



# STR



**STR**

**GUIDANCE,  
INSTRUCTION,  
INNOVATION.**

DR TREVOR DOBBINS

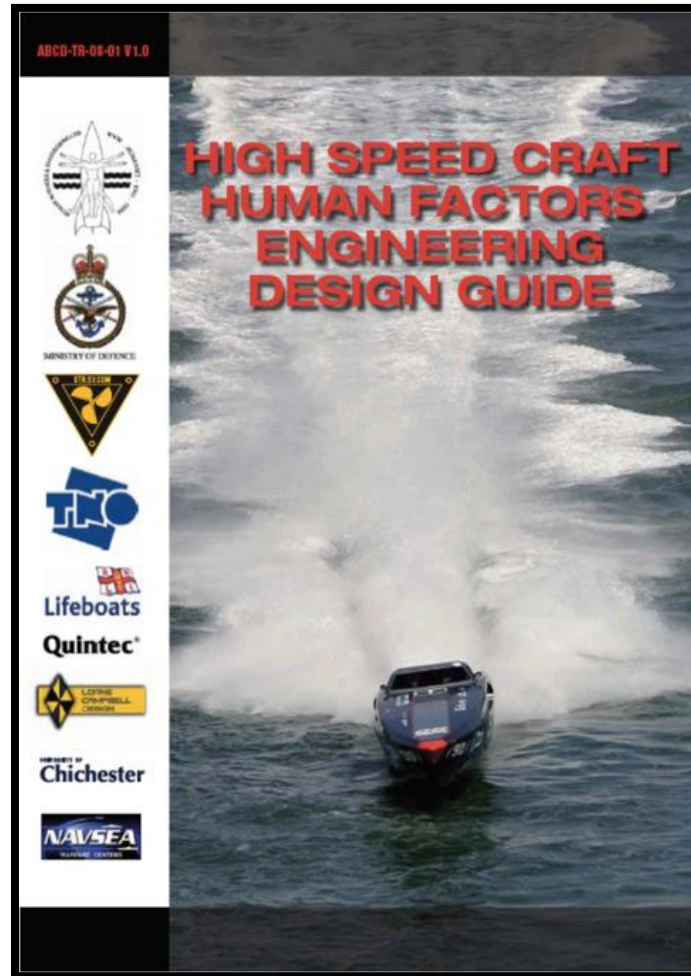


**STR**

**HSC HFE  
DESIGN GUIDE  
SUPPLEMENT**

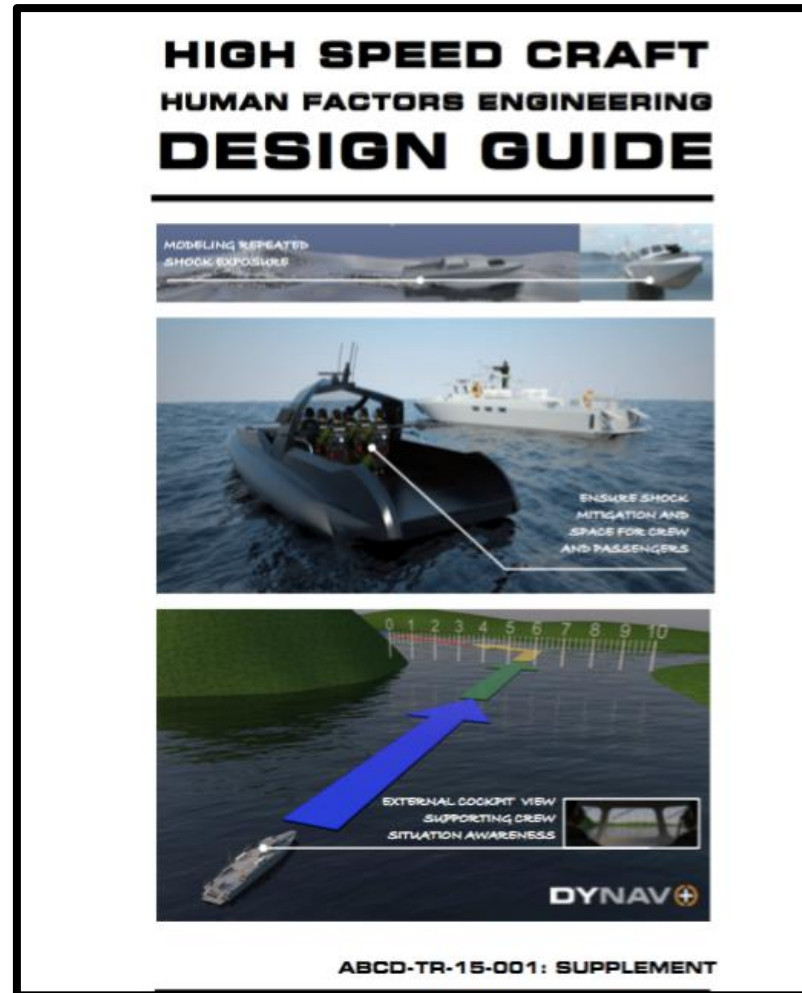
DR TREVOR DOBBINS

# ORIGINAL DESIGN GUIDE



**2006  
-  
2008**

# NEW SUPPLEMENT



# ACCESS

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**A FREE PDF**

**[www.highspeedcraft.org](http://www.highspeedcraft.org)**

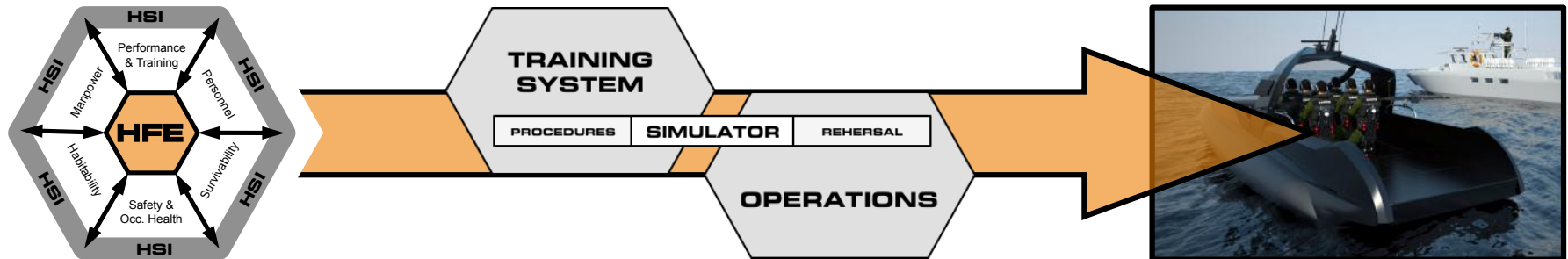
# SUPPLEMENT CONTENT

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- Human Factors Integration (HFI)
- Digital Human Models (DHM)
- Command & Control (C2)
- Repeated Shock (RS) Motion Exposure
- Crash & Impact Safety
- Launch & Recovery (L&R)

# HUMAN FACTORS INTEGRATION (HFI)

- Domains
- HCD Process
- HRL





# DIGITAL HUMAN MODELS

95<sup>th</sup> %ile  
MALE



5<sup>th</sup> %ile  
FEMALE



EXAMPLE DIFFERENCES  
IN BODY SIZES THAT  
DESIGNERS MUST  
ACCOUNT FOR.

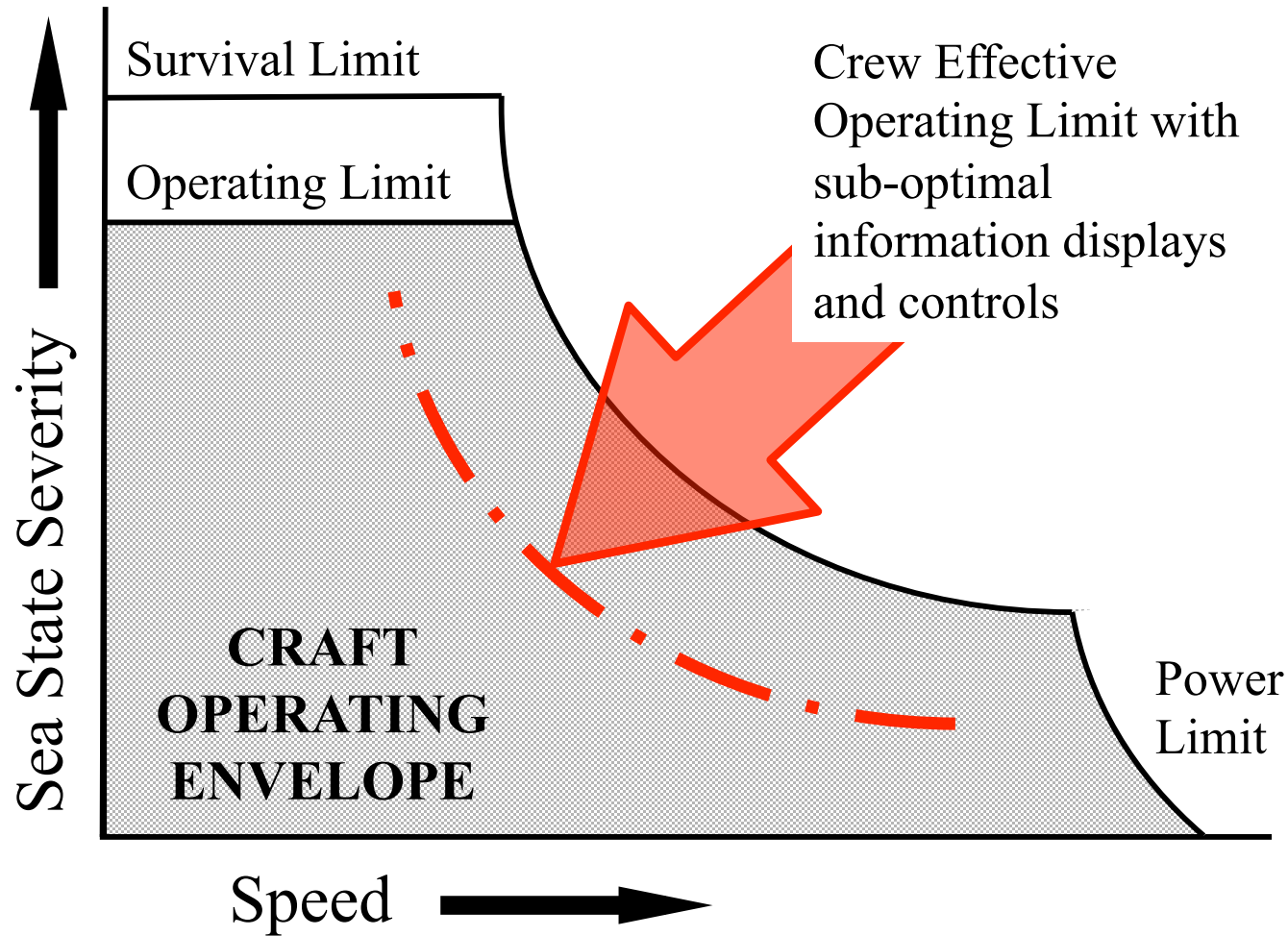


REACH ENVELOPES  
DEVELOPED TO SUPPORT  
COMMAND & CONTROL

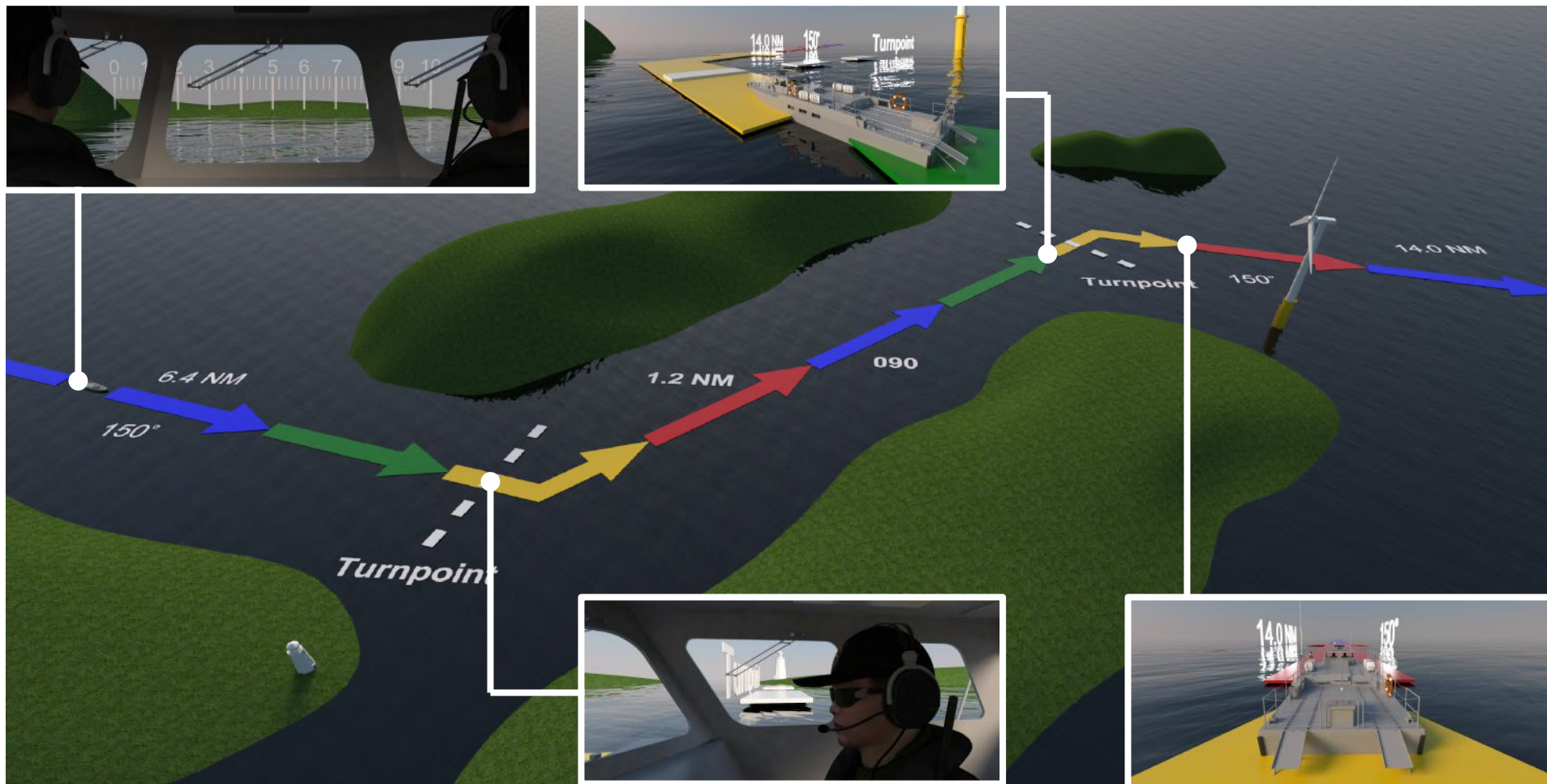


3D CAD EXAMPLE OF 50<sup>th</sup> %ile MALE vs. 95<sup>th</sup>  
%ile MALE WITH FULL BOARDING EQPT AND  
PPE ILLUSTRATING SIZE DIFFERENCES

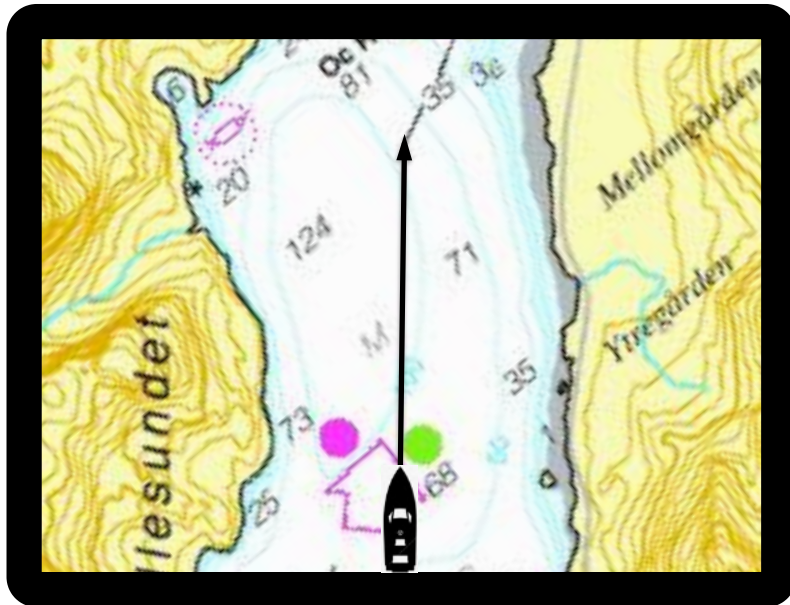
# COMMAND & CONTROL



# C2 - DYNAMIC NAVIGATION



# COMMAND & CONTROL





# COMMAND & CONTROL

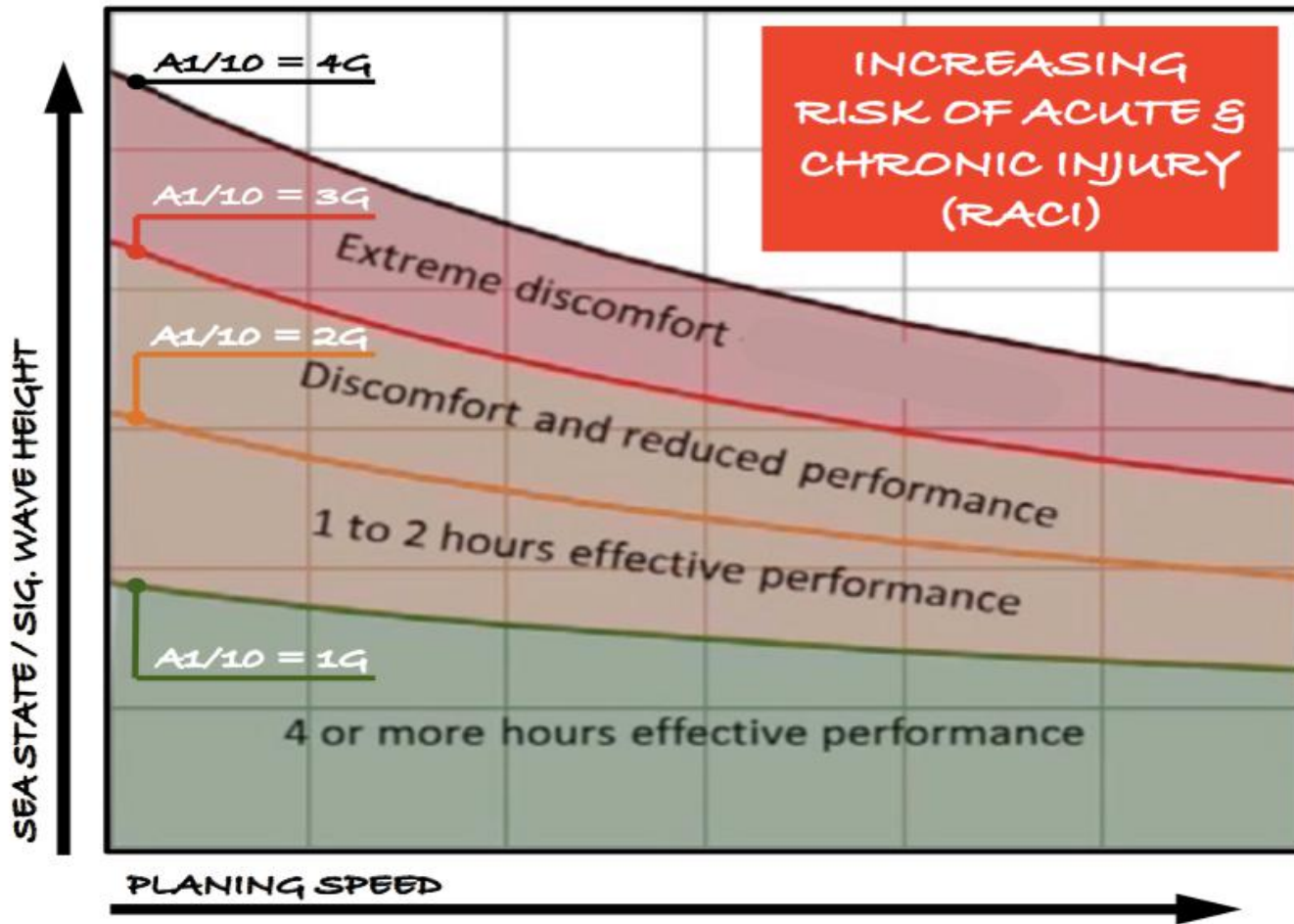
## TEXT SIZE IN WBV / RS EXPOSURE

Distance to Display (m)	Text Height (mm)
1.0	15
1.5	20

**15**<sub>mm</sub>   **20**<sub>mm</sub>

**DEFSTAN 970**

# REPEATED SHOCK MOTION EXPOSURE



# **CRASH & IMPACT SAFETY**



# CRASH & **IMPACT** SAFETY





# CRASH & IMPACT SAFETY

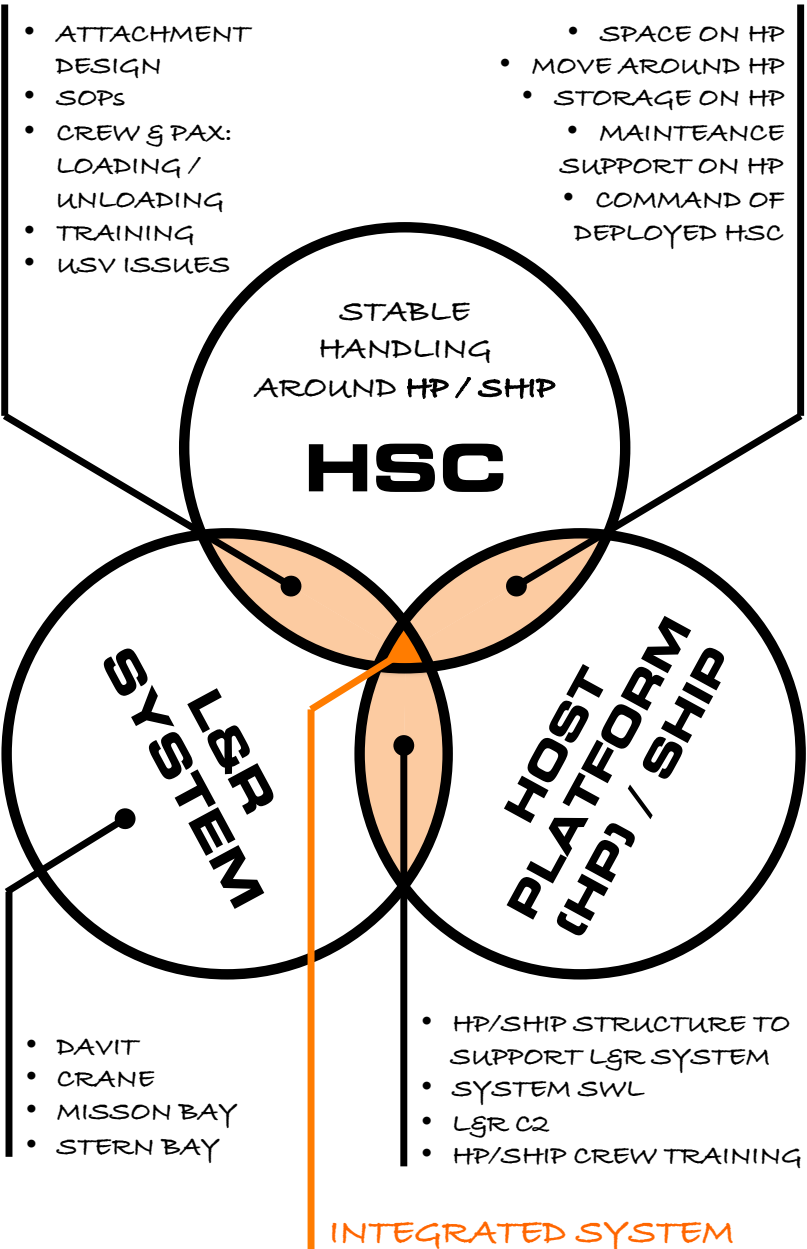


# CRASH & IMPACT SAFETY

	<b>PRE-CRASH</b>	<b>CRASH</b>	<b>POST-CRASH</b>
<b>HUMAN</b>	<ul style="list-style-type: none"> <li>• Situation awareness</li> <li>• Posture</li> </ul>	<ul style="list-style-type: none"> <li>• Human impact with cockpit structure</li> <li>• Restraint systems</li> </ul>	<ul style="list-style-type: none"> <li>• Secondary impact</li> <li>• Survival</li> </ul>
<b>CRAFT</b>	<ul style="list-style-type: none"> <li>• Speed</li> <li>• Motion (6DOF)</li> </ul>	<ul style="list-style-type: none"> <li>• Structural response</li> <li>• Crash impulse received at cockpit</li> </ul>	<ul style="list-style-type: none"> <li>• Motion (6DOF)</li> </ul>
<b>ENVIRONMENT</b>	<ul style="list-style-type: none"> <li>• Visibility</li> <li>• Sea State</li> </ul>	<ul style="list-style-type: none"> <li>• Impact type; other craft, hardness of impact site, gradient / angle of impact</li> </ul>	<ul style="list-style-type: none"> <li>• Craft orientation / position</li> </ul>

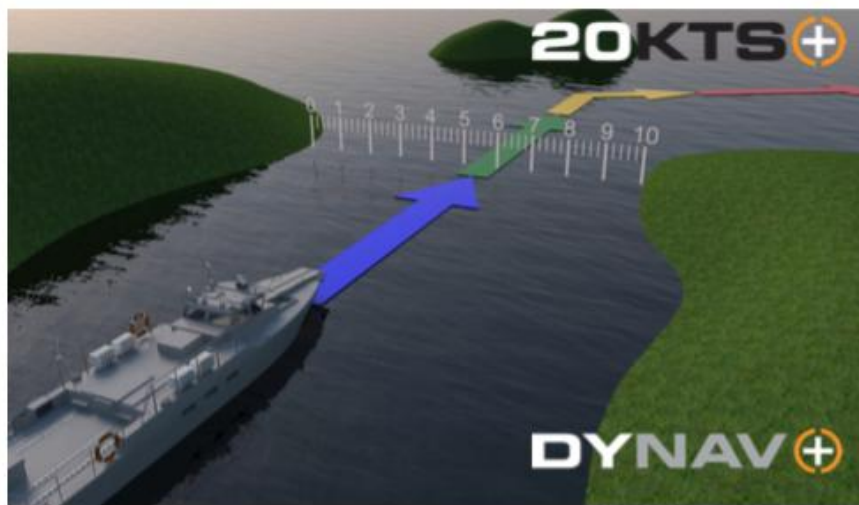
**Table 5.1: The HSC Crash Analysis Matrix**

# LAUNCH & RECOVERY



# DYNAV MANUAL

20KTS+



# DYNAMIC NAVIGATION MANUAL

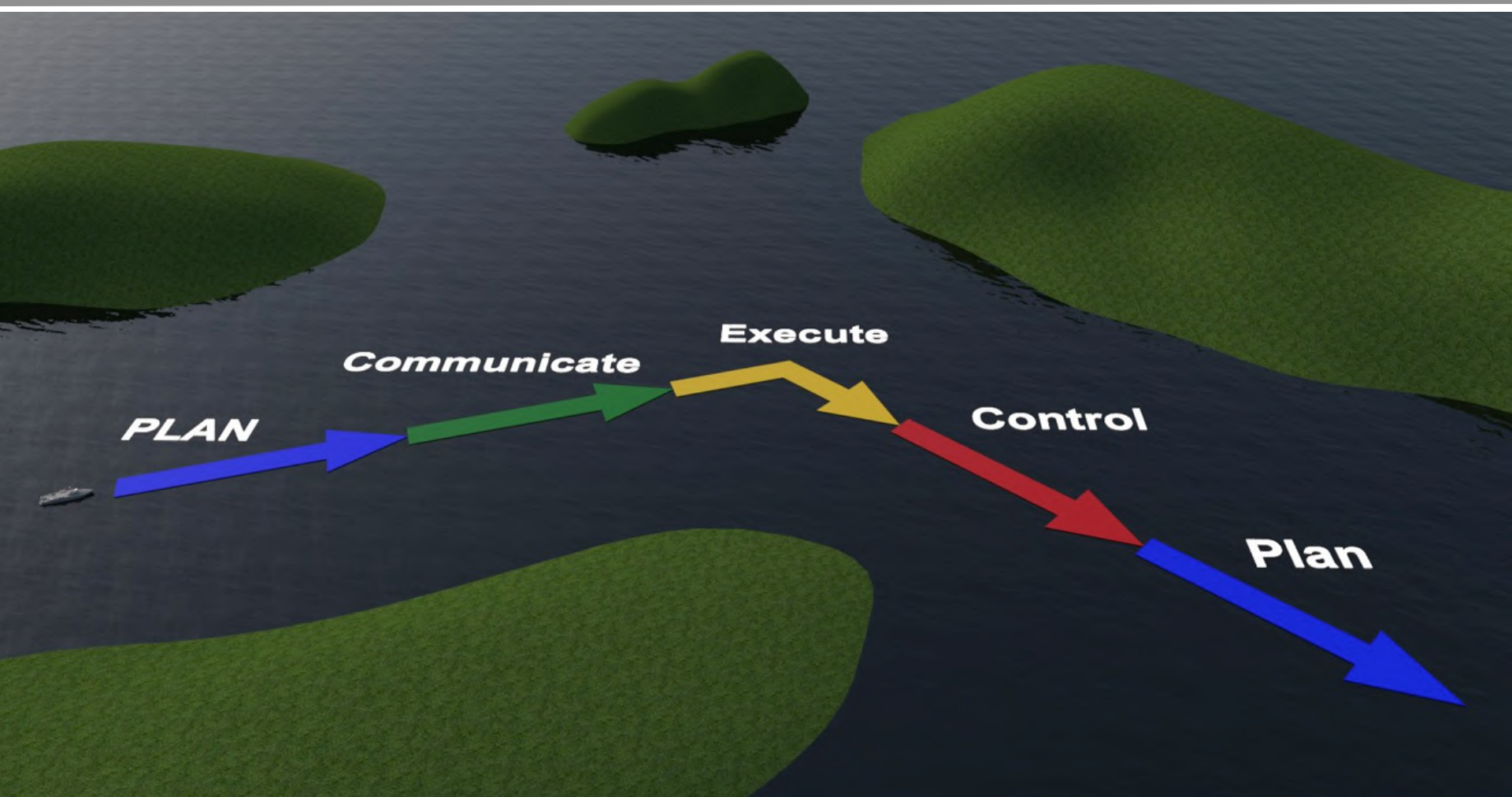
DYNAV.ORG

# CONTENTS:

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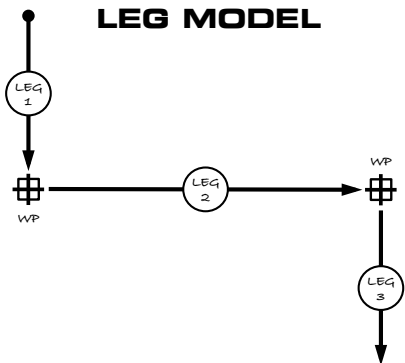
1. Introduction
2. DYNAV Origins
3. The Dynamic Environment
4. Making The System Work
5. Route Planning
6. On-water Navigation
7. Crew Communication
8. DYNAV Application
9. Multiple-craft Navigation
10. Hovercraft Navigation
11. Instruction & Support
12. A Dynamic Future
13. References

# METHODOLOGY

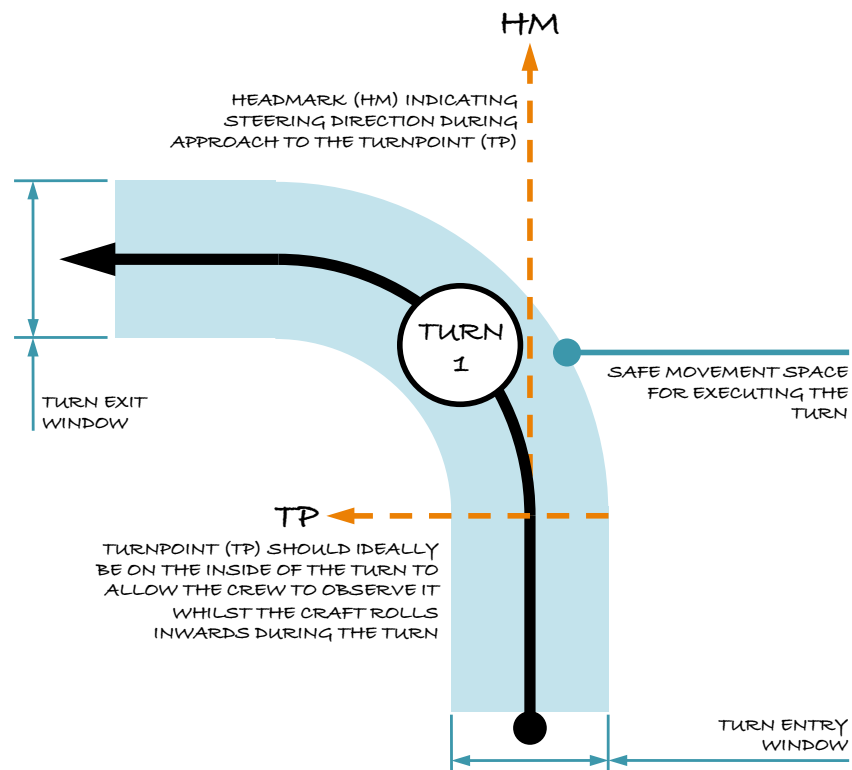
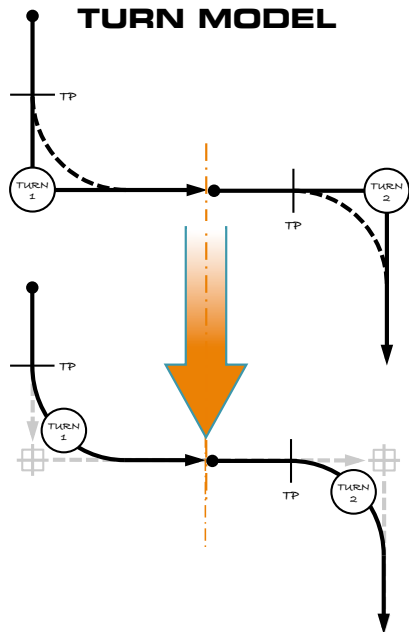


# TURNS NOT LEGS

LEG MODEL

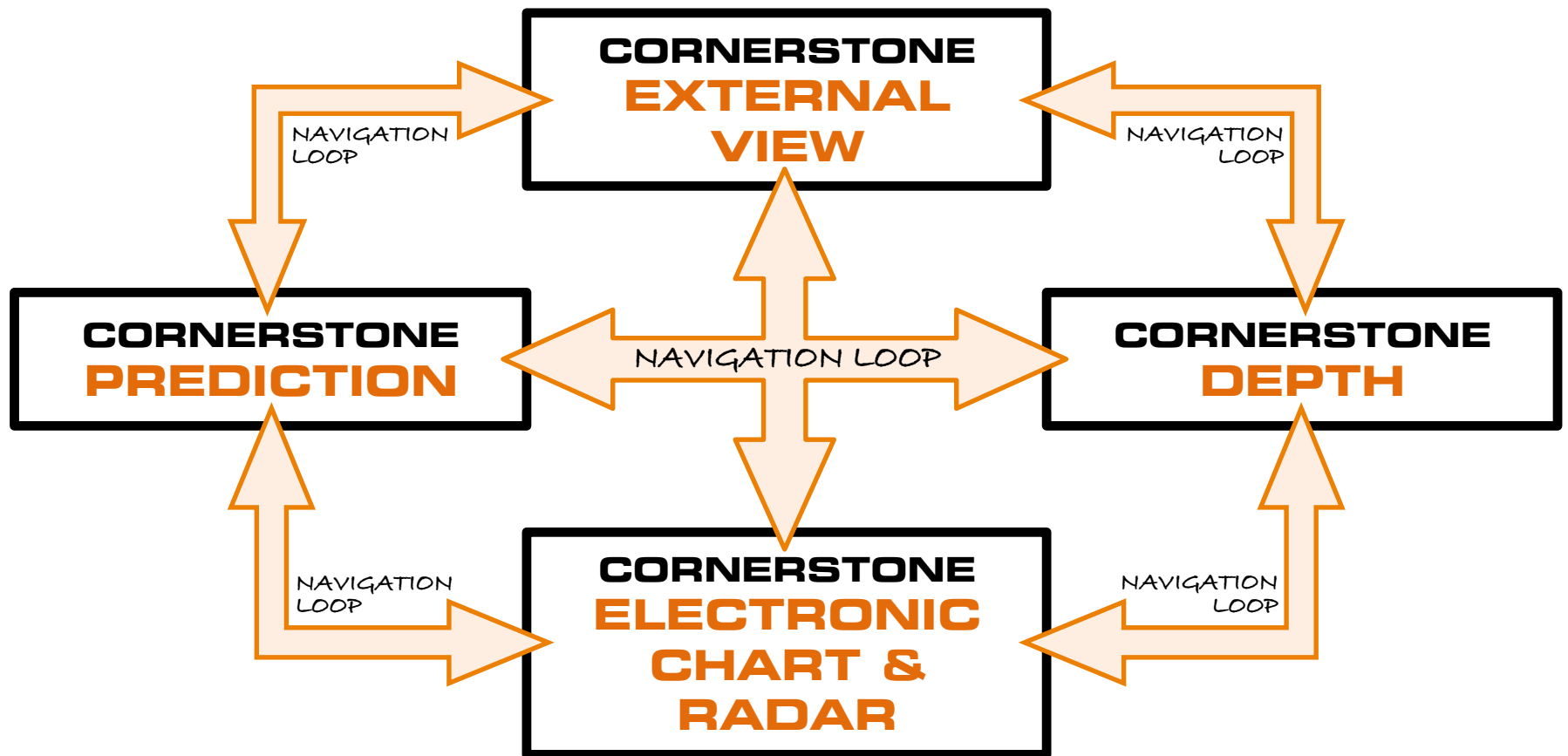


TURN MODEL

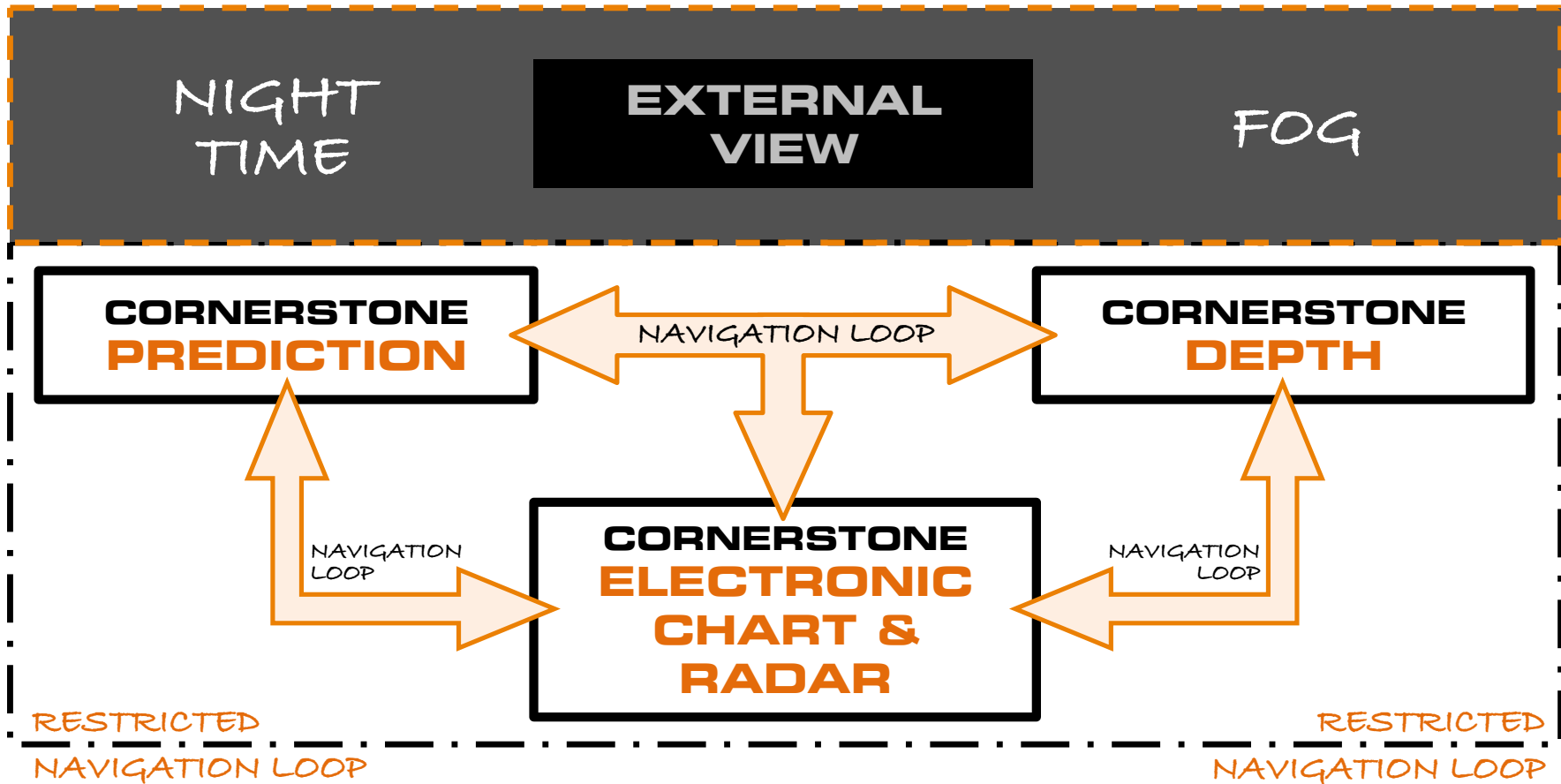




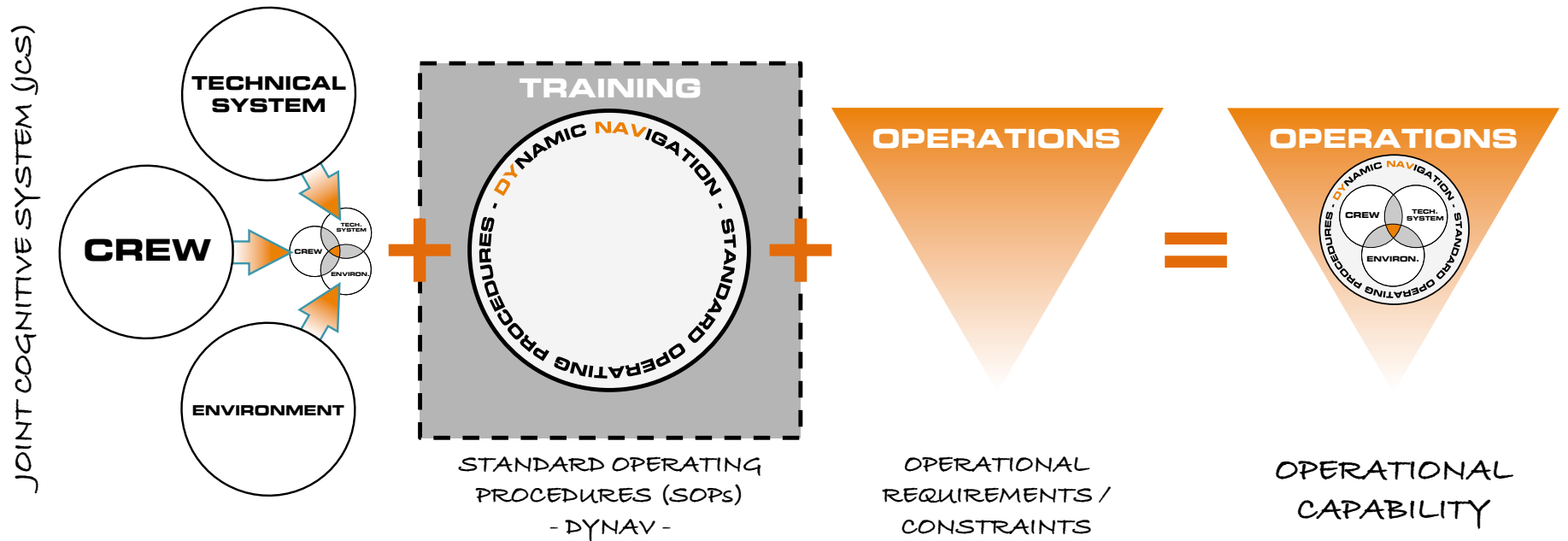
# CORNERSTONES & LOOPS



# CORNERSTONES & LOOPS

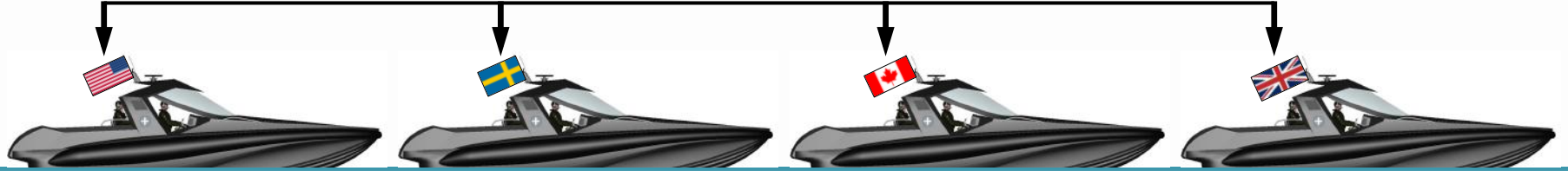


# THE TOTAL SYSTEM



# INTEROPERABILITY

INTERNATIONAL INTEROPERABILITY



# DYNAV.ORG

[HOME](#) [REFERENCES](#) [THE DYNNAV MANUAL](#) [WHATS HAPPENING OUT THERE?](#)

## DYNAMIC NAVIGATION

[METHODOLOGY](#)

[THE DYNNAV MANUAL](#)

# NEXT DEVELOPMENTS:



1. Instructor PPT SLIDES
2. Organisation Specific Edition
3. Boat Specific Edition
4. Translation



**EXO-  
SKELETON**

**MARINE**

**MOJO**

**20KTS** 

SUPPORT STRAP

UPPER-LEG ROD

MOJO UNIT

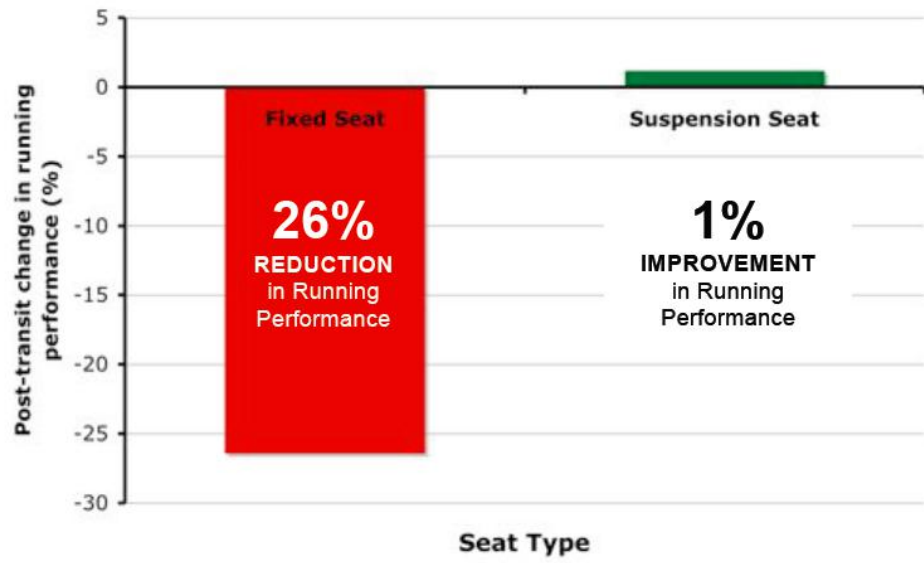
LOWER-LEG ROD

SHOE ADAPTOR

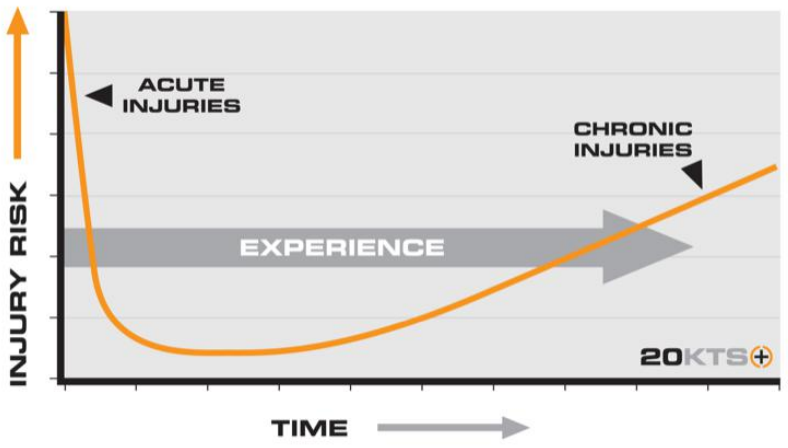




## FATIGUE & INJURY



RACI: RISK OF ACUTE & CHRONIC INJURY



# MARINEMOJO+

WEAR

**HEAD PROTECTION**



**LIFE JACKET**



**IMMERSION SUIT**



**EXO-SKELETON**

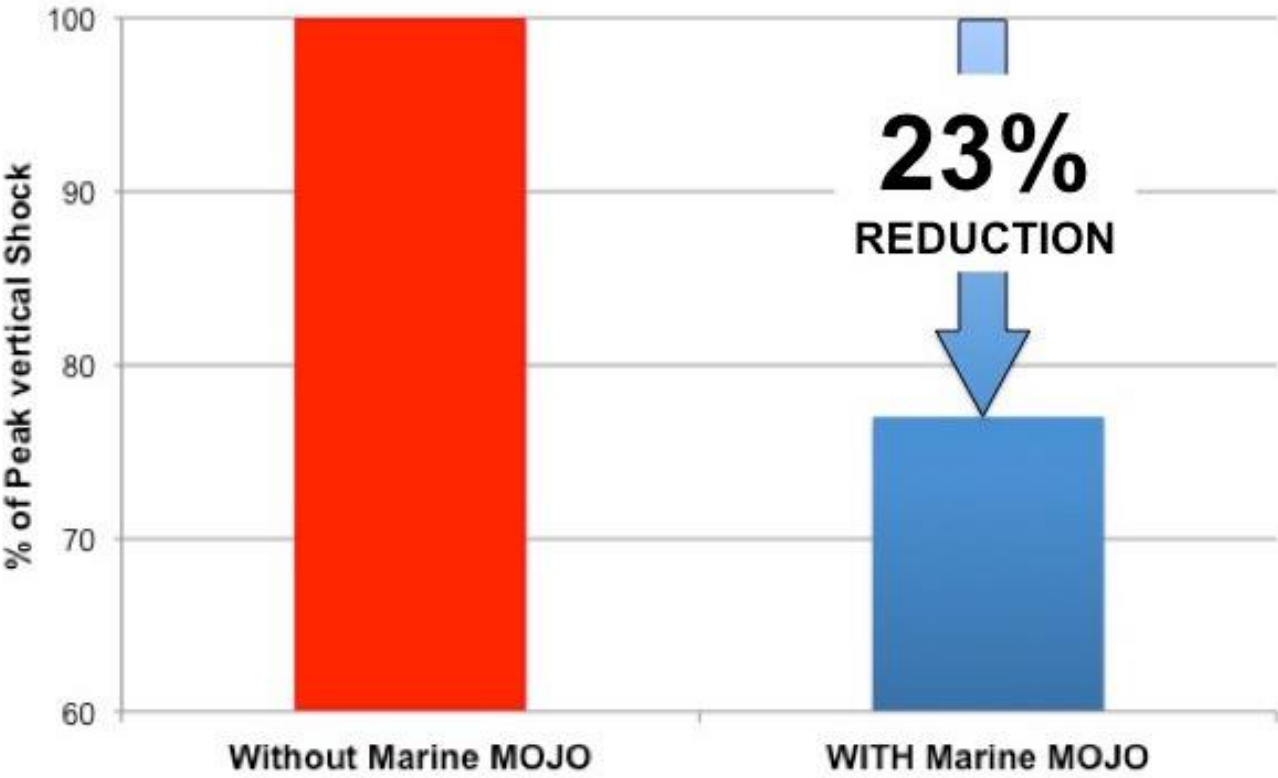


**MARINEMOJO** 

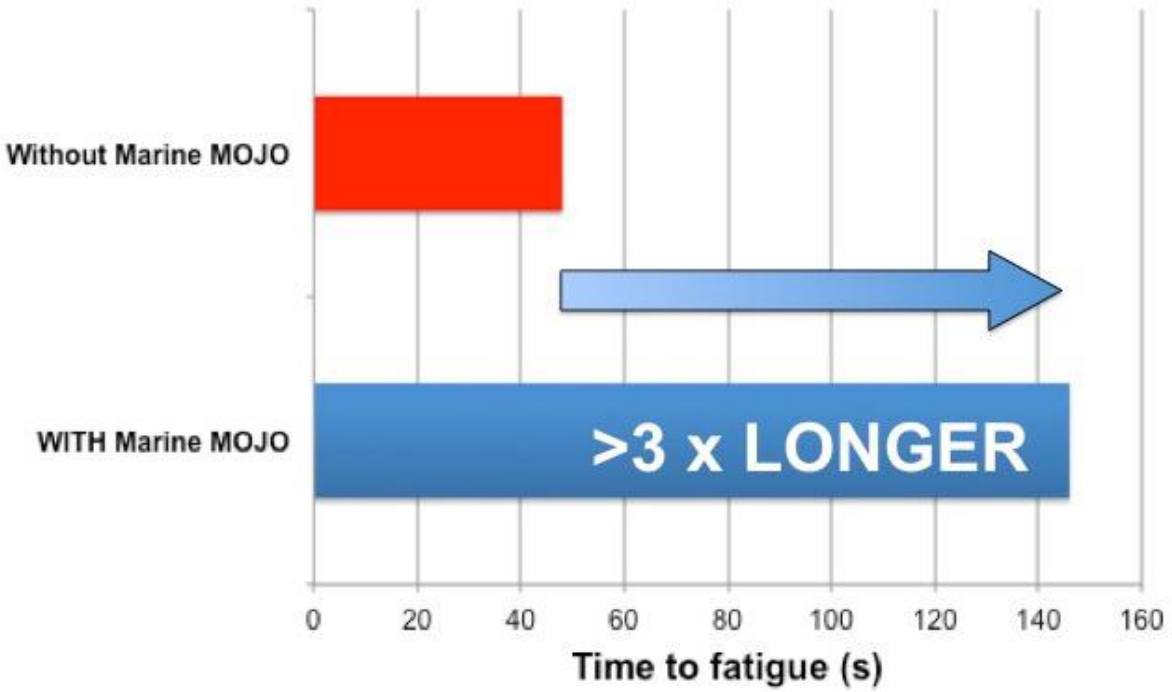
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# **LABORATORY TESTING**

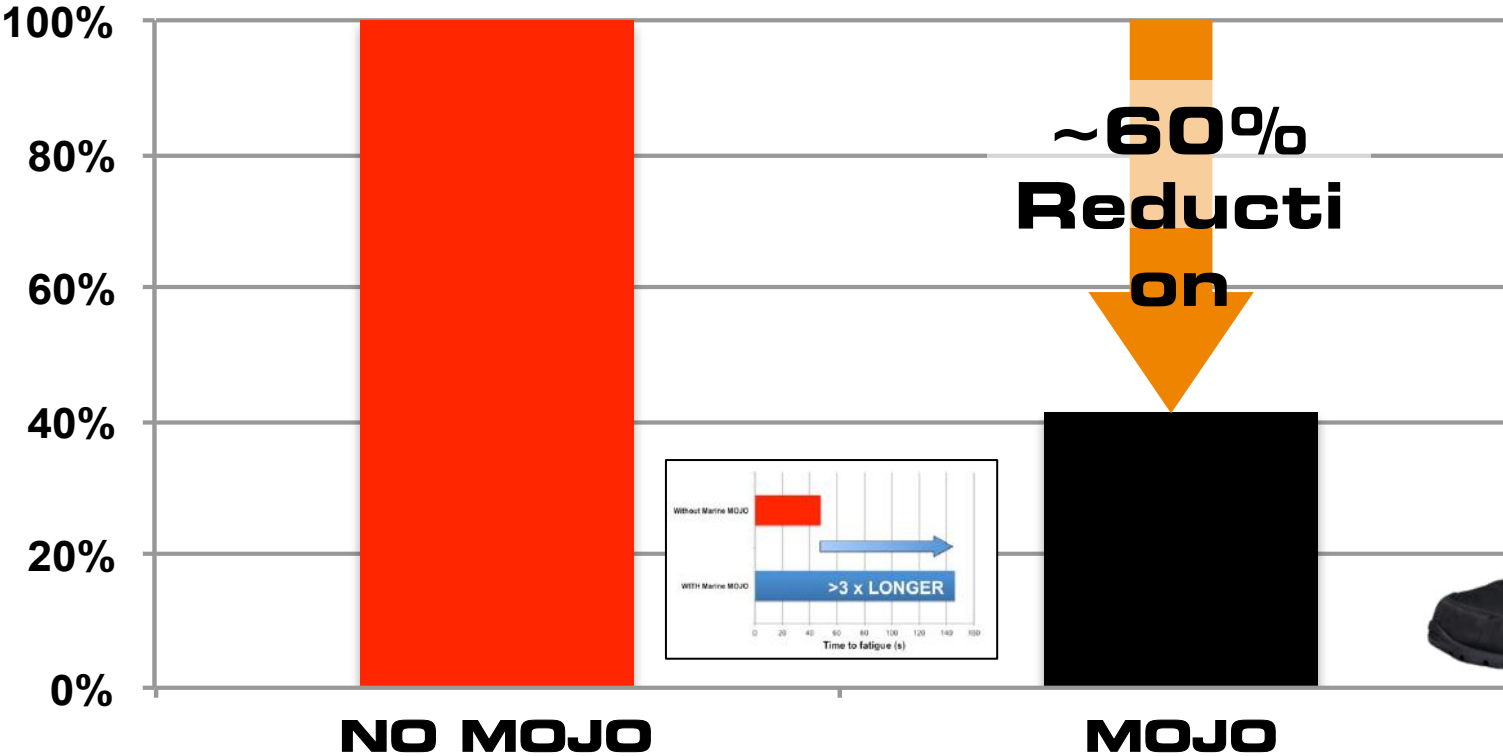
## SHOCK & IMPACT



# FATIGUE



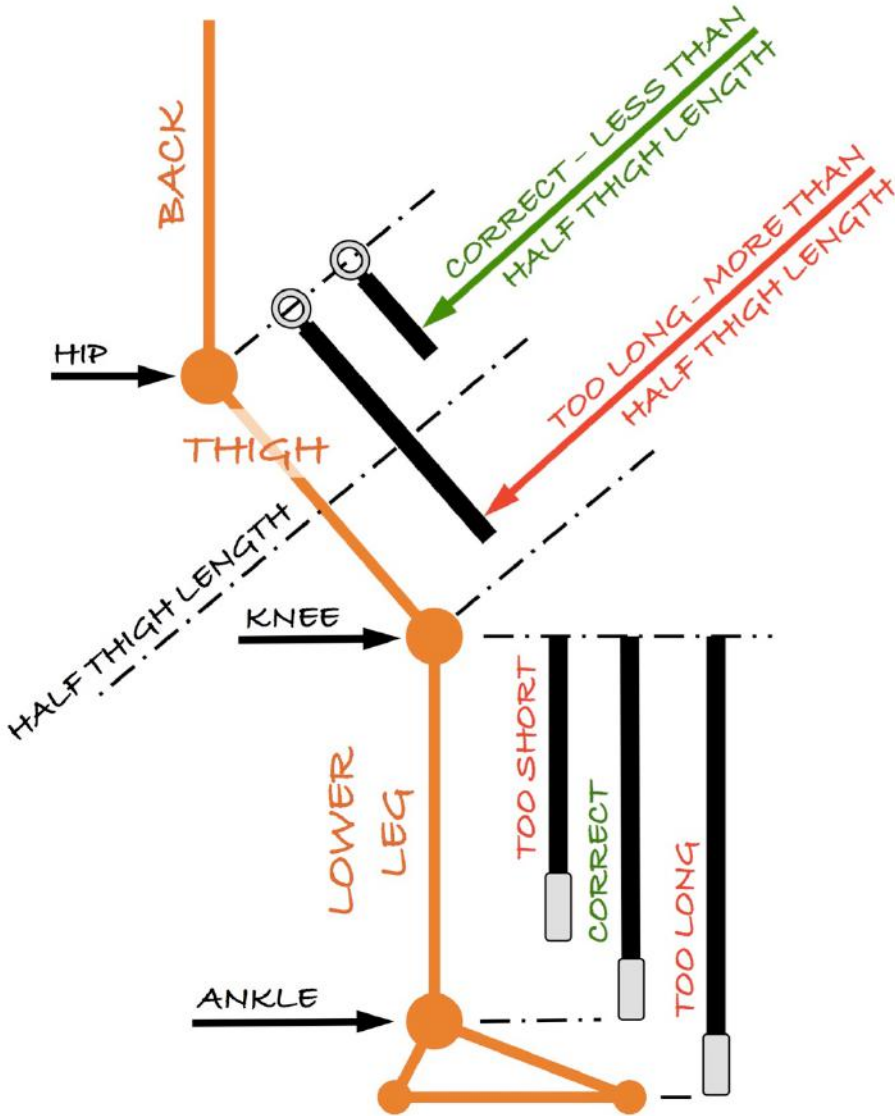
## MUSCLE RECRUITMENT DURING FATIGUE TEST



## **SYSTEM CHARACTERISTICS:**

- **NO POWER REQUIRED**
- **LIGHTWEIGHT (~1KG)**
- **DIRECT USE ON NEW & IN-SERVICE CRAFT**
- **COST EFFECTIVE**
- **EASY TO USE**

## NEW DEVELOPMENTS: SIZE FITMENT

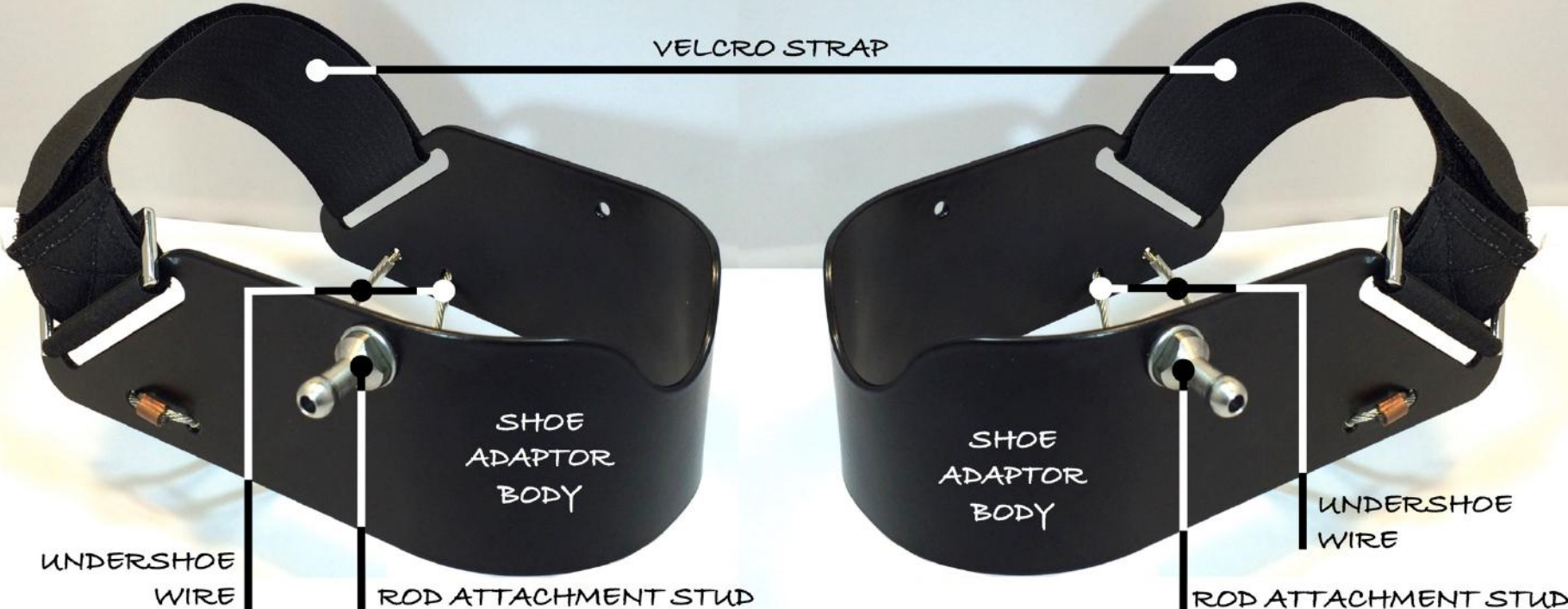




## NEW DEVELOPMENTS FOOTWEAR ADAPTORS

LEFT FOOT SHOE ADAPTOR

RIGHT FOOT SHOE ADAPTOR



## **EXAMPLE APPLICATION: HIGH SPEED CRAFT WITHOUT SUSPENSION SEATS**



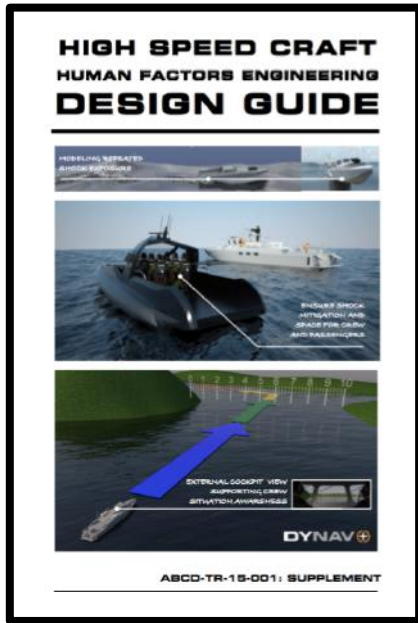


## EXAMPLE APPLICATIONS: OPERATORS STANDING ON MOVING PLATFORM



## EXAMPLE APPLICATION: FAST-ROPING





[www.highspeedcraft.org](http://www.highspeedcraft.org)

[dynav.org](http://dynav.org)

[www.20knots-plus.com](http://www.20knots-plus.com)



MARINEMOJO+



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↓

# QUESTIONS

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