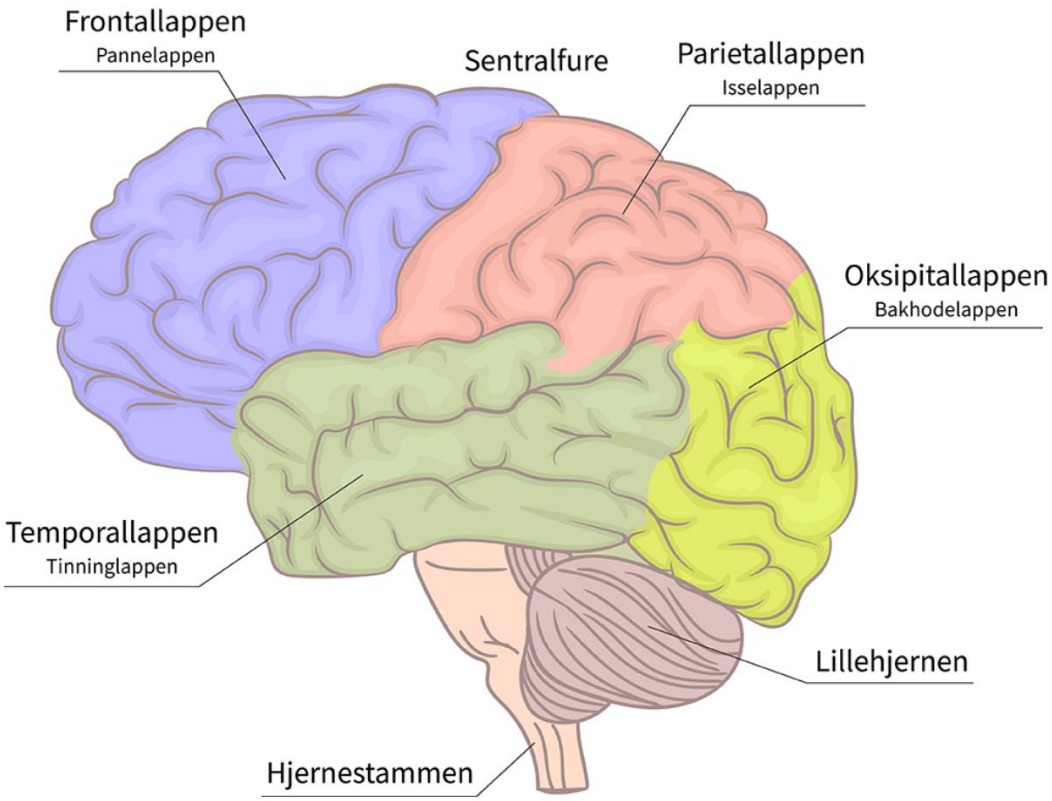
En voksen menneskehjerne veier mellom 1,3 og 1,5 kg. Den kan grovt deles inn i storhjernen, lillehjernen og hjernestammen. Storhjernen består av to deler, høyre og venstre hemisfære, som er forbundet med hverandre gjennom en hjernebjelke. Storhjernen tar klart størst plass i skallen, og er også betydelig større hos mennesker enn hos dyr. Dette skyldes blant annet at det ytre laget, hjernebarken, folder seg når hjernen utvikles. Dette har gitt både vindinger (gyri) og furer (sulci). Disse har igjen gitt en inndeling av begge hjernehemisfærene i lapper: pannelappen, isselappen, tinninglappen og bakhodelappen.




Hver side (hemisfære) av storhjernen din er delt inn i fire lapper: pannelappen, isselappen, tinninglappen og bakhodelappen. (Illustrasjonsbilde Shutterstock)

Pannelappen hjelper oss blant annet å forstå det vi sanser, regulere følelser, planlegge og gjennomføre aktiviteter, løse problemer, kunne sammenlikne flere perspektiver og styre impulser. Hjernen utvikler seg bakfra og frem. Det betyr at funksjonene vi nettopp listet er noe som læres og finjusteres jo større barnet (og dermed pannelappen) blir.

> *Hvordan trenes hjernen? Lær mer om hjernens formbarhet og*

## Så hvordan trener vi en voksen hjerne?

Bruk den. Hold hjernen i form ved hjelp av fysisk aktivitet og hjernetrim. Hjernen styrkes nemlig når vi bruker den!


Illustrasjonsbilde Shutterstock

**Visste du at?**

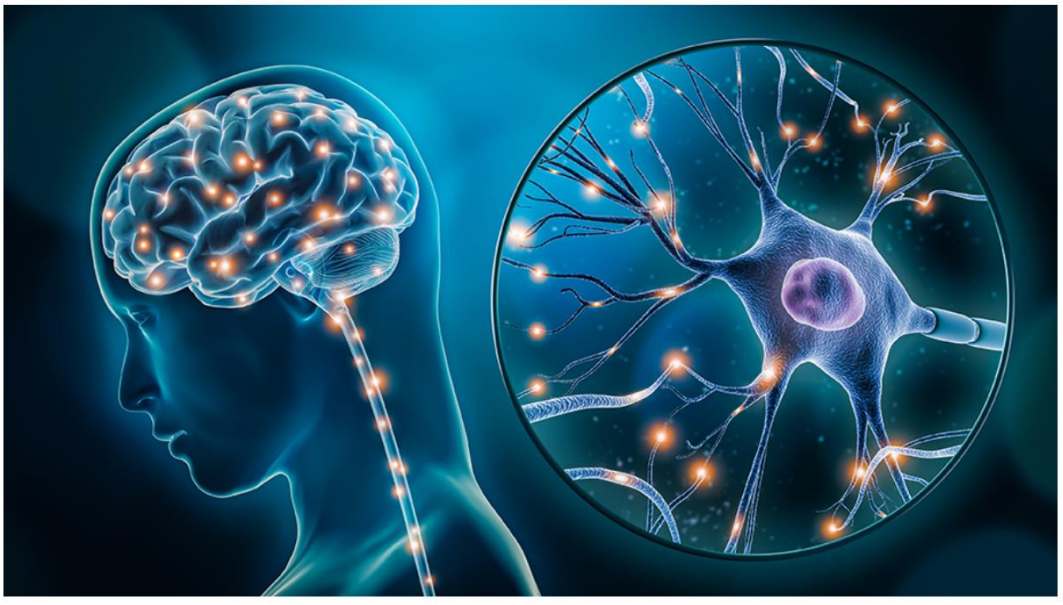
- Ordet «plastisitet» kommer fra det greske ordet «plassein» («å forme»).
- En nervecelle (et nevron) består av en kjerne og to typer utløpere som forbinder kjernene mellom ulike nevroner med hverandre.
- Disse to utløperne kalles aksoner og dendritter. Dendrittene tar imot signaler; aksonene sender ut signaler.
- En nervecelle har flere dendritter, men bare ett akson.

Hjernen er et ekstremt komplekst organ. Artikkelen er en forenklet fremstilling av hjernens plastisitet.

Kilde: Urnes, Anne-Grethe (2020) Hjernens utvikling, sårbarhet og plastisitet. I A.-G. Urnes (Red.), *Den interaktive hjernen hos barn og unge* (s. 45-52). Gyldendal Akademisk.

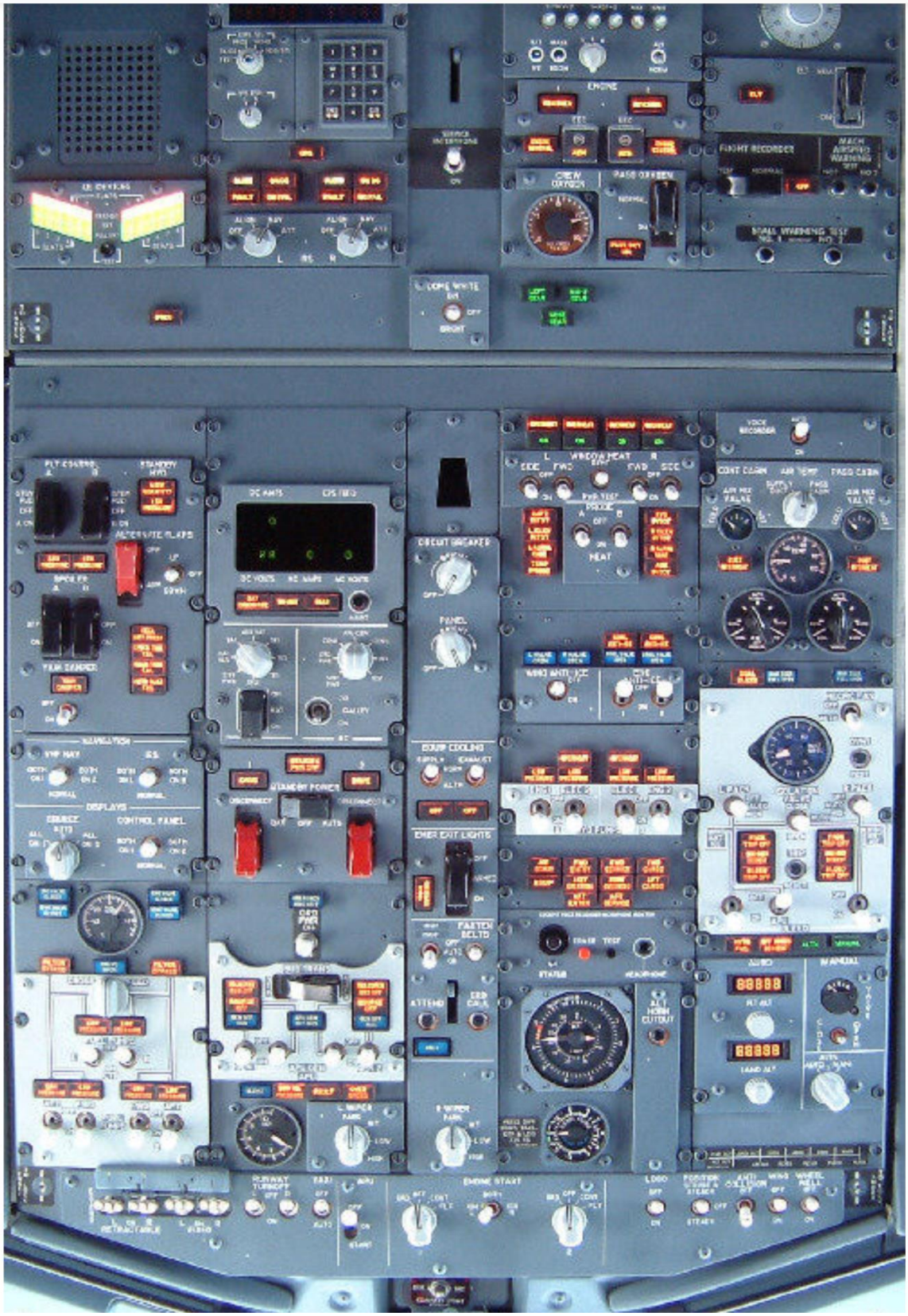
# Hvordan trenes hjernen? – om hjernens plastisitet

Menneskehjernen består av om lag hundre milliarder nerveceller, kalt nevroner. Gjennom utviklingen av hjernen oppstår det forbindelser mellom disse nevronene. I begynnelsen dannes det langt flere både nevroner og forbindelser enn det den voksne hjernen sitter igjen med. Allerede på fosterstadiet skjer det en celledød og etter hvert som barnet vokser til foregår det både celledød og klipping av forbindelser. Sannsynligvis skyldes det at forbindelser som ikke fungerer optimalt fjernes, mens forbindelse som er velfungerende forsterkes.



Hjernen består av milliarder av nerveceller (til høyre). Nervecellene mottar og sender ut signaler (nerveimpulser) til kroppen. Illustrasjonsbilde Shutterstock.

# Overhead + AFT Overhead Panel



# Cognition

## Mer å spørre om

Hva betyr cognition?

The mental action or process of acquiring knowledge through thought, experience an senses.

DinOrdbok
https://www.dinordbok.no › engelsk-norsk

cognition på bokmål | Engelsk-bokmål oversettelse

Hva er følelser på nynorsk?

Hva betyr ordet kognitiv?

Kognitiv er **det som har med erkjennelse, oppfatning og tenkning å gjøre**. I filosofi og psykologi opptrer ofte uttrykket «kognitiv» som motsetning til det følelsesmessige eller intuitive.

Store norske leksikon
https://snl.no › kognitiv

kognitiv - Store norske leksikon

Hva betyr kognisjon?

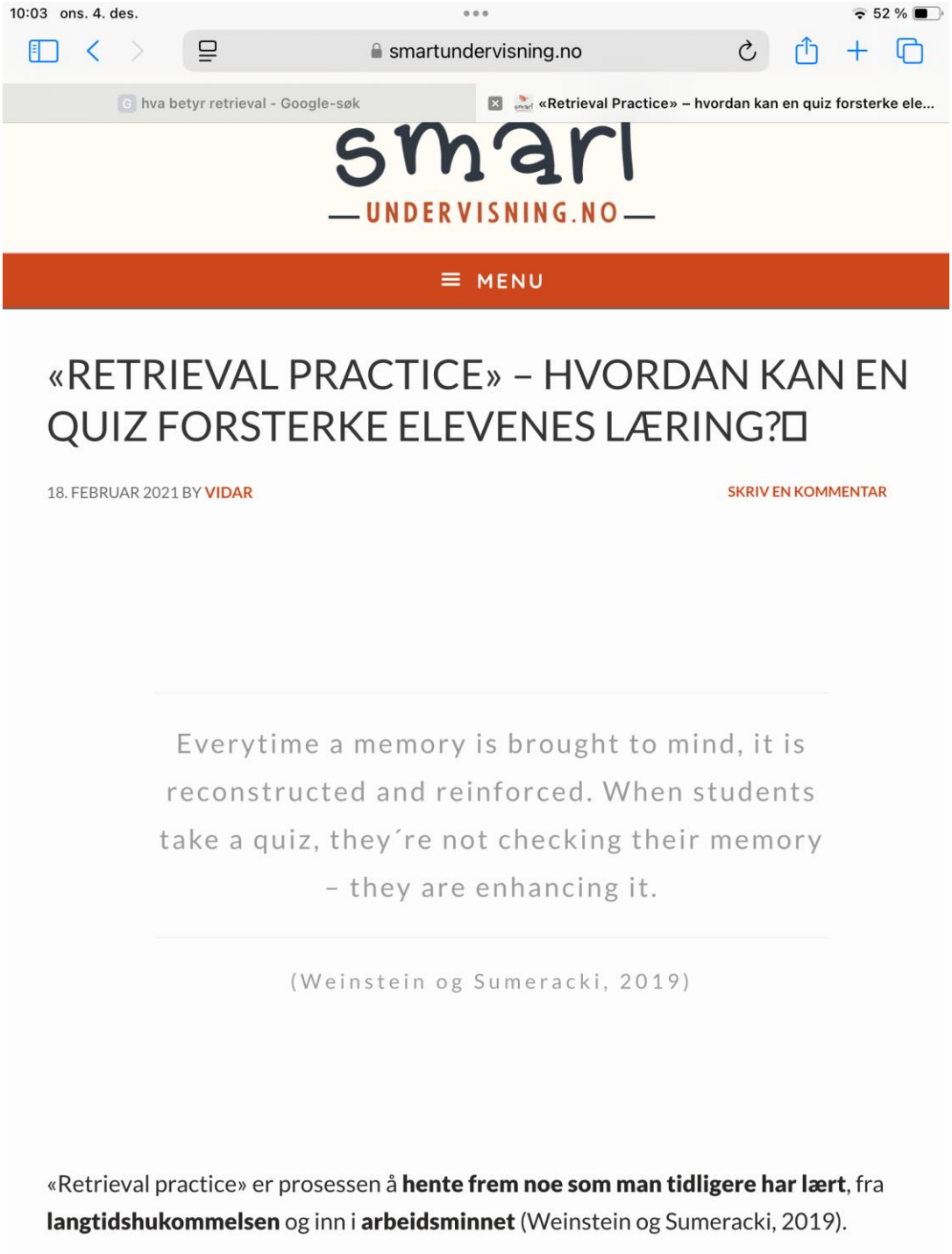
Hva er nedsatt kognitiv?

Hva er forskjellen på kognitiv svikt og demens?

Hva er kognitive øvelser?

Tilbakemel

# Retrieval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smartundervisning.no
hva betyr retrieval - Google-søk
«Retrieval Practice» – hvordan kan en quiz forsterke ele...
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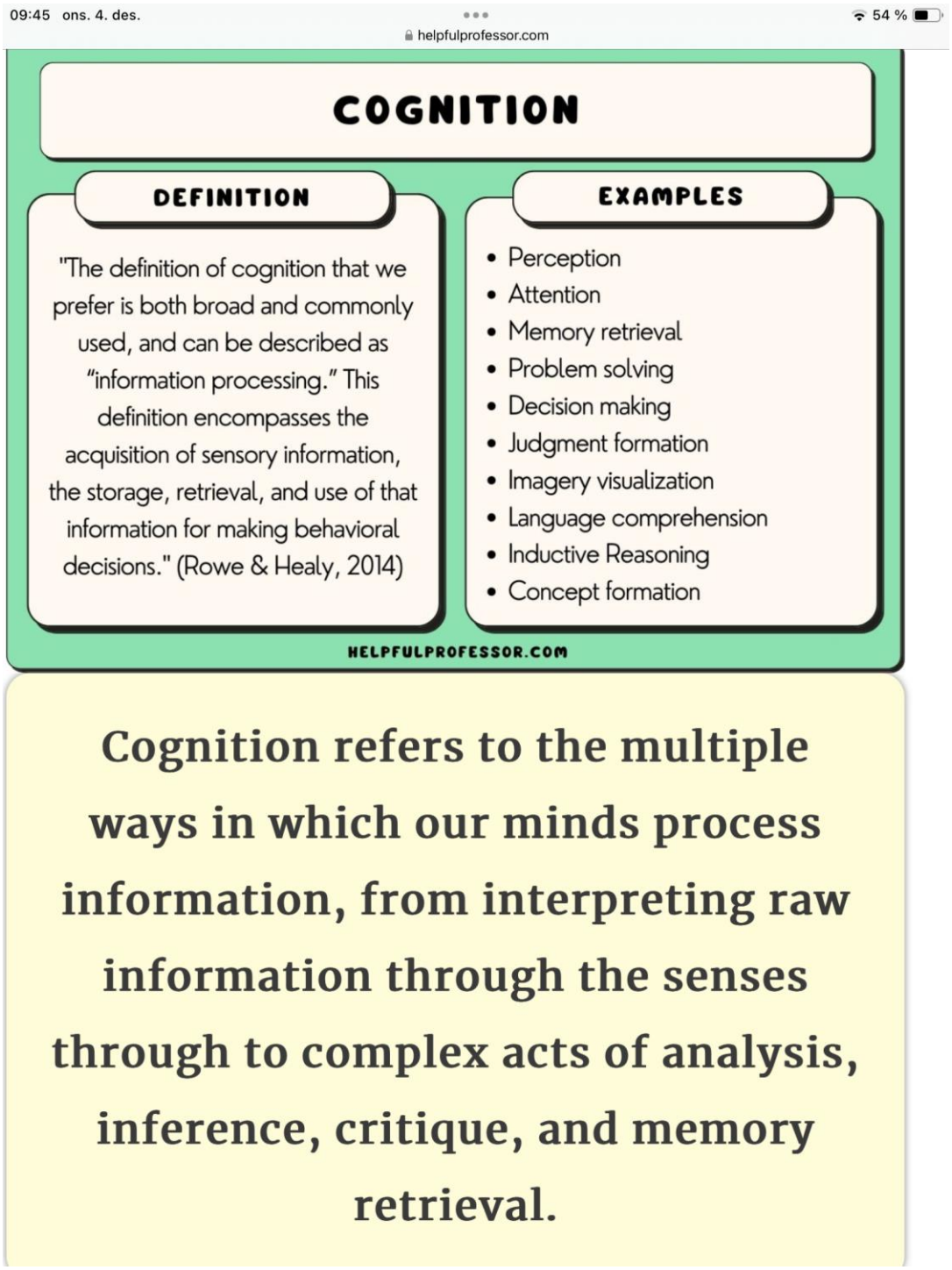
MENU
«RETRIEVAL PRACTICE» – HVORDAN KAN EN QUIZ FORSTERKE ELEVENES LÆRING?
18. FEBRUAR 2021 BY VIDAR
SKRIV EN KOMMENTAR
Everytime a memory is brought to mind, it is reconstructed and reinforced. When students take a quiz, they´re not checking their memory – they are enhancing it.
(Weinstein og Sumeracki, 2019)
«Retrieval practice» er prosessen å **hente frem noe som man tidligere har lært**, fra **langtidshukommelsen** og inn i **arbeidsminnet** (Weinstein og Sumeracki, 2019).

# Cognition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helpfulprofessor.com
COGNITION
DEFINITION
"The definition of cognition that we prefer is both broad and commonly used, and can be described as "information processing." This definition encompasses the acquisition of sensory information, the storage, retrieval, and use of that information for making behavioral decisions." (Rowe & Healy, 2014)
EXAMPLES
Perception
Attention
Memory retrieval
Problem solving
Decision making
Judgment formation
Imagery visualization
Language comprehension
Inductive Reasoning
Concept formation
HELPFULPROFESSOR.COM
Cognition refers to the multiple ways in which our minds process information, from interpreting raw information through the senses through to complex acts of analysis, inference, critique, and memory retrieval.

# Cognitive Skills of the Brain

## FRONTAL LOBE

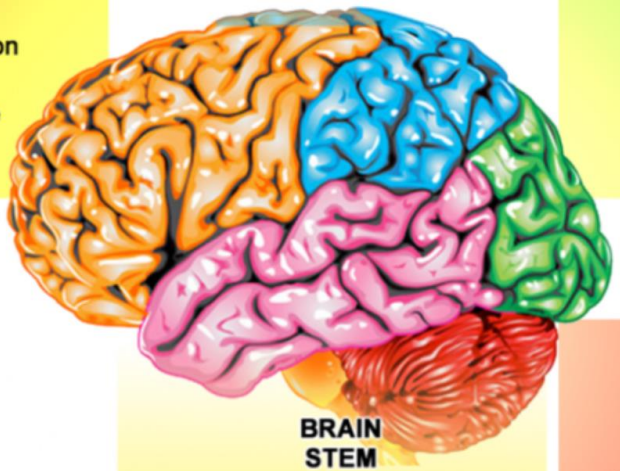
- Initiation
- Problem solving
- Judgment
- Inhibition of behavior
- Planning/anticipation
- Self-monitoring
- Motor planning
- Personality/emotions
- Awareness of abilities/limitations
- Organization
- Attention/concentration
- Mental flexibility
- Speaking (expressive language)

## PARIETAL LOBE

- Sense of touch
- Differentiation: size, shape, color
- Spatial perception
- Visual perception
  Academic skills (reading)

## OCCIPITAL LOBE

- Vision
- Reading (perception and recognition of printed words)



## TEMPORAL LOBE

- Memory
- Hearing
- Understanding language
- (receptive language)
- Organization and sequencing
- Musical awareness

## BRAIN STEM

- Breathing
- Heart Rate
- Swallowing
- Reflexes to seeing and
- hearing (startling response)
- Controls sweating, blood pressure, digestion, tem perature (autonomic nervous system)
- Affects level of alertness
- Ability to sleep
- Sense of balance (vestibular function)

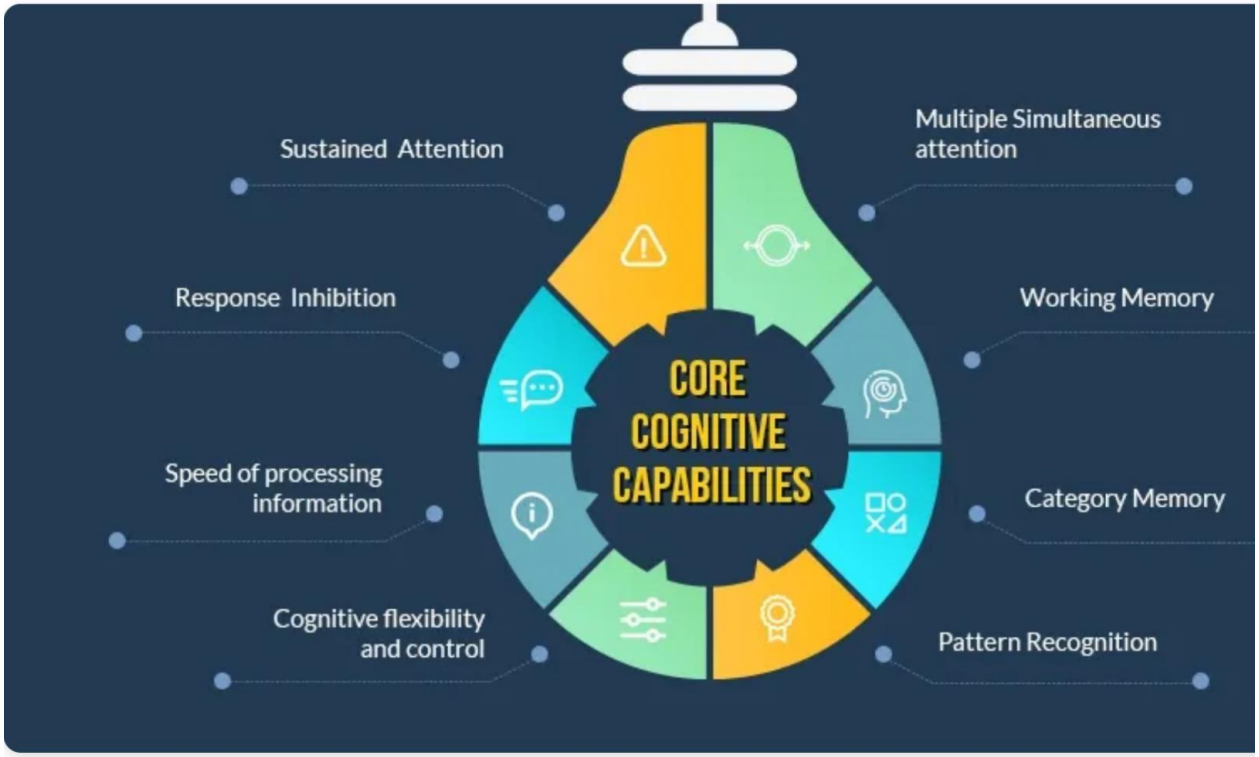
## CEREBELLUM LOBE

- Coordination of voluntary movement
- Balance and equilibrium
- Some memory for reflex motor acts

Information Source: http://biau.org/about-brain-injuries/cognitive-skills-of-the-brain

# Cognitive Ability Important?

Cognitive ability plays a crucial role in our daily lives, helping us to:




- Learn new information and cognitive skills
- Make decisions and solve problems
- Communicate effectively with others

# Components of Cognitive Ability

Cognitive ability is made up of several key components, including:

| Component | Description |
| --- | --- |
| **Attention** | The ability to focus on specific tasks or stimuli. |
| **Memory** | The capacity to store and recall information. |
| **Language Skills** | The ability to understand and apply language. |
| **Problem-Solving** | The ability to analyze situations and implement solutions. |
| **Visual-Spatial Skills** | The ability to interpret visual information. |
| **Executive Function** | Higher-order mental processes that regulate behavior. |

# ICAO Shell Model



## Description

**ICAO SHELL Model,** as described in ICAO Doc 9859, *Safety Management Manual*, is a conceptual tool used to analyse the interaction of multiple system components. It also refers to a framework proposed in ICAO Circular 216-AN31.

The concept (the name being derived from the initial letters of its components, Software, Hardware, Environment, Liveware) was first developed by Edwards in 1972, with a modified diagram to illustrate the model developed by Hawkins in 1975.

One practical diagram to illustrate this conceptual model uses blocks to represent the different components of Human Factors. This building block diagram does not cover the interfaces which are outside Human Factors (hardware-hardware; hardware-environment; software-hardware) and is only intended as a basic aid to understanding Human Factors:

- **Software** - the rules, procedures, written documents etc., which are part of the standard operating procedures.
- **Hardware** - the Air Traffic Control suites, their configuration, controls and surfaces, displays and functional systems.
- **Environment** - the situation in which the L-H-S system must function, the social and economic climate as well as the natural environment.
- **Liveware** - the human beings - the controller with other controllers, flight crews, engineers and maintenance personnel, management and administration people - within in the system.



According to the SHELL Model, a mismatch between the Liveware and other four components contributes to human error. Thus, these interactions must be assessed and considered in all sectors of the aviation system.

## Liveware


The critical focus of the model is the human participant, or liveware, the most critical as well as the most flexible component in the system. The edges of this block are not simple and straight, and so the other components of the system must be carefully matched to them if stress in the system and eventual breakdown are to be avoided.

However, of all the dimensions in the model, this is the one which is least predictable and most susceptible to the effects of internal (hunger, fatigue, motivation, etc.) and external (temperature, light, noise, workload, etc.) changes.

# Swiss Cheese Model



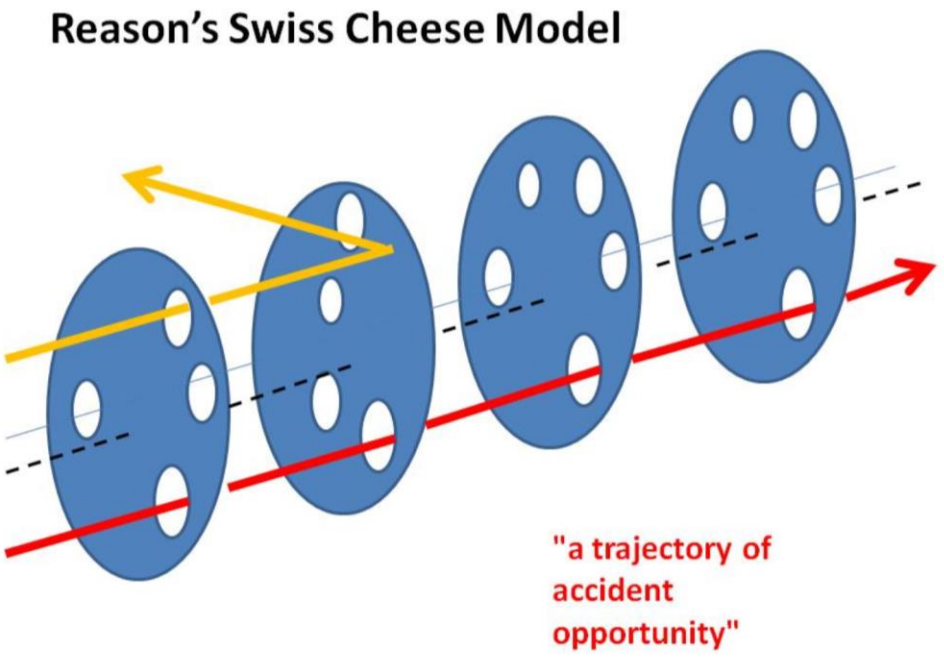
## Description

The *Swiss Cheese* model of accident causation, originally proposed by James Reason, likens human system defences to a series of slices of randomly-holed Swiss Cheese arranged vertically and parallel to each other with gaps in-between each slice.

Reason hypothesizes that most accidents can be traced to one or more of four levels of failure:

- Organisational influences,
- Unsafe supervision,
- Preconditions for unsafe acts, and
- The unsafe acts themselves.

In the Swiss Cheese model, an organisation's defences against failure are modelled as a series of barriers, represented as slices of the cheese. The holes in the cheese slices represent individual weaknesses in individual parts of the system, and are continually varying in size and position in all slices. The system as a whole produces failures when holes in all of the slices momentarily align, permitting "a trajectory of accident opportunity", so that a hazard passes through holes in all of the defences, leading to an accident.




Swiss Cheese model of accident causation

## Related Articles

# Challenges and Barriers to Effective Monitoring



Monitoring may sound like an easy part of pilots' duties, but in reality — for multiple reasons — it is often challenging and error-prone. If a flight crew deviates from an assigned altitude, it is simplistic to label them "unprofessional" or to assume they are "just not doing their job." To improve monitoring, we must first understand why it is challenging and then create ways to address the barriers to effectiveness (Table 2).[1]

The following parts of this section provide more detail about the challenges and barriers highlighted in Table 2.

## 3.1 Human Factors Limitations

During monitoring, pilots are expected to carry out two distinct tasks. First, they monitor highly reliable automated systems over extended periods of time (such as in cruise flight). Second, they monitor complex aircraft flight path changes and system states while simultaneously completing several other flight-related tasks (e.g., programming approaches in the flight management system [FMS] and communicating with air traffic control [ATC], cabin crew, passengers, their airline, etc.); at times, such as during approach to landing, pilots can be very busy. Even for highly skilled and conscientious professional pilots, monitoring tasks are more challenging than they seem — especially when combined with other tasks and with fatigue.

Because modern aircraft typically have advanced autoflight capabilities and are highly reliable, pilots often have little to do during cruise but monitor for occasionally unexpected flight path changes generated by the autoflight system and for system anomalies that rarely occur. Monitoring for such events on the flight deck during long periods of cruise can be compared to waiting for water to boil, watching paint dry or watching grass grow. The human brain has evolved for active engagement in individual tasks that are challenging or stimulating, yet is less effective at monitoring for events that so rarely occur.

**Challenges and Barriers to Effective Monitoring**

**Human factors limitations[1]**

- The human brain has difficulty with sustained vigilance;
- The human brain has quite limited ability to multitask;
- Humans are vulnerable to interruptions and distractions; and,
- Humans are vulnerable to cognitive limitations that affect what they notice and do not notice.

**Time pressure**

- This factor exacerbates high workload and increases errors; and,
- It often leads to rushing and "looking without seeing."

**Lack of feedback to pilots when monitoring lapses occur**

- Pilots are often unaware that their monitoring performance has degraded.

**Design of flight deck systems and standard operating procedures**

- Some aspects of automated systems for flight path management are not well matched to human information processing characteristics; and,
- Standard operating procedures may fail to explicitly address monitoring tasks.

**Pilots' inadequate mental models of autoflight system modes**

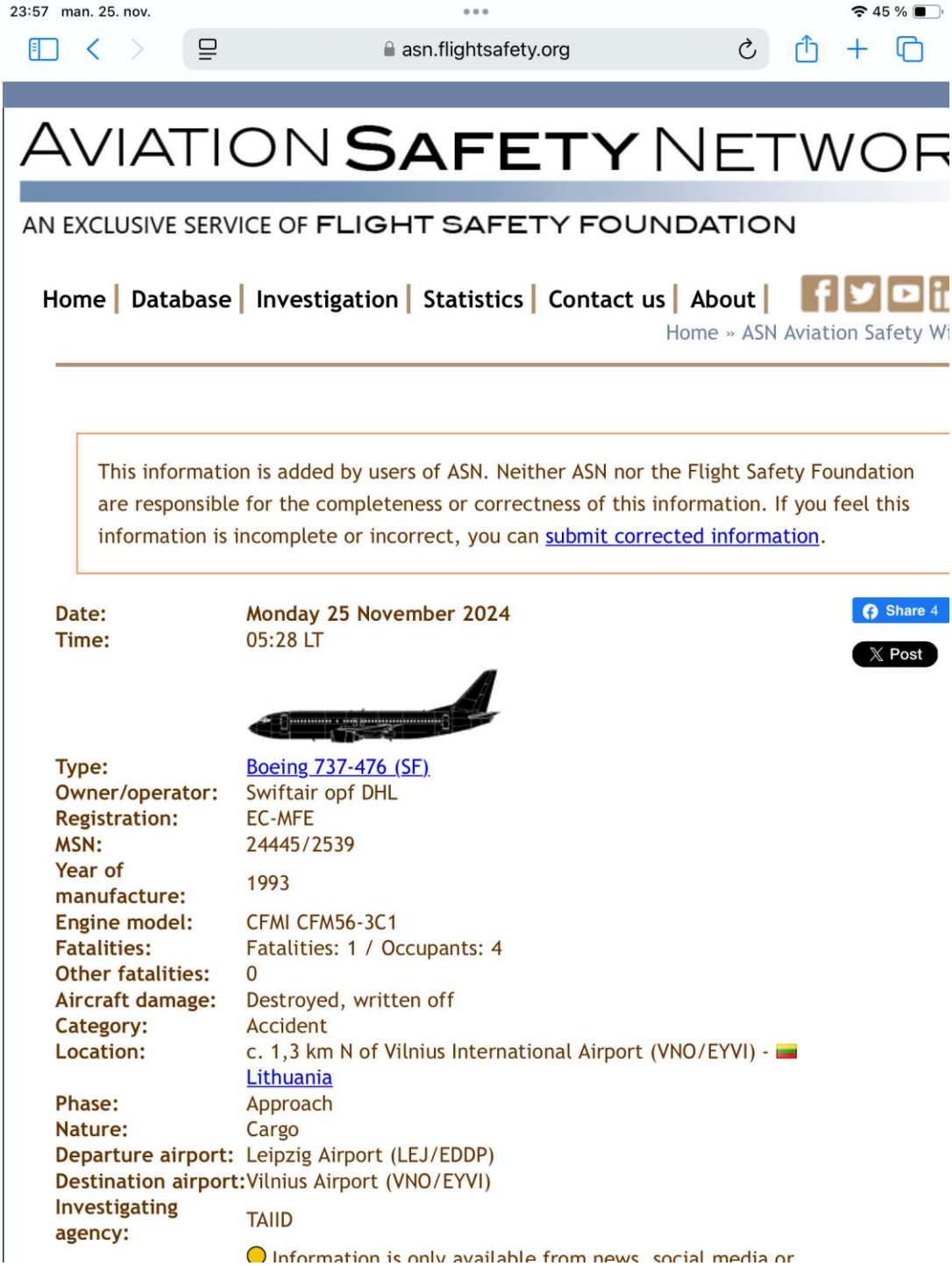
- Pilots may not have a complete or accurate understanding of all of the functions and behaviors of the autoflight system on their aircraft.

**Corporate climate that does not support emphasis on monitoring**

- Inadequate training overlooks the importance of monitoring and how to do it effectively; and,
- Lack of emphasis on monitoring occurs in training and evaluation.

1. See the CAA paper *Monitoring Matters* at <www.caa.co.uk/monitoringmatters> for additional discussion of barriers to monitoring. While beyond the scope of this document, other human factors limitations also affect pilots' ability to monitor effectively (e.g., disorientation, subtle incapacitation, startle reflex, confirmation bias and fatigue). *Monitoring Matters* addresses some of these other issues, and tries to drill down to the root causes of inadequate monitoring and flesh out the factors that influence performance — physiological, psychological, personal, cultural, social factors, etc.

# ASN Report (crash)



avsoft.com

# CRJ-200 FLIGHT INSTRUMENTS


Mtrain999

**West Air Sweden Flight 294** was a cargo flight of a Canadair CRJ200 from Oslo to Tromsø, Norway that crashed on 8 January 2016. A malfunction in one of the inertial reference units had produced erroneous attitude indications on one of the instrument displays. The crew's subsequent response resulted in spatial disorientation, leading to the loss of control of the aircraft. Both crew members on board were killed. [1][2][3]

Investigators discovered that, the inertial reference unit (IRU; which provides information to the flight crew's instruments) no. 1 (connected to the captain's instruments and the flight data recorder) had malfunctioned in-flight (the SHK was unable to determine the cause of the malfunction), causing the captain's artificial horizon to display a nose-up pitch, when in fact the aircraft was perfectly level.[15]
The captain responded by pushing the yoke down in an attempt to regain level flight. Instead, the aircraft's nose lowered and it departed level flight. The aircraft then entered a steep dive traveling over 510 knots (940 km/h; 590 mph), nearly inverted, and banked over 40 degrees, causing the "bank angle" warning sounded in the cockpit.

## West Air Sweden Flight 294

The aircraft involved, seen at Tromsø Airport in July 2014.

| Accident | |
|---|---|
| **Date** | 8 January 2016 |
| **Summary** | Instrument failure leading to spatial disorientation and pilot error, loss of control |
| **Site** | Near Akkajaure, Sweden 67°43′N 16°54′E |
| **Aircraft** | |
| **Aircraft type** | Bombardier CRJ200 |
| **Operator** | West Air Sweden |
| **IATA flight No.** | PT294 |
| **ICAO flight No.** | SWN294 |
| **Call sign** | AIR SWEDEN 294 |
| **Registration** | SE-DUX |
| **Flight origin** | Oslo Airport, Gardermoen, Oslo, Norway |
| **Destination** | Tromsø Airport, Tromsø, Norway |
| **Occupants** | 2 |
| **Passengers** | 0 |
| **Crew** | 2 |
| **Fatalities** | 2 |
| **Survivors** | 0 |

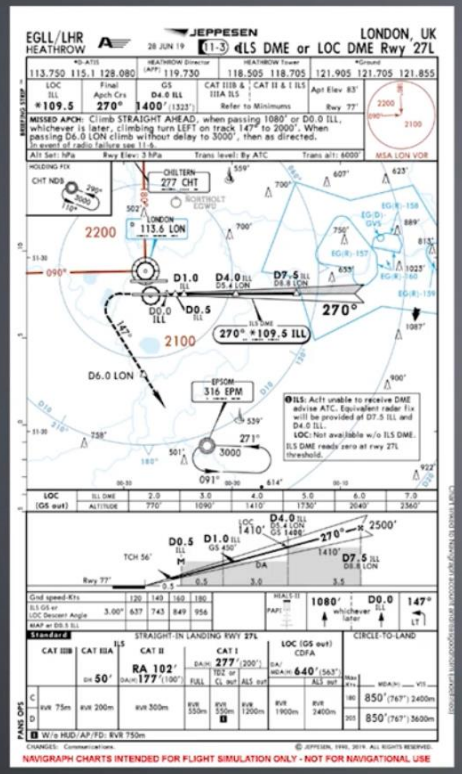
https://en.wikipedia.org/wiki/West_Air_Sweden_Flight_294

# Dynon Avionics - Glass Cockpit Made Easy

# Dynon Avionics - Glass Cockpit Made Easy

# Dynon Avionics - Glass Cockpit Made Easy


Scenario Vehicle Navigation World Options Views Analysis Network Tools Virtual Reality Help Add-ons
Developer License
Concept View
Virtual Cockpit
0.70 Zoom
PARKING BRAKE PULL


EGLL/LHR
HEATHROW
JEPPESEN
LONDON, UK
ILS DME or LOC DME Rwy 27L
MISSED APCH: Climb STRAIGHT AHEAD, when passing 1080' or D0.0 ILL, whichever is later, climbing turn LEFT on track 147° to 2000'. When passing D6.0 LON climb without delay to 3000', then as directed.
CHILTERN
277 CHT
LONDON
113.6 LON
EPSOM
316 EPM
D6.0 LON
270°
*109.5 ILL
STRAIGHT-IN LANDING RWY 27L
CIRCLE-TO-LAND
NAVIGRAPH CHARTS INTENDED FOR FLIGHT SIMULATION ONLY - NOT FOR NAVIGATIONAL USE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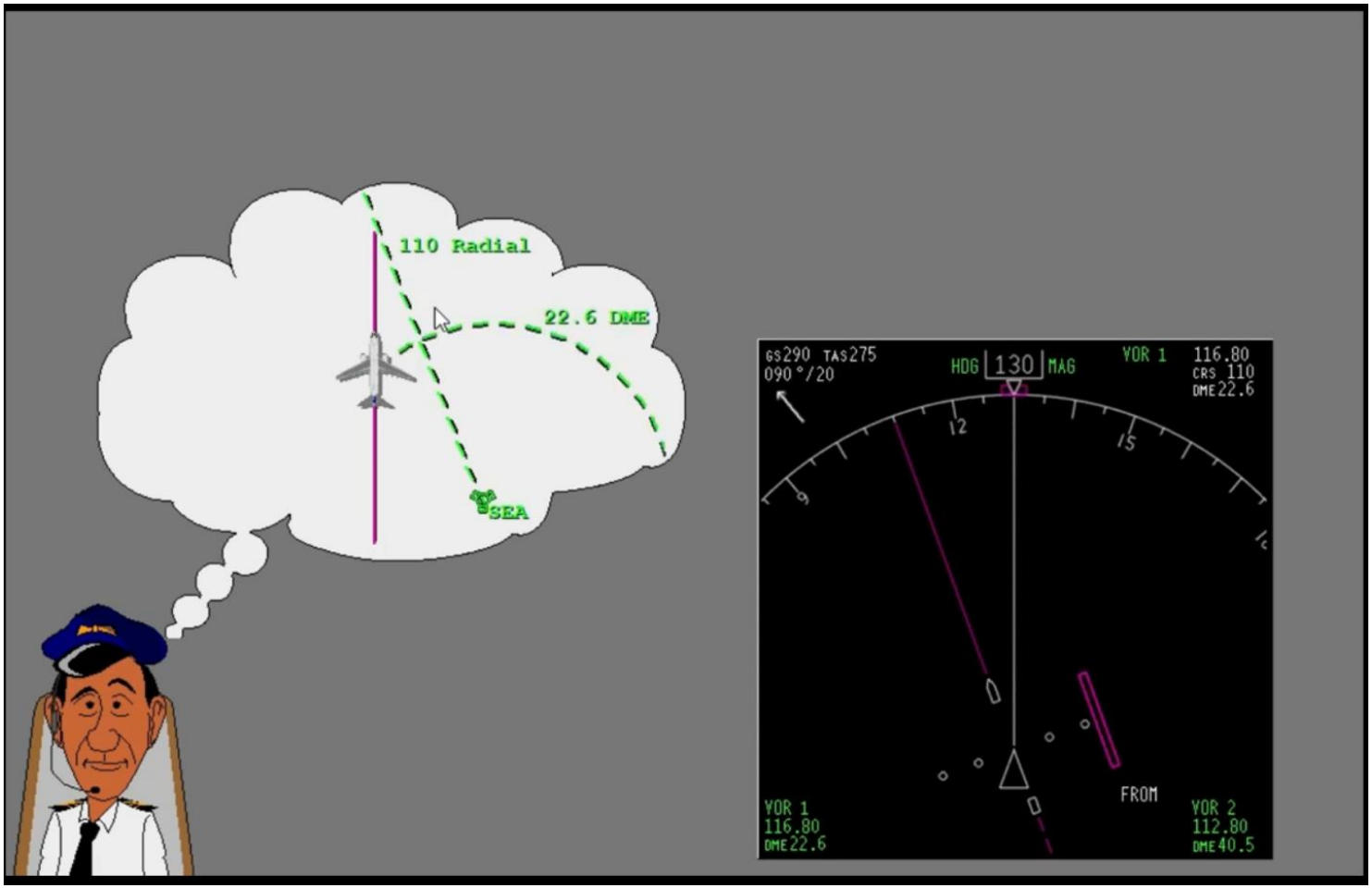
110 Radial
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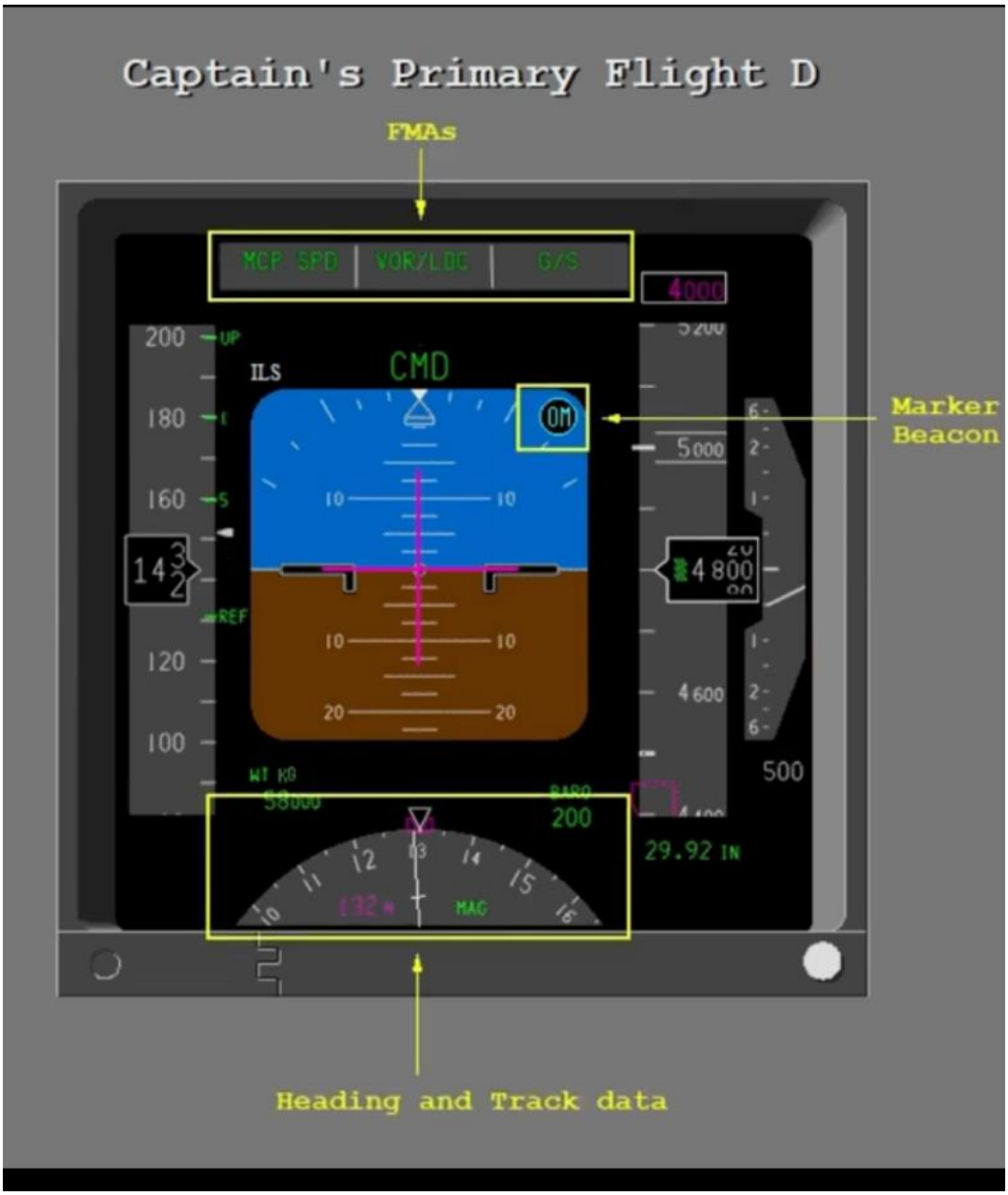
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