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## Long-endurance UAS operations translated to neuroergonomics

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► **To cite this version:**

Marcel Hinss, Emilie Jahanpour, Anke Brock, Jean-Paul Imbert, Raphaëlle Roy. Long-endurance UAS operations translated to neuroergonomics. ICCAS22-International Conference on Cognitive Aircraft Systems, Jun 2022, Toulouse, France. hal-04149728

**HAL Id: hal-04149728**

**<https://hal.science/hal-04149728>**

Submitted on 5 Jul 2023

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# Long-endurance UAS operations translated to neuroergonomics

## Introduction

Mental fatigue is developing into an ever more pressing issue as operating complex systems is shifting away from operating towards monitoring systems. Hardly any domain represents this as well as

### Long-endurance UAV missions (1)

- 🕒 Over 24h operations
- 📺 Prolonged missions
- 🌙 Night shifts



## Objective

Investigate how long endurance UAS missions effect the operators cognition

## Methods

3 Interviews with current and former French UAV operators ( MQ9 Reaper System)

## Results

### Cognitive Flexibility

*the ability to flexibly switch between tasks (2)*

"Changes in mission objective occur as frequent as 2-3 times a week"

"Difficulties with reprioritizing ."

"Not mentally prepared for the change in objective"

### Vigilance decrement

*decreased cognitive efficiency in response to monotonous stimuli (3)*

"Strategies to divert attention away from fatigue"

### Cognitive Fatigue

*temporary decrease in mental resources over time due to sustained cognitive effort (reaction time & accuracy, 4)*

"Sluggishness after intense mission phases"

### Situational Awareness

*the perception of environmental elements and events with respect to time or space (5)*

" Difficulties with reprioritizing ."

"Not mentally prepared for the change in objective"

### Top Down Attention

*the voluntary allocation of attention to certain features, objects, or regions in space. (7)*

"Forgetting to check systems"

" Not reacting to or not attending radio messages "

### Errors

(6)

#### Commission

*Incorrect execution of a task*

"Fingertrouble"

#### Omission

*not doing a task*

"difficulties with following checklists entirely"

"Forgetting to check systems"

"Not reacting to or not attending radio messages"

### Legend

- Mental States
- Aspects of Cognition
- Behavior

## Conclusion

Mental/Cognitive Fatigue



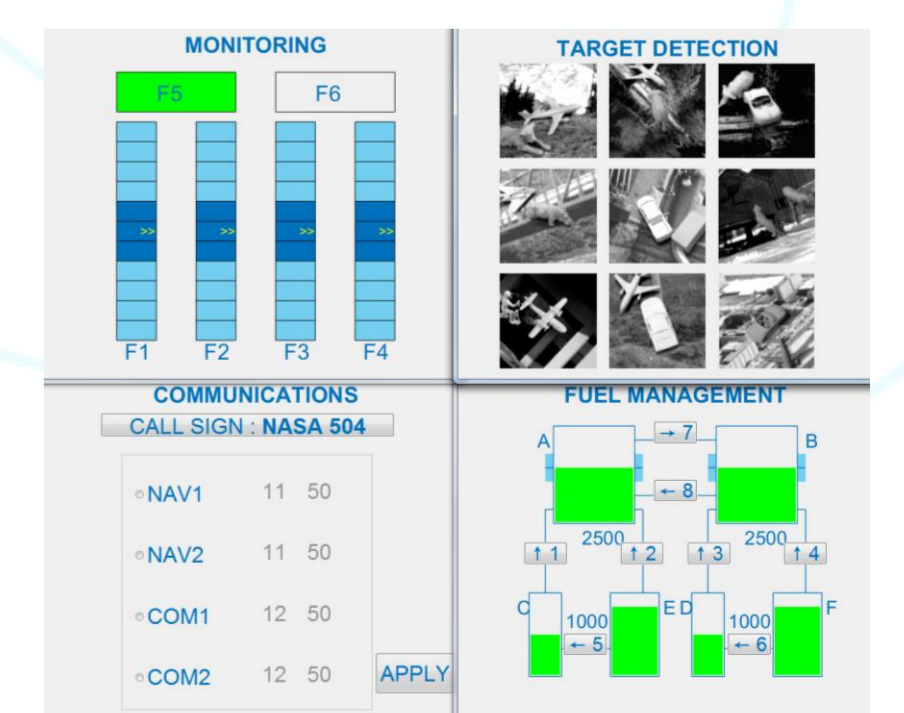
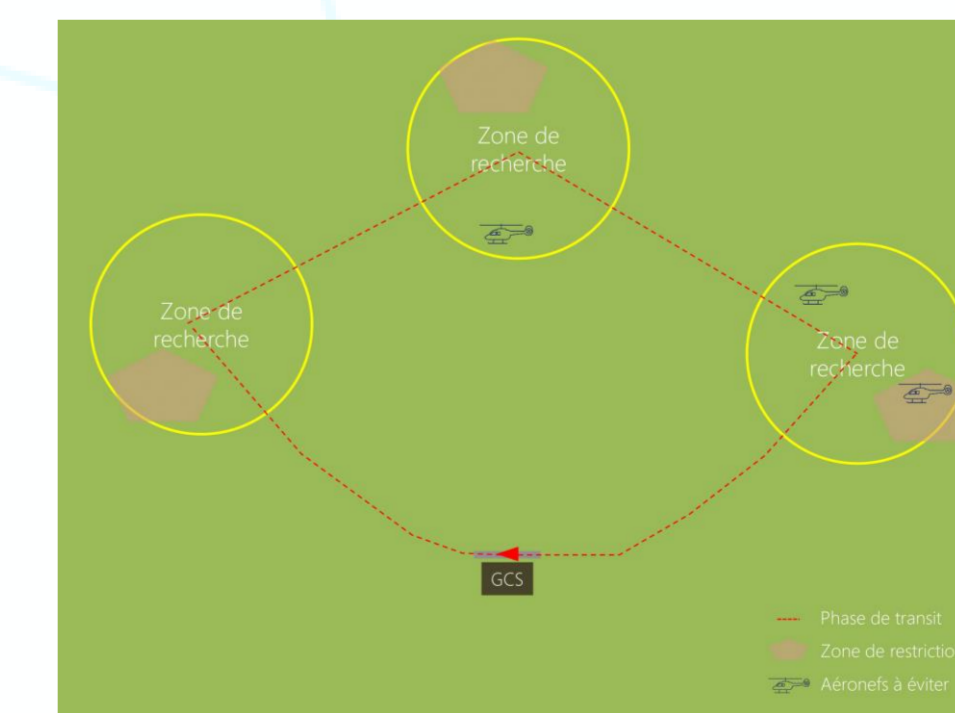
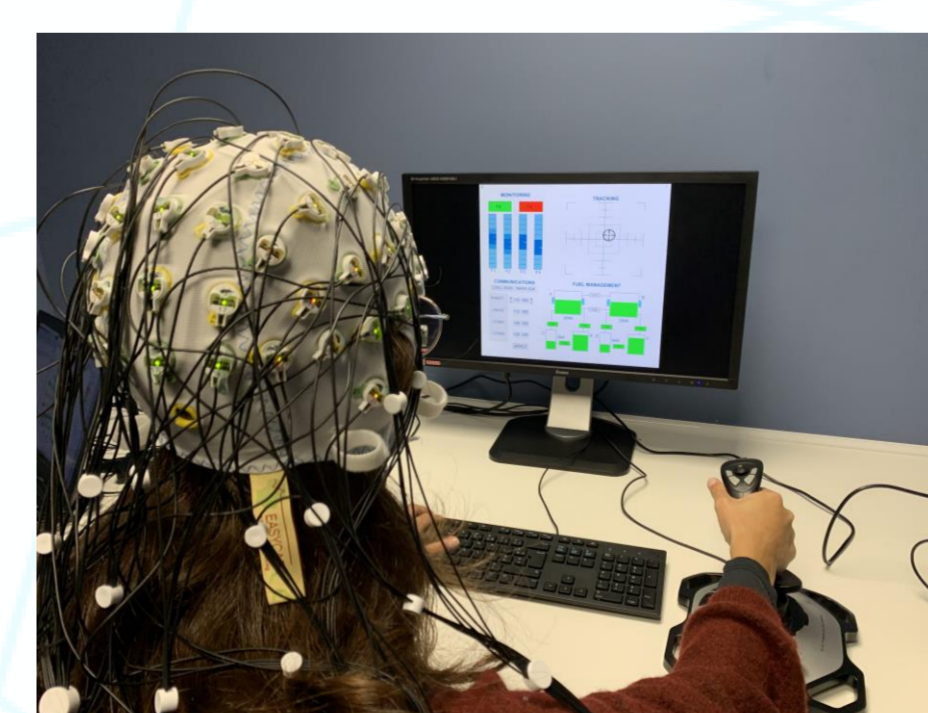
changed cognition



reduced performance

The operation of Long endurance UAV missions is expected to have a multitude of effects on cognition, that may increase the risk of mishaps

## Perspectives



Experimental protocol to investigate cognitive/mental fatigue and its physiological markers (EEG, ECG & Eye-tracking ) during Long-Endurance UAS missions

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