hull Designs



TV171 Patrol Vessel 1979



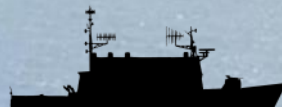
Haras Patrol Craft 1981



Landsort MCMV 1984



StanFlex Multirole Vessel 1989



Orion SIGINT / Patrol Vessel 1984



SPICA-III corvette 1984



SPICA-IV corvette 1990

## Stealth Designs



Smyge Stealth Craft 1991



Bedok MCMV 1994



Styrsö MCMV 1996



StanFlex Patrol Craft 2006



Visby GHOST® Corvette 2009



P28 Corvette Superstructure 2012



Littoral Mission Vessel 2013

## Steel/Alu Hull Designs



SPICA-II FAC 1976



SPICA-M FAC 1979



CG40 Patrol Craft 1980



Carlskrona Minelayer / Offshore Patrol Vessel 1982



CG Patrol Vessel 2001



CG Patrol Craft 1995





# Visby Class Corvette

*“we have the  
right stuff”*

*“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



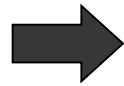




# Introducing stealth in Sweden

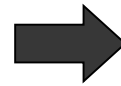
## Challenge:

- Littoral environment
- Multi-threat scenario
- Tight budgets



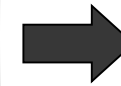
## Simulations:

Stealth provides significant tactical advantages



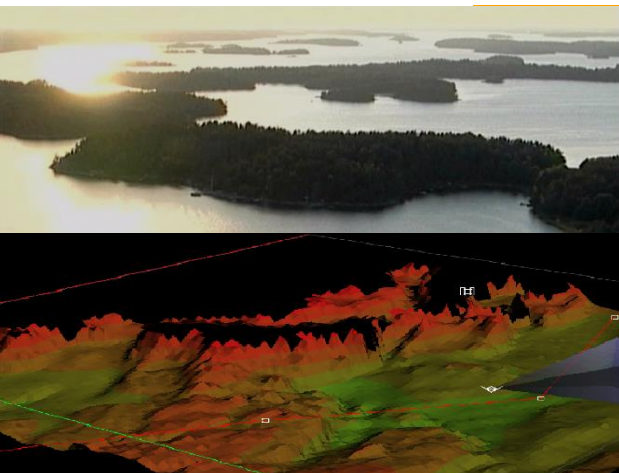
## Stealth demonstrator:

Ensuring that stealth works in real life



## Implementation:

Stealth implemented to the Visby Class program



# Why composites?

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Weight saving

Significant structural weight reduction

Low life cycle cost

Low fuel consumption

No corrosion

Long life span

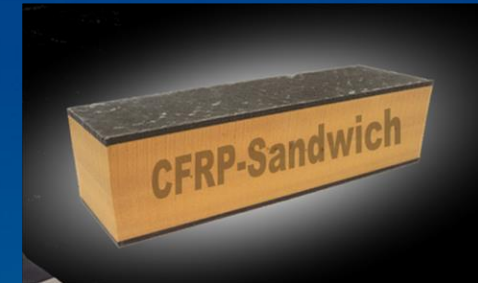
Shock-resistance

Proven in live tests

Stealth/signature reduction

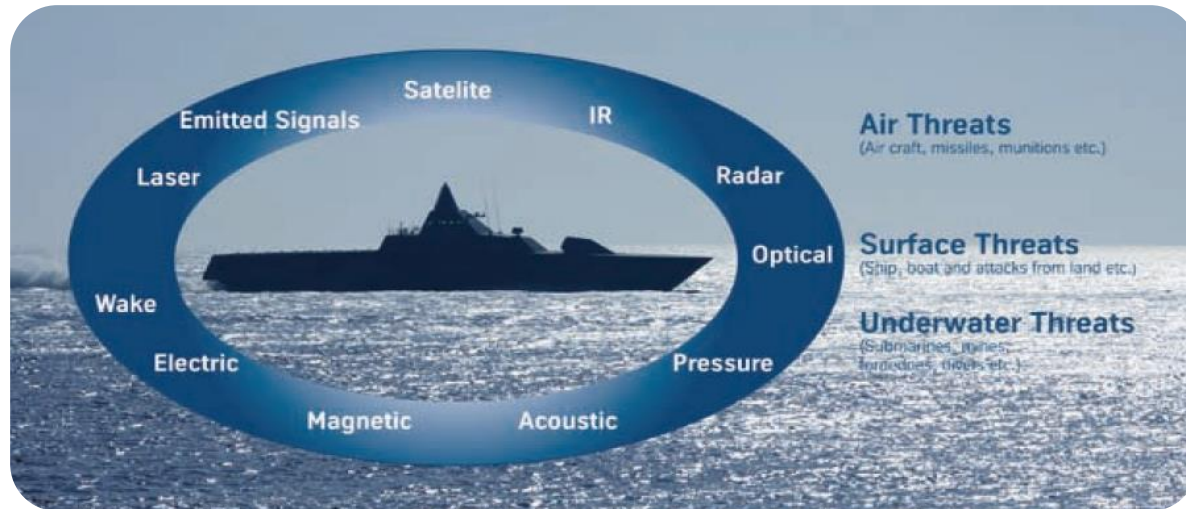
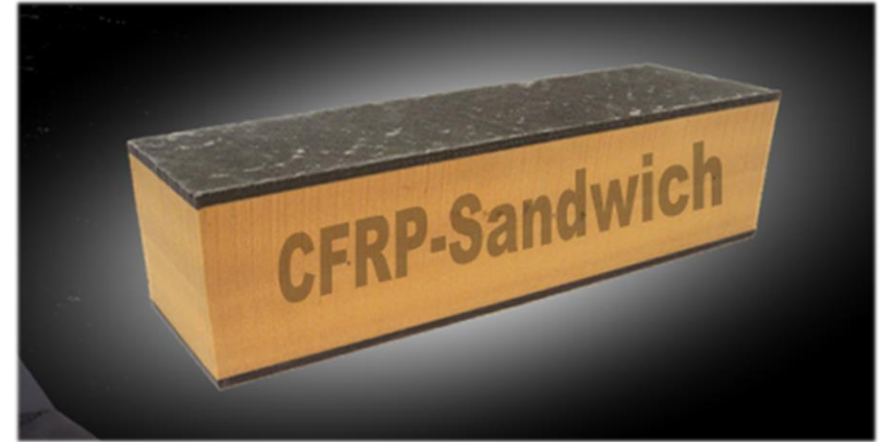
Radar, IR, Acoustics, Pressure

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





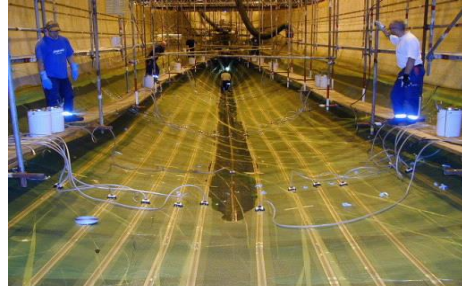
# Stealth design

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- 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

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Full scale shock trials



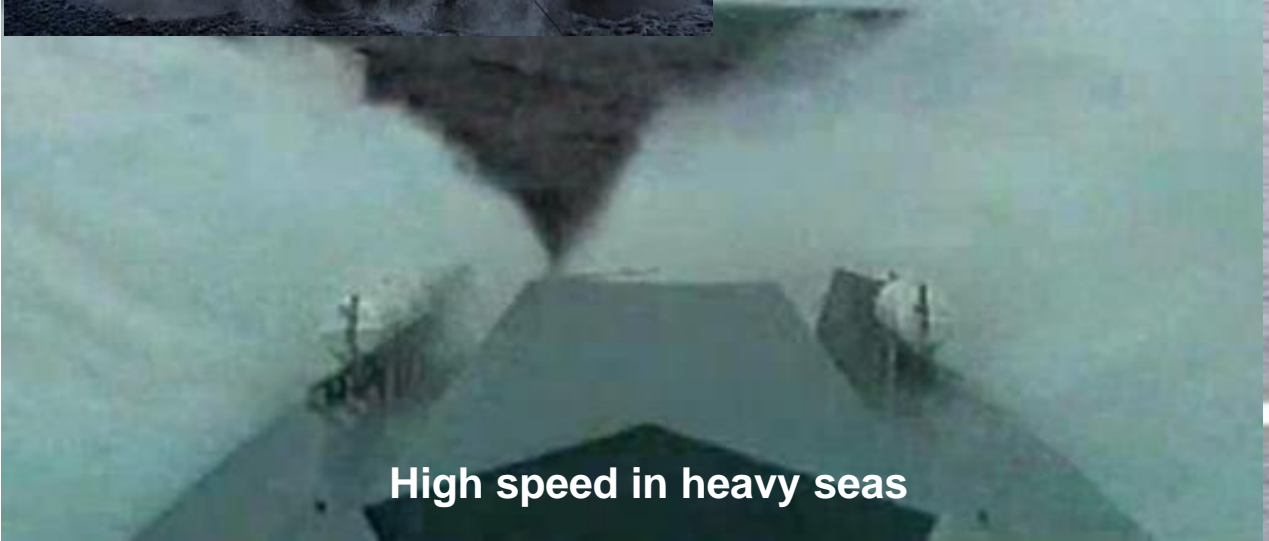
Transit in icy waters



Trials in hot climate



Signature validation



High speed in heavy seas



Payload validation



# Hybrid ships

## Steel hulls - Composite superstructures





# Conclusions

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- 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 **midlife upgrade** of existing ships*
  - *Preparing for the **next generation of ships***

