



# Steering bar system for enhanced and intuitive vessel control

Per-Egon Persson

Ullman Controls



# Agenda

- Challenges controlling High-Speed Craft
- Objective of designing HSC Cockpits
- Sensory overload
- Intuitive interfaces
- The Ullman Intuitive Steering System



With great power comes  
great responsibility

=>

- Demands on the operators increase.
- Margins for mistakes shrink.
- Consequences of mistakes get worse.



# Challenges controlling High-Speed boats

- Conventional vessels vs. HSC
  - Different driving techniques
  - Higher relative power
  - Higher forces acting on craft and crew



# Conventional Cockpits







# Sensory overload

Poor visibility

Stress

Fatigue

The brain receives thousands of signals every second.

Only a fraction reaches conscious levels.

Several factors affect our capacity to register these signals

When critical information is missed or misunderstood

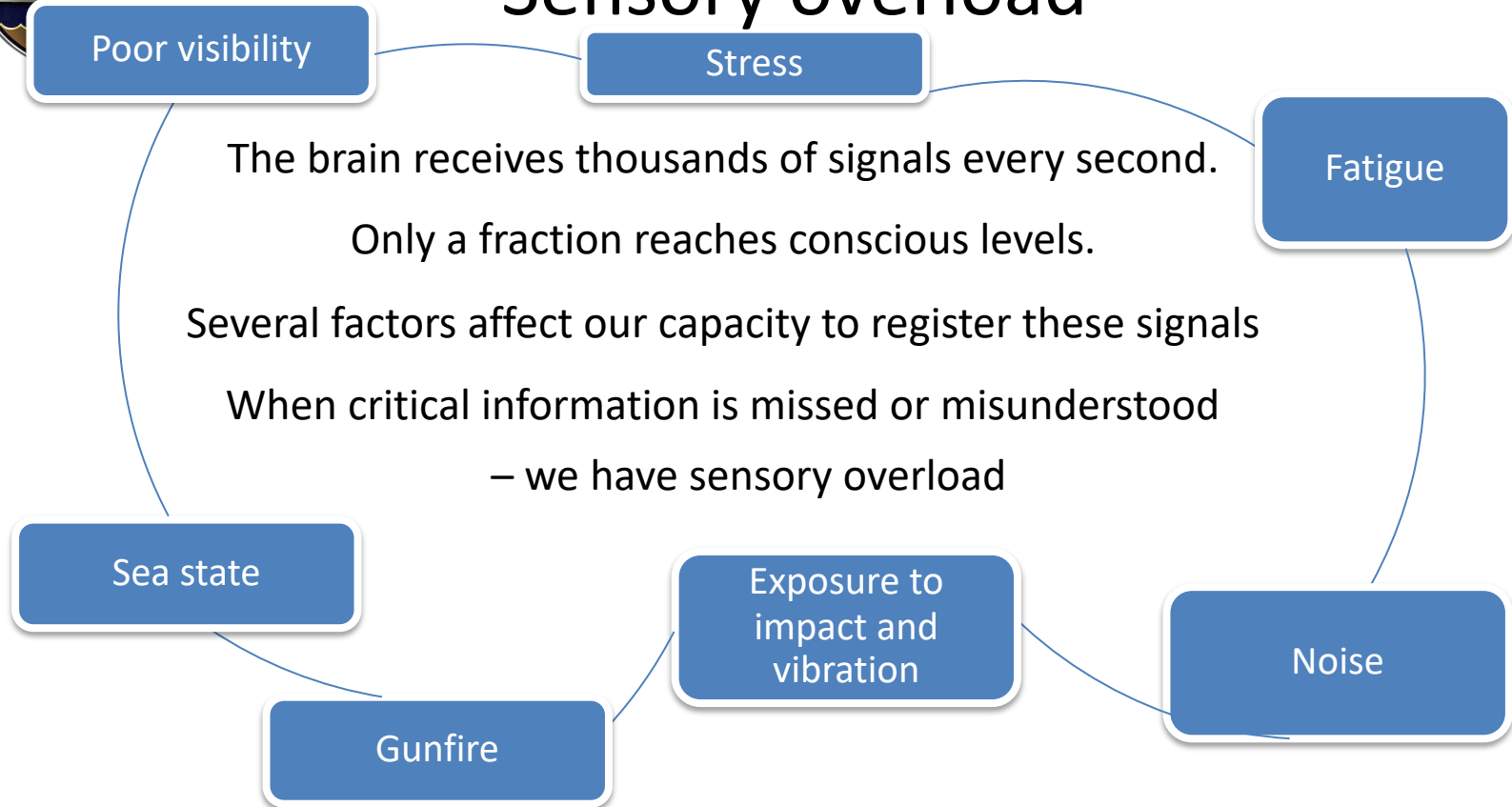
– we have sensory overload

Sea state

Exposure to  
impact and  
vibration

Noise

Gunfire





# Sensory overload

The bulk of the signals are just filtered,  
but a huge amount is used to control  
reflex patterns.

subconscious response

conscious response





# Sensory overload

Moving routine tasks from cortical (conscious) levels of the brain to the brain stem (reflex levels) will free mental capacity.

This is effective to increase perception, capacity and safety.

Existing reflexes can be used when controlling a boat!







# The future of HSC Cockpits?





# Objective when designing a HSC Cockpit

Operators of HSC's should have an environment that is:

Safe

Comfortable

Flexible

Relaxing

After 4 hours as well as after 20 years



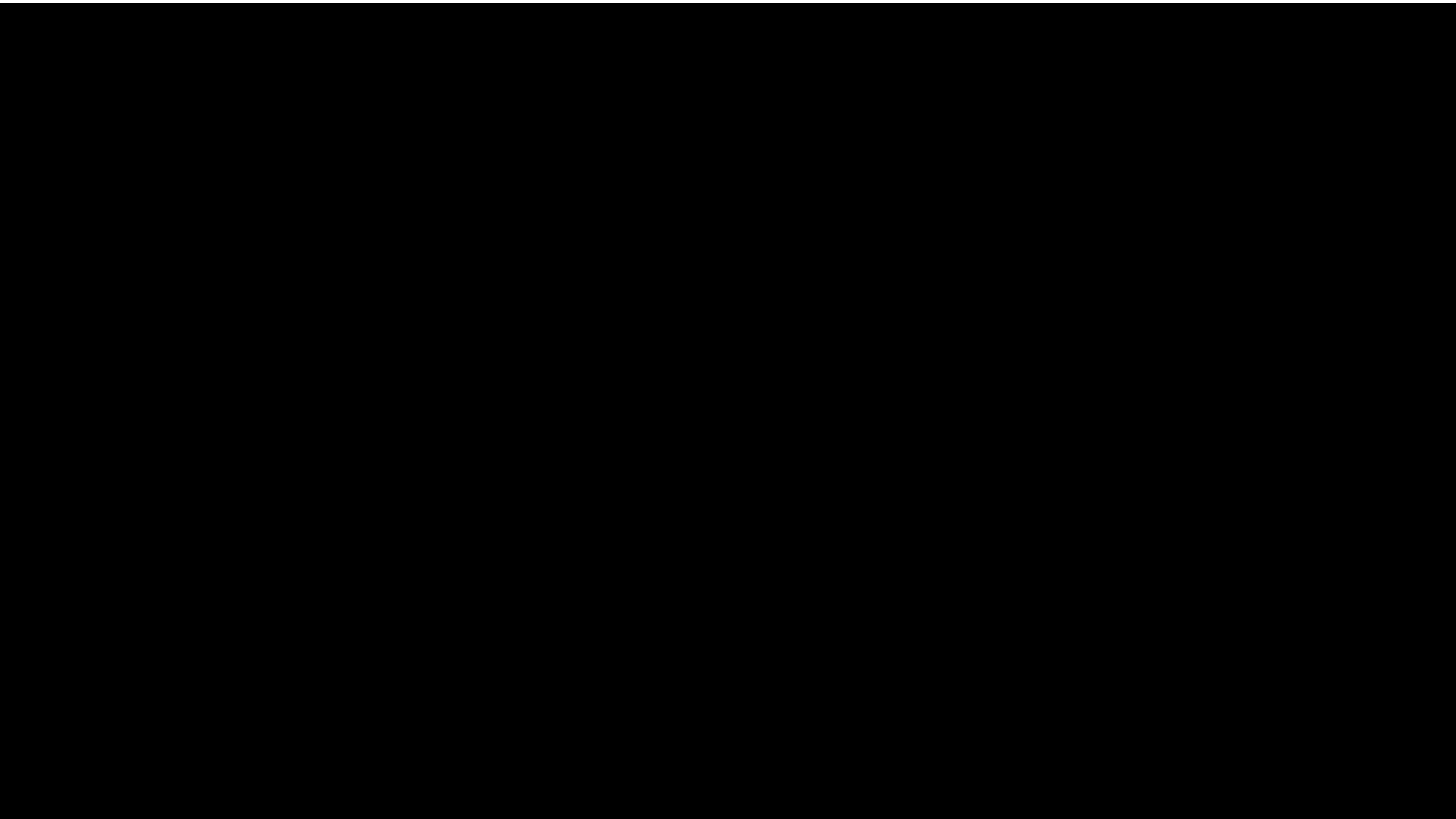
# Operator Interfaces

There are a few “rules”

- Identify crucial controls
- Minimize the static and dynamic load
- Avoid extreme positions
  - like slouching or stretching/reaching

## Intuitive interfaces

- Human compatible
- Multimodal feedback





Raymarine

Raymarine

Raymarine

WARNING: This equipment is not to be used in the presence of flammable vapors or gases.  
WARNING: This equipment is not to be used in the presence of explosive atmospheres.  
WARNING: This equipment is not to be used in the presence of high voltage.  
WARNING: This equipment is not to be used in the presence of high temperatures.  
WARNING: This equipment is not to be used in the presence of high humidity.  
WARNING: This equipment is not to be used in the presence of high salinity.  
WARNING: This equipment is not to be used in the presence of high acidity.  
WARNING: This equipment is not to be used in the presence of high alkalinity.  
WARNING: This equipment is not to be used in the presence of high pressure.  
WARNING: This equipment is not to be used in the presence of high vibration.  
WARNING: This equipment is not to be used in the presence of high shock.







# Intuitive interfaces

It works the way you would expect

- Shorter response times
- Reduced risk of mistakes
- Reduced sensory load
- Reduced stress
- Increased comfort
- Faster learning – “Reflexation”