
# The new CIMA: The Human Performance Challenge!

**LtCol. Beatriz Puente, CIMA**
**CENTRO DE INSTRUCCIÓN DE MEDICINA AEROESPACIAL**

**RAMSTEIN AEROSPACE MEDICINE SUMMIT AND NATO/STO TECHNICAL COURSE, 2019**


# The new? CIMA: The Human Performance Challenge!

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# I cannot let this opportunity pass…



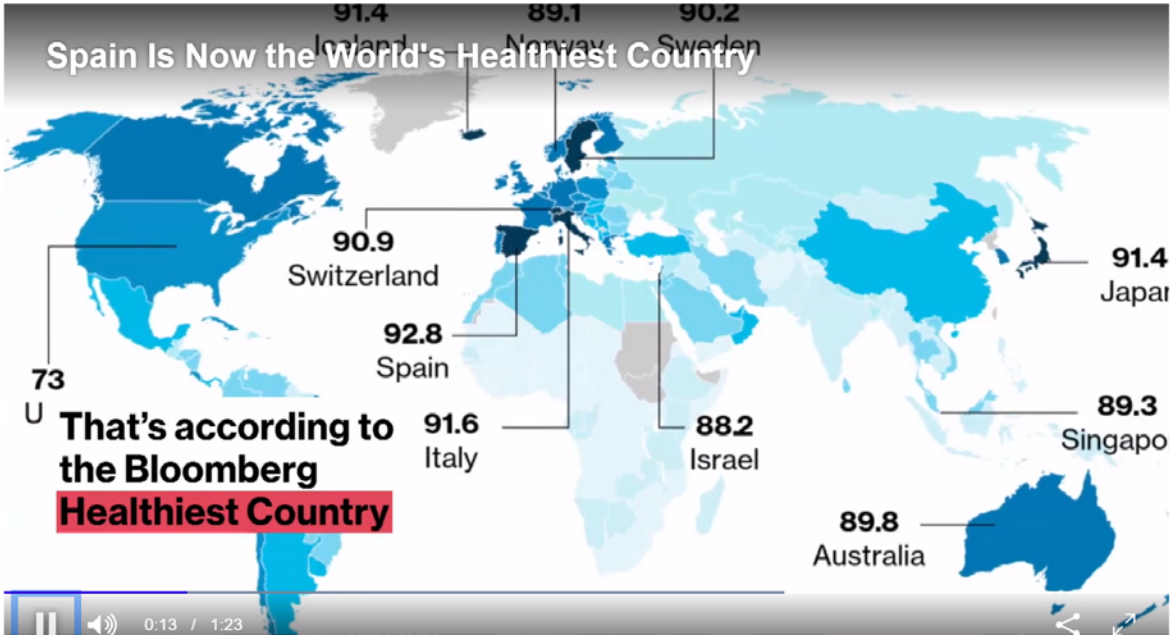
Economics

## These Are the World's Healthiest Nations

By Lee J Miller and Wei Lu

24 de febrero de 2019 15:00 GMT+1

- Iceland, Japan, Switzerland round out top five; U.S. is 35th
- Health index looks at life expectancy, environmental factors



# Bloomberg 2019 Healthiest Country Index

| 2019 Rank | 2017 Rank | Change | Economy | Health Grade | Health Score | Health Risk Penalties |
|---|---|---|---|---|---|---|
| **1** | 6 | +5 | Spain | **92.75** | 96.56 | -3.81 |
| **2** | 1 | -1 | Italy | **91.59** | 95.83 | -4.24 |
| **3** | 2 | -1 | Iceland | **91.44** | 96.11 | -4.67 |
| **4** | 7 | +3 | Japan | **91.38** | 95.59 | -4.21 |
| **5** | 3 | -2 | Switzerland | **90.93** | 94.71 | -3.78 |
| **6** | 8 | +2 | Sweden | **90.24** | 94.13 | -3.89 |
| **7** | 5 | -2 | Australia | **89.75** | 93.96 | -4.21 |
| **8** | 4 | -4 | Singapore | **89.29** | 93.19 | -3.90 |
| **9** | 11 | +2 | Norway | **89.09** | 93.25 | -4.16 |
| **10** | 9 | -1 | Israel | **88.15** | 92.01 | -3.86 |
| **11** | 10 | -1 | Luxembourg | **87.39** | 92.03 | -4.64 |
| **12** | 14 | +2 | France | **86.94** | 91.70 | -4.76 |
| **13** | 12 | -1 | Austria | **86.30** | 90.81 | -4.51 |
| **14** | 15 | +1 | Finland | **85.89** | 90.18 | -4.29 |
| **15** | 13 | -2 | Netherlands | **85.86** | 90.07 | -4.21 |
| **16** | 17 | +1 | Canada | **85.70** | 90.31 | -4.61 |
| **17** | 24 | +7 | S. Korea | **85.41** | 89.48 | -4.07 |
| **18** | 19 | +1 | New Zealand | **85.06** | 89.68 | -4.62 |
| **19** | 23 | +4 | U.K. | **84.28** | 88.74 | -4.46 |
| **20** | 22 | +2 | Ireland | **84.06** | 89.57 | -5.51 |

# Agenda

- History
- Aeromedical Center
  - Physical examinations
- Aeromedical Training
- Instruction
  - Flight Surgeon, Flight Nurse, AME, Techc, Aerospace Med, AAI, Flight Safety, etc…
- Research

# Agenda

- History
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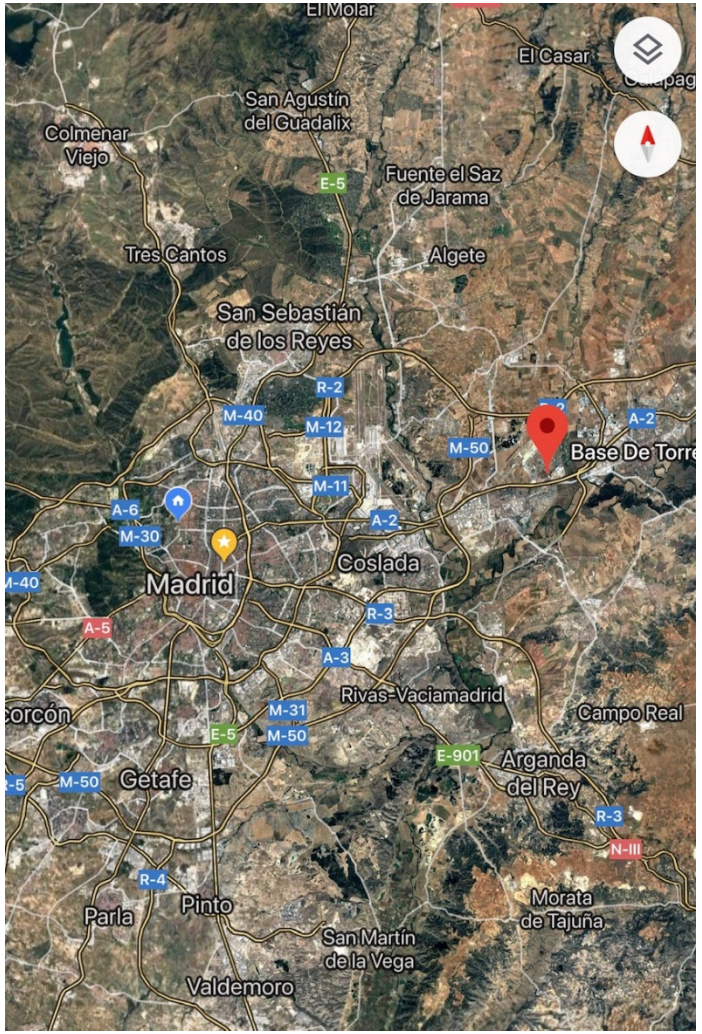
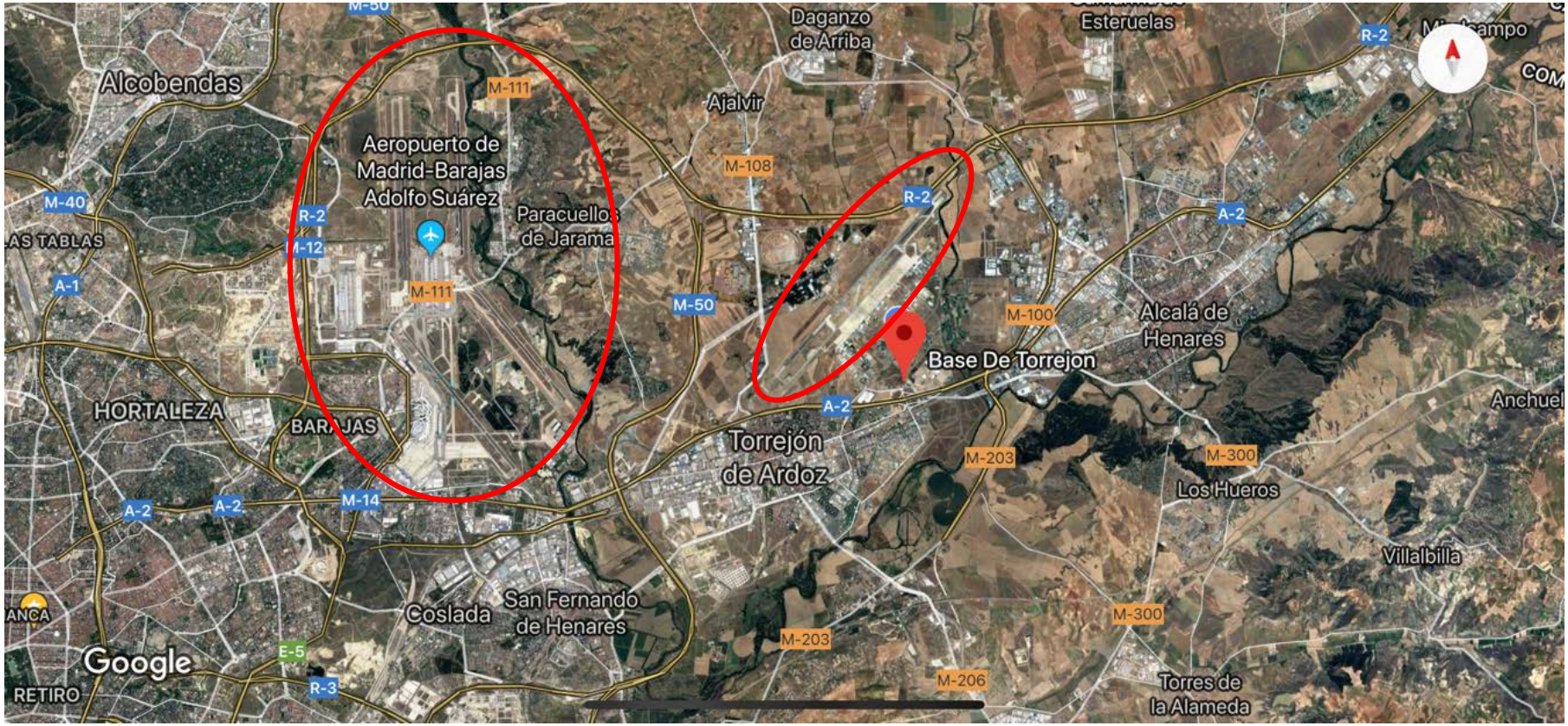
- Research

# CIMA

- "Centro de Instrucción de Medicina Aeroespacial" = "Aerospace Medicine Institute"
- Born in 1940
- Belongs to Spanish AIR FORCE
- Works for all Services
- It´s also an EASA AeMC
- Nowadays located in Torrejón AF Base, Madrid




Alcobendas
Aeropuerto de Madrid-Barajas Adolfo Suárez
Paracuellos de Jarama
Daganzo de Arriba
Esteruelas
Ajalvir
Base De Torrejon
Alcalá de Henares
HORTALEZA
BARAJAS
Torrejón de Ardoz
Los Hueros
Villalbilla
Coslada
San Fernando de Henares
Torres de la Alameda
RETIRO
Google
M-111
M-108
M-50
M-100
M-203
M-300
M-206
M-14
M-40
M-12
A-1
A-2
R-2
R-3
E-5

# 1910-1939

- 1910, April 2nd: Born of Spanish Military Aviation
  - First Spanish pilot: Engineer Benito Loygorri Pimentel.
- **1939, October 7th: Born of Air Force**


# 1940

## 1940, February the 23rd
## Aviation Medicine Institute



# GOBIERNO DE LA NACION

## MINISTERIO DEL AIRE

**DECRETO de 23 de febrero de 1940 creando dos Institutos de Medicina Aeronáutica en Madrid y Sevilla.**

Para que el Cuerpo de Sanidad del Aire pueda llenar sus múltiples e importantes misiones, necesita los Organismos de estudio, investigación, tratamiento, profilaxis y especialización médico-quirúrgica que, al mismo tiempo que formen a la oficialidad profesional y al personal auxiliar del Cuerpo, permitan ejecutar con toda eficacia y en todos los escalones, las funciones sanitarias y médico-aeronáuticas, tan claramente diferenciadas y específicas de esta rama de la Medicina militar.

Por otra parte, la necesidad de dar a esta especialización el mayor desarrollo y urgencia posibles, aconseja utilizar los conocimientos de cuantos se hayan dedicado a ella.

En su virtud, a propuesta del Ministro del Aire, y previa deliberación del Consejo de Ministros,

DISPONGO:

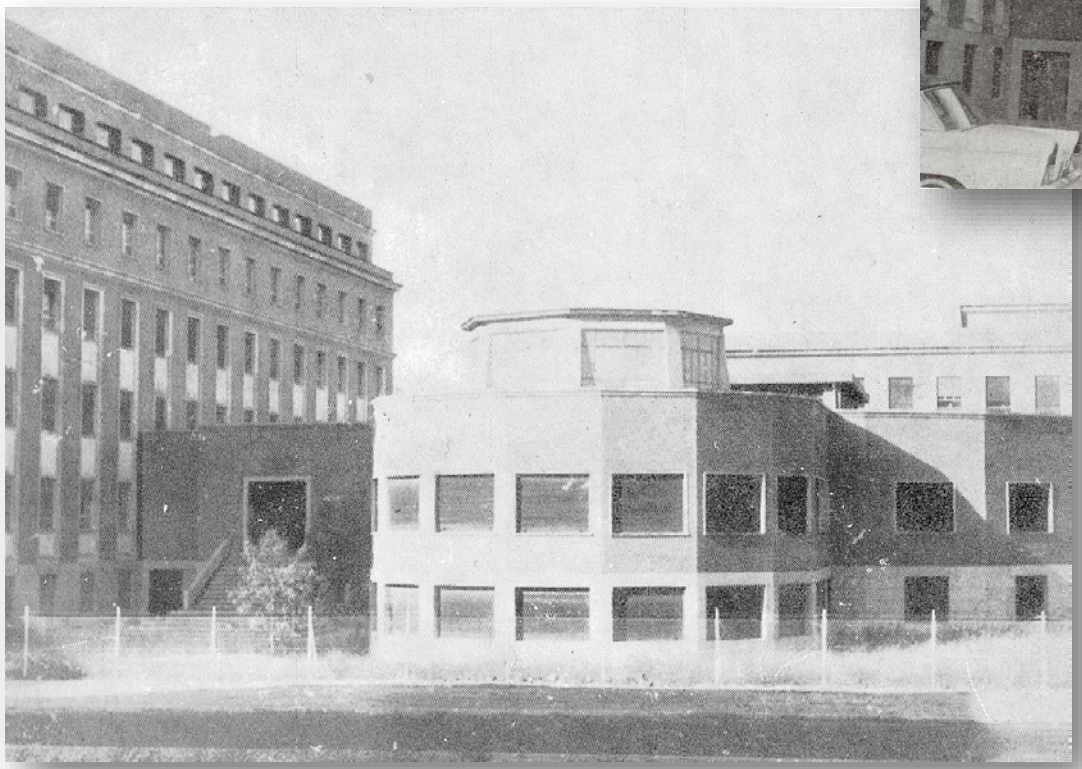
**Artículo primero.**—Por el presente Decreto se crean dos Institutos de Medicina Aeronáutica en Madrid y Sevilla.

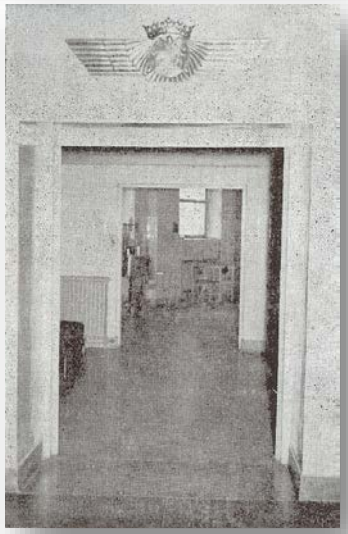
**Artículo segundo.**—Estos Institutos tendrán como misión: los Servicios de reconocimiento psico-físico y psico-técnico del personal del Arma de Aviación, Investigación de Medicina aeronáutica y fisiopatología del vuelo. Profilaxis, higiene, diagnóstico y tratamiento de las Fuerzas del Ejército del Aire.

El de Madrid tendrá, además, el ingreso, formación y especialización de la oficialidad profesional

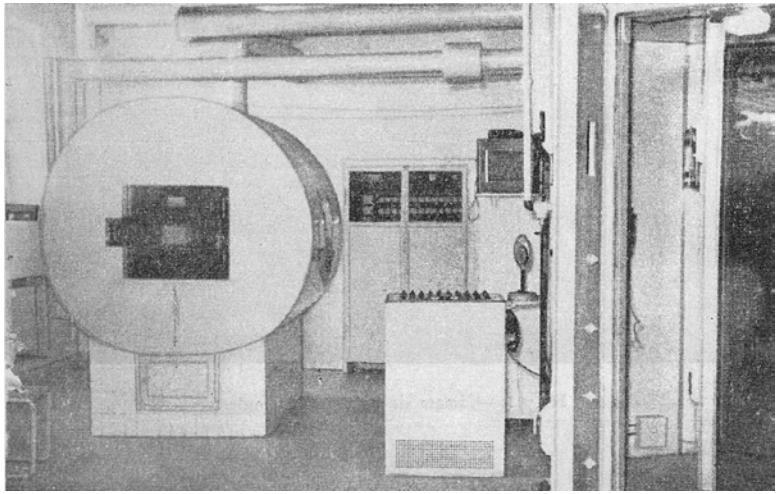
# First CIMA in Madrid

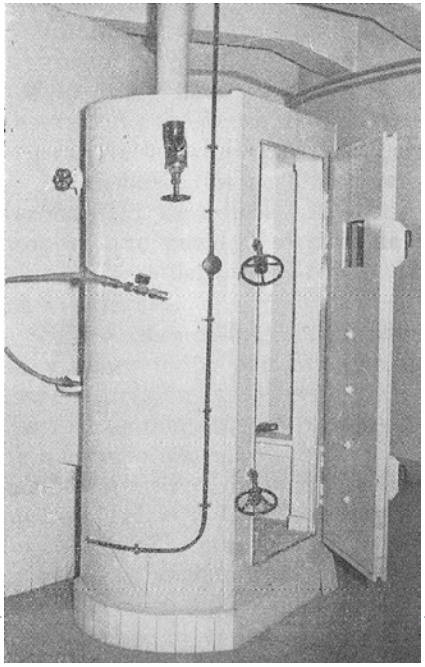
- Complutense University
- **1942-1974**





# 1943 First Hypobaric Chamber





# 1974-2013

- Arturo Soria St, besides Air Force Hospital
- AF Hospital (re)moved in 2001


# 2014-…

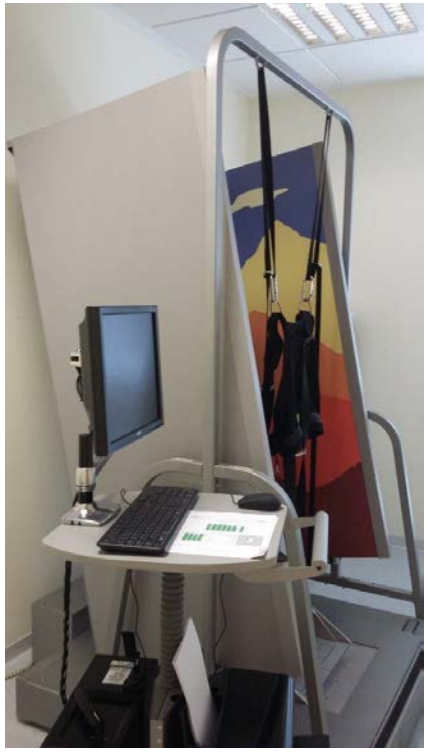

Torrejón AF Base, Madrid

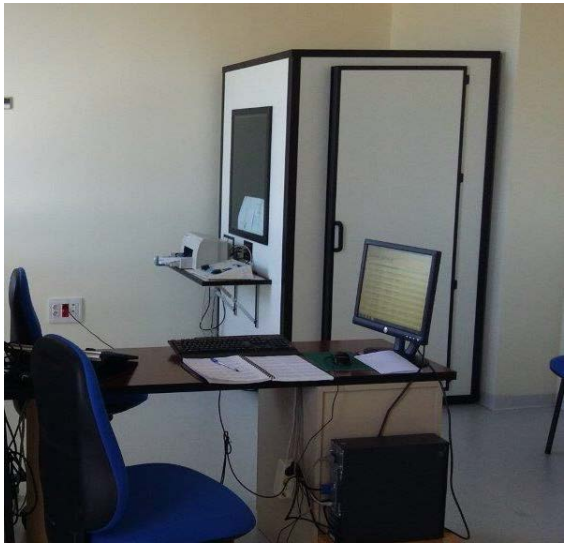
# AEROMEDICAL CENTER

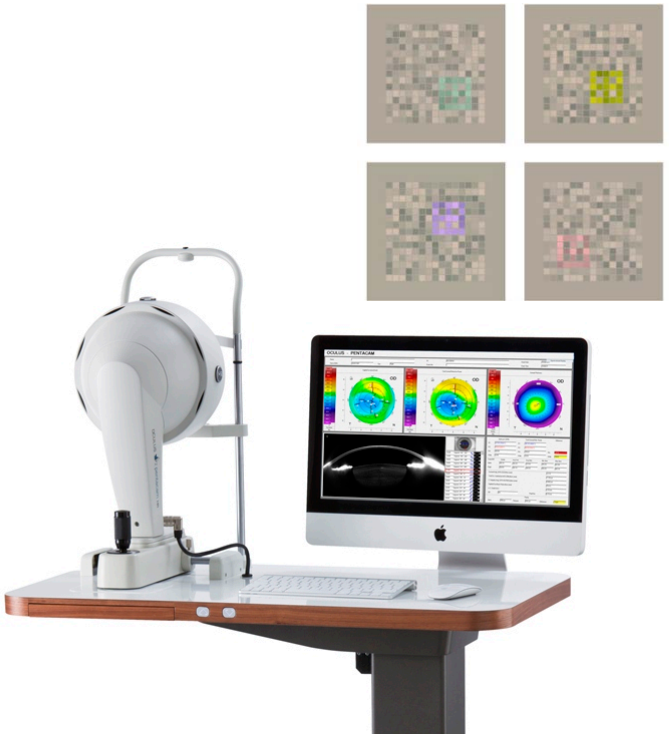
- Physical Examinations 2018: 7012
  - Military: 5876 (82,73%)
  - Civilian: 1136 (17,27%)
- Regulations:
  - National (MIL)
  - EASA

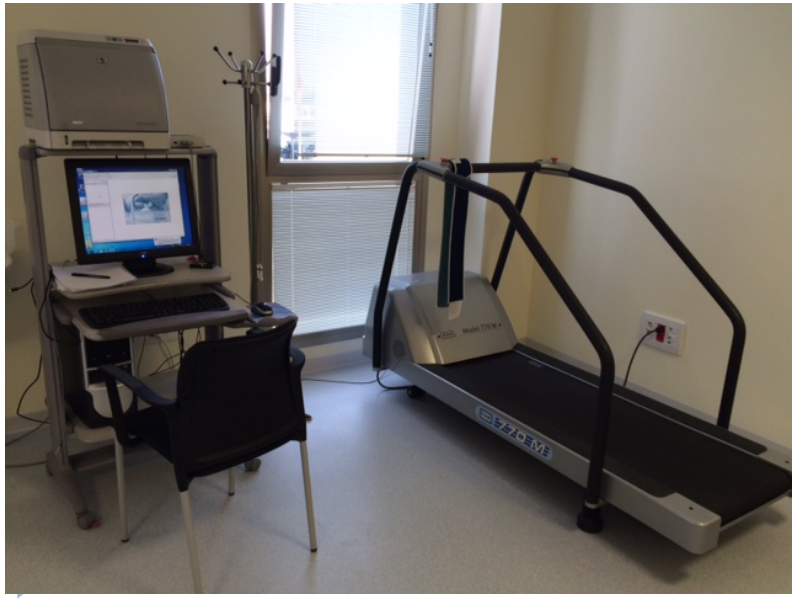
# AEROMEDICAL CENTER

- Aerospace Med
- Lab
  - Blood, urine (drugs)
- ENT
- Ophtalmology
  - Pentacam, OCT
  - CAD
- Cardiology
  - ECG, US
  - Stress ECG (+ gas consumption)
- Radiology
  - Conventional,
  - US, CT
- Mental health:
  - Psychiatrist
  - Psycologist









# AEROMEDICAL TRAINING

- Altitude Training
  - Hypoxia
  - Experience Of Change Of Pressure (RD)
- Disorientation Training
- High "G" Training
- Night Vision Training
- Extreme Temperatures
- UW Scape Training
- Human Performance:
  - Physical Training
  - Biomechanics

# AEROMEDICAL TRAINING

- REGULATIONS:
  - STANAG 3114 – AEROMEDICAL TRAINING OF FLIGHT PERSONNEL
  - STANAG 3827 – MINIMUM REQUIREMENTS FOR PHYSIOLOGICAL TRAINING OF AIRCREW IN HIGH "G" ENVIRONMENT
  - STANAG 7147 – AEROMEDICAL ASPECTS OF NIGHT VISION DEVICE (NVD) TRAINING
  - PLUS NATIONAL REGULATION

NATO OTAN

NATO STANDARDIZATION AGENCY
AGENCE OTAN DE NORMALISATION

NSA

***MILITARY COMMITTEE AIR STANDARDIZATION BOARD (MCASB)***

# THE TRAINERS

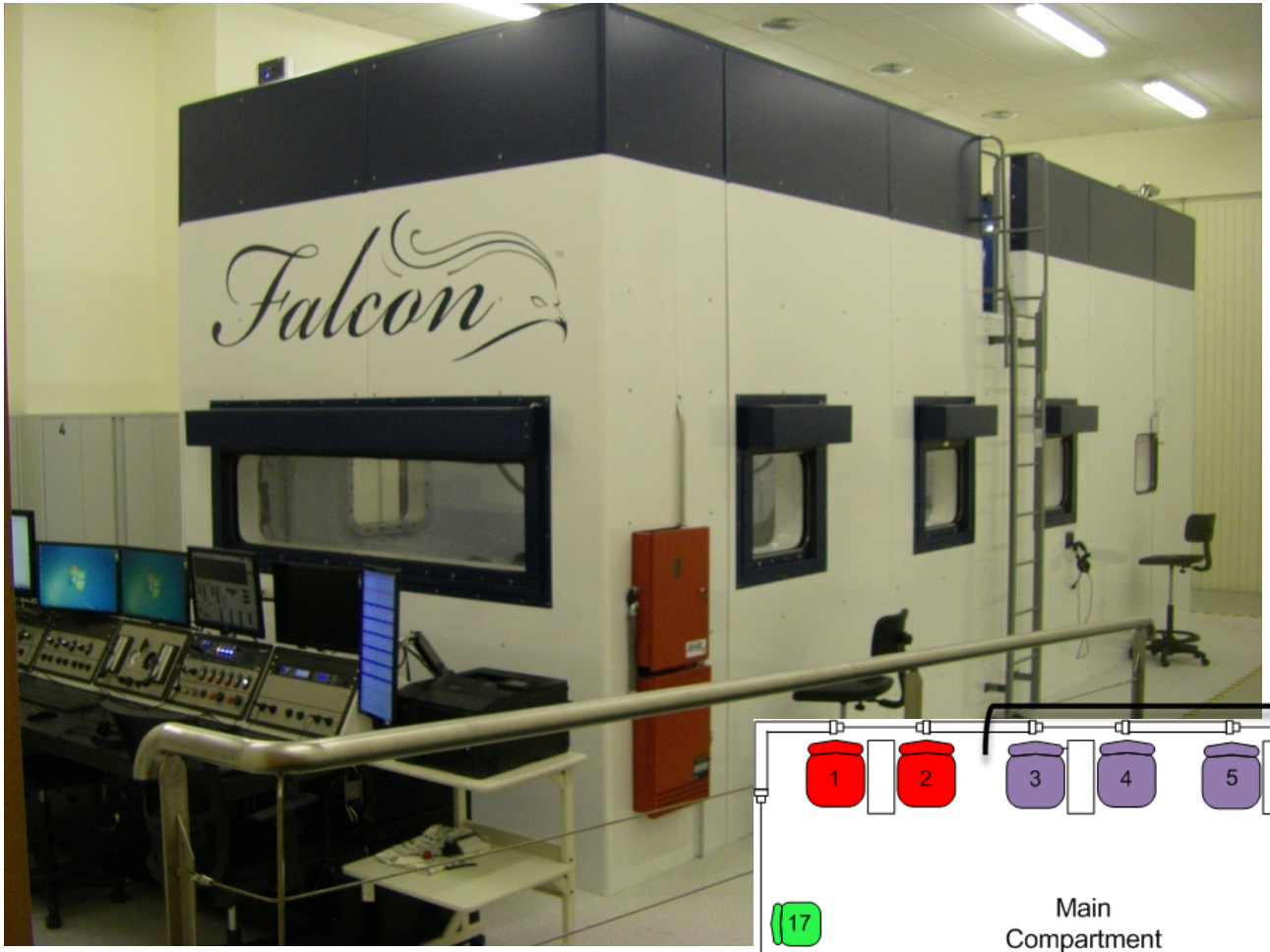
- HYPOBARIC CHAMBERS (2)
- NORMOBARIC HYPOXIA (2)
- DISORIENTATION TRAINERS (2)
- CENTRIFUGE
- NITE LAB + VTIGS
- CLIMATIC CHAMBER
- CABIN MOCK-UP
- UNDERWATER ESCAPE
- HUMAN PERFORMANCE
  - GYM
  - Biomechanics

# HYPOBARIC CHAMBERS

**Since 1980…**

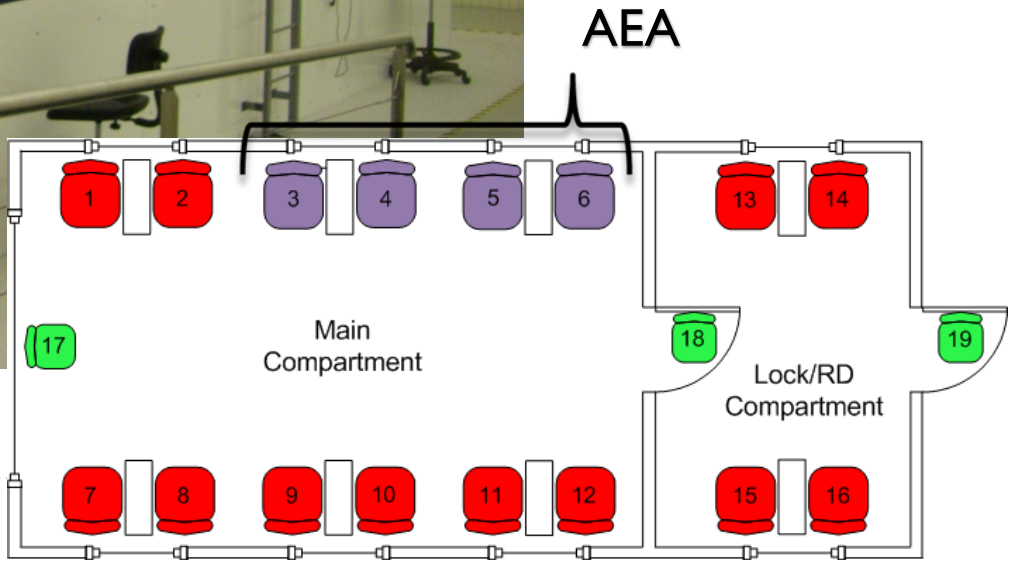
Mask off

# HYPOBARIC CHAMBERS




**Since 2014**

**Mask off & Mask on**

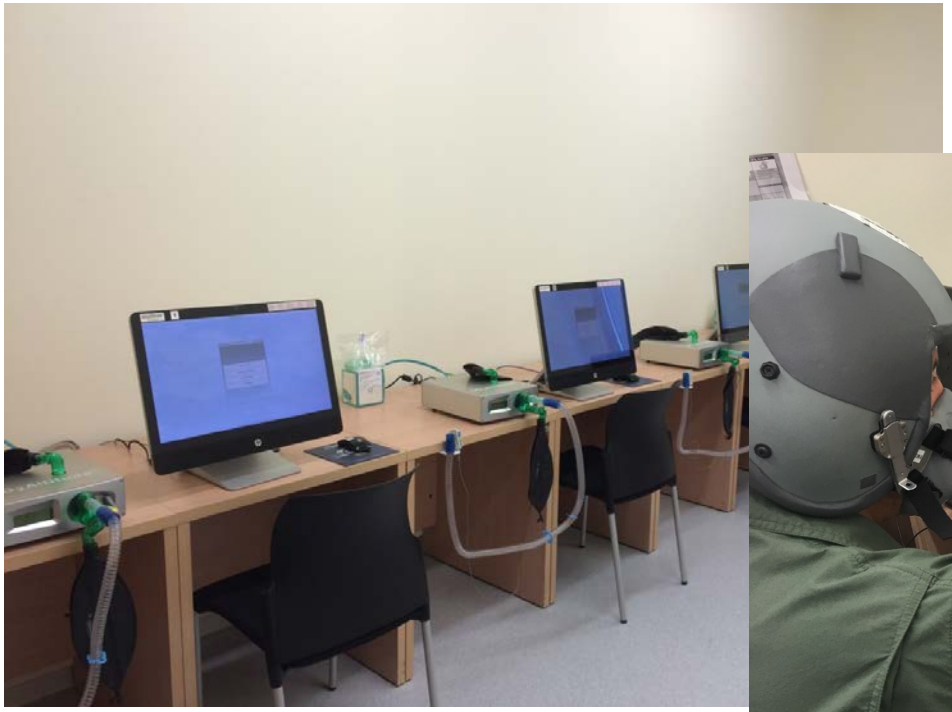



Falcon
HYPOBARIC CHAMBER


8
7
6

# NORMOBARIC HYPOXIA

- GO2Altitude



GO2Altitude®
HYPOXIC TRAINING of the 21st CENTURY

Mask on

# NORMOBARIC HYPOXIA

- iAltitude
  - Since 2017
  - Portable
  - No gas storage
  - %O2 or SpO2 constant


iAltitude

Mask on

# Normobaric Hypoxia

- Flight Trainer (C-101)


Mask on


A400M

# DISORIENTATION TRAINER (former)

# Disorientation trainers: Gyro IPT II


# Disorientation trainers: Airfox ASD

- Advanced Trainer
- NVG Compatible
- VTIGS link


AIRFOX


HE.25-5
78 24
HE.25-2
78 21

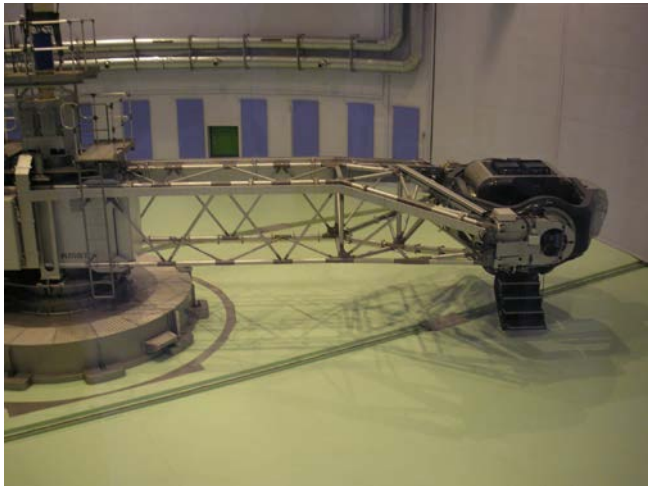

8 30
78 24


20


78 28

# CENTRIFUGE TRAINING

CML
1988→2007



2007 →….

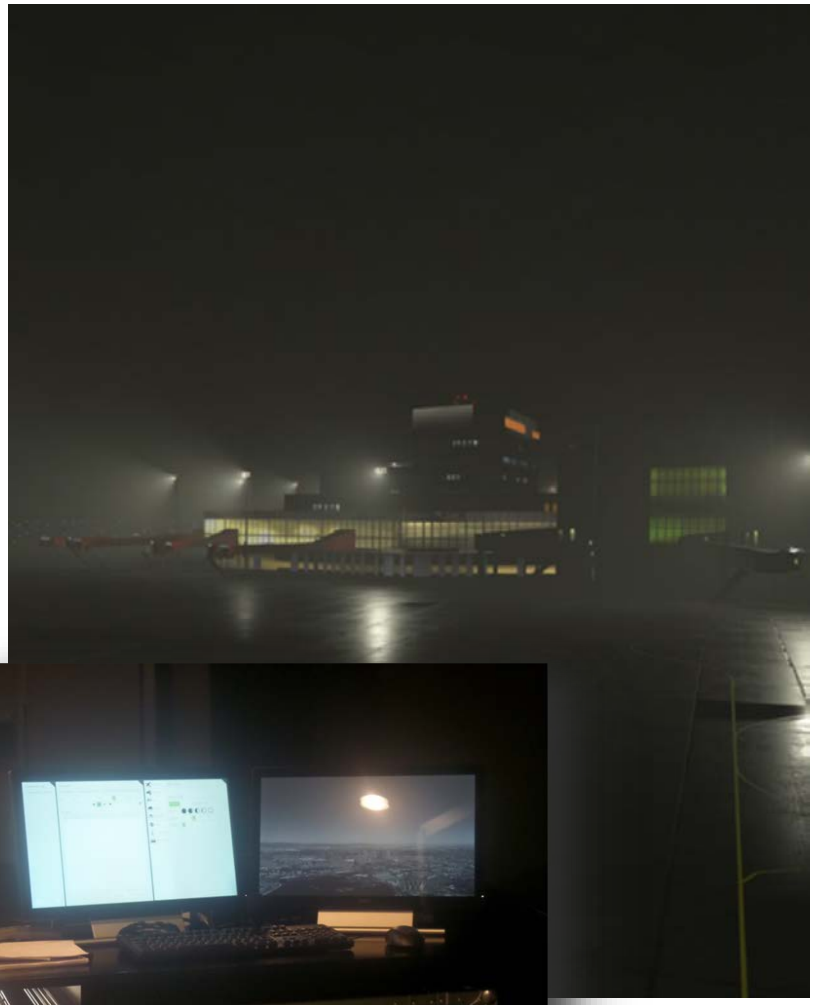

Basic and Advanced Training

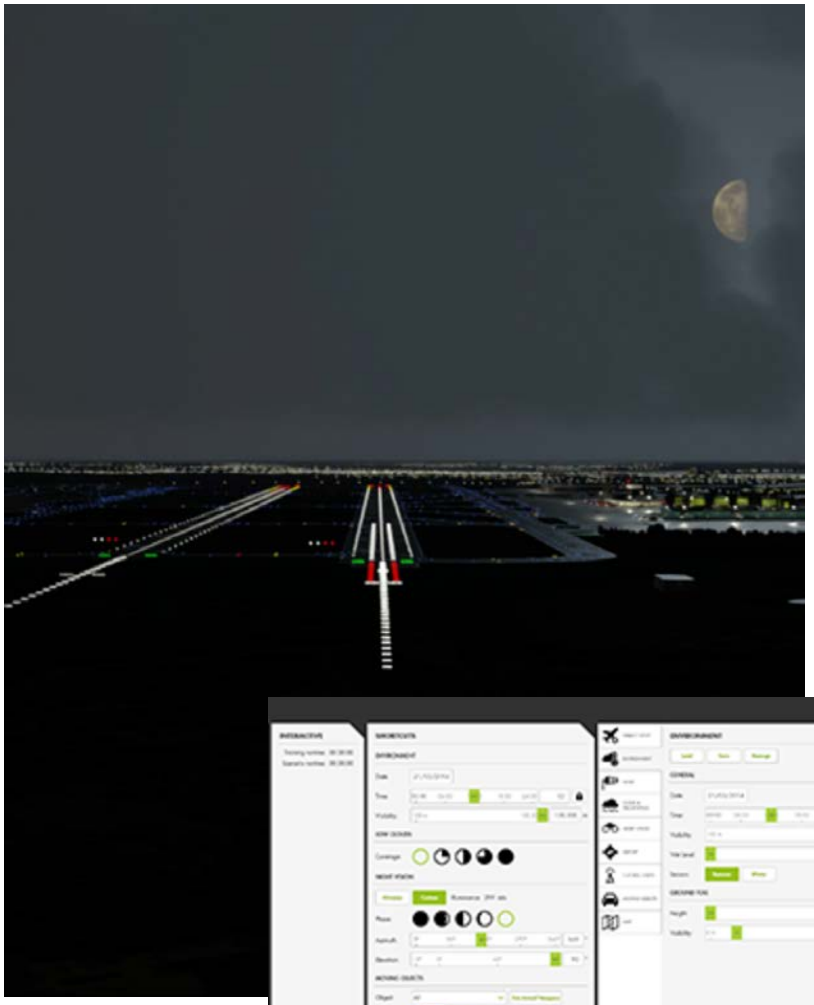
Author: María del Pilar Edilia Luis Guanche

# NVG TRAINER: Night Fox (2 Terrain Model Boards)

# NightFox


# VTIGS:
# Virtual Terrain Image Generation System






12-75

# CLIMATIC CHAMBER

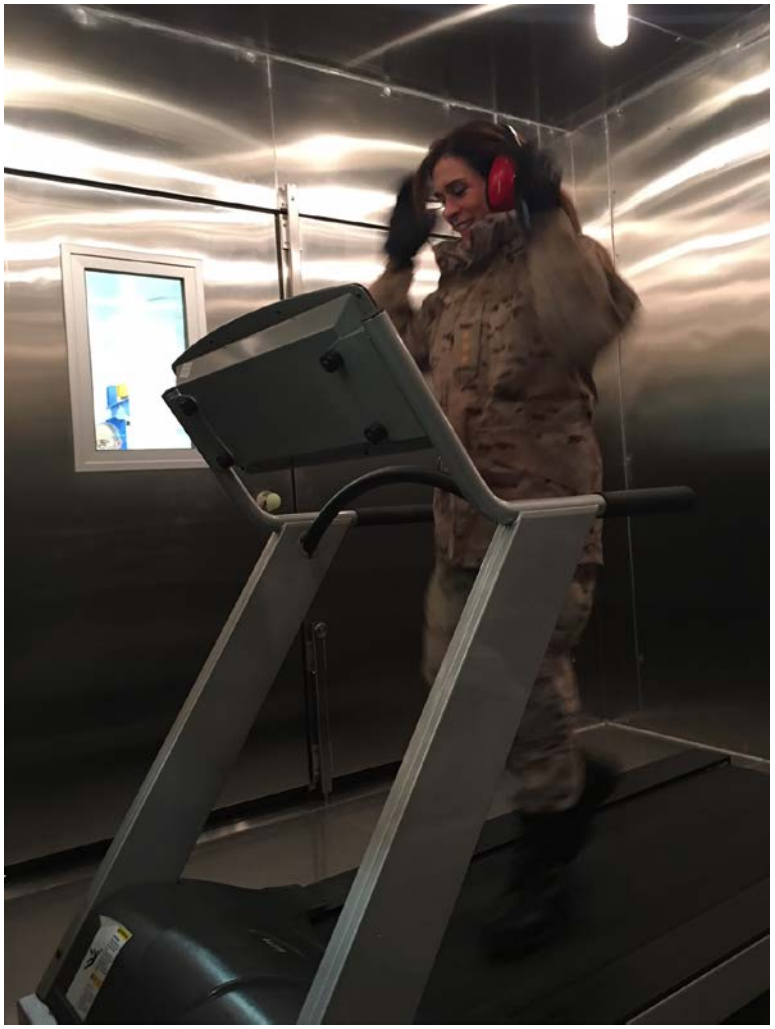

-65°C → 96°C

10°C per minute

Humidity: 20% - 85%

**Since NOV 2018**


MONARK



# CABIN MOCK-UP

# UNDERWATER ESCAPE TRAINER

**Since NOV 2018**

# AEROMEDICAL TRAINING

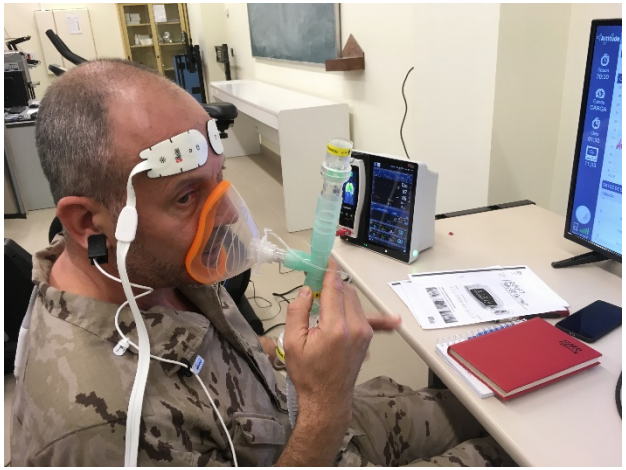
- 2018: 1559 trainees
  - **Altitude Training: 1146**
    - Hypobaric Hypoxia: 374 (49 "flights")
    - Normobaric Hypoxia: 333
    - HALO-HAHO: 141 (15 "flights")
    - RD: 298 (93 "flights")
  - **Disorientation Training: 306**
    - Basic: 73
    - Advanced: 233
  - **High "G" Training: 18**
  - **Night Vision Training: 55**
  - **Extreme Temperatures: 6**
  - **UW Escape Training: 28**

# HUMAN PERFORMANCE

- Gym
- "Nutrition and Physical Exercise Guide for Aircrew" (Dec 2018)

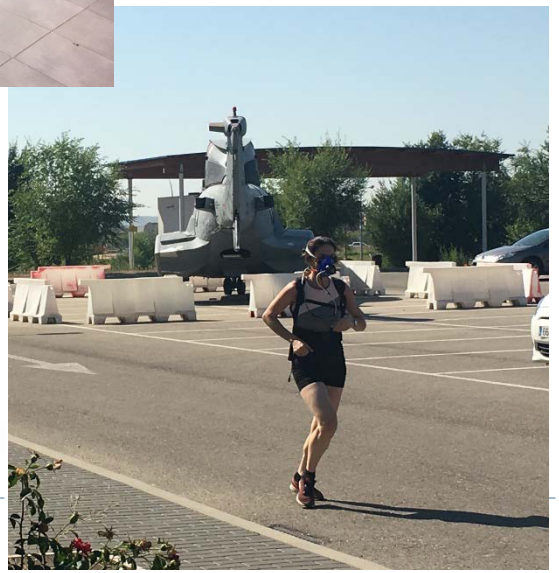
# HUMAN PERFORMANCE

- iAltitude "HIT":
  - "Hypoxia Interval Training": Exposure to repetitive mild hypoxia
  - Altitude training for atheletes
  - Objective:
    - Enhancing pilot performance



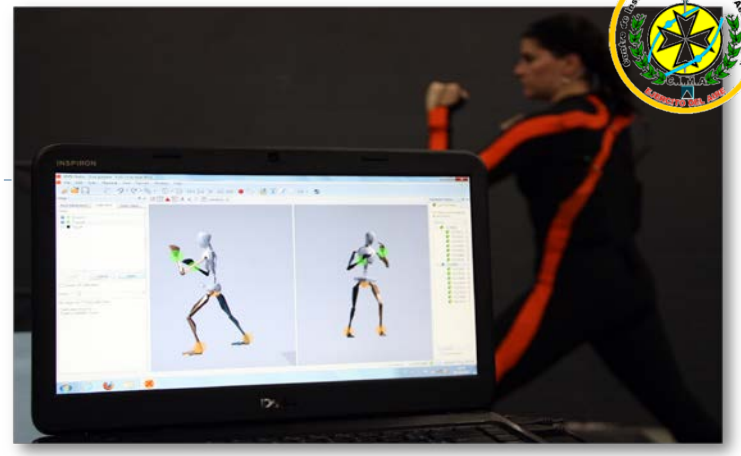
# HUMAN PERFORMANCE

- Cardiopulmonary exercise testing with gases consumption

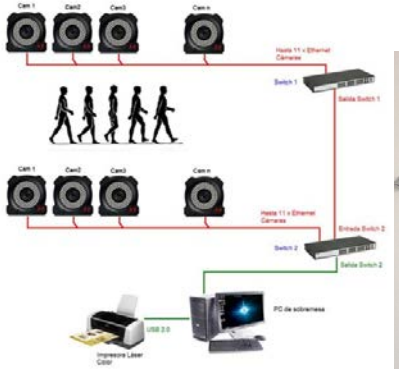


# BIOMECHANICS

- Bio-impedanciometry: In-Body
- Kinescan



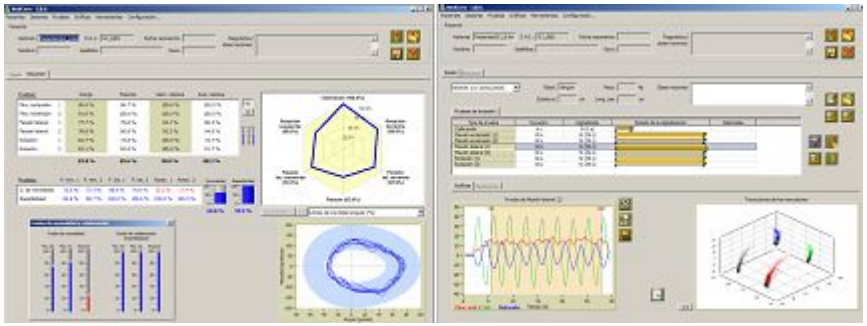
IBV INSTITUTO DE BIOMECÁNICA DE VALENCIA

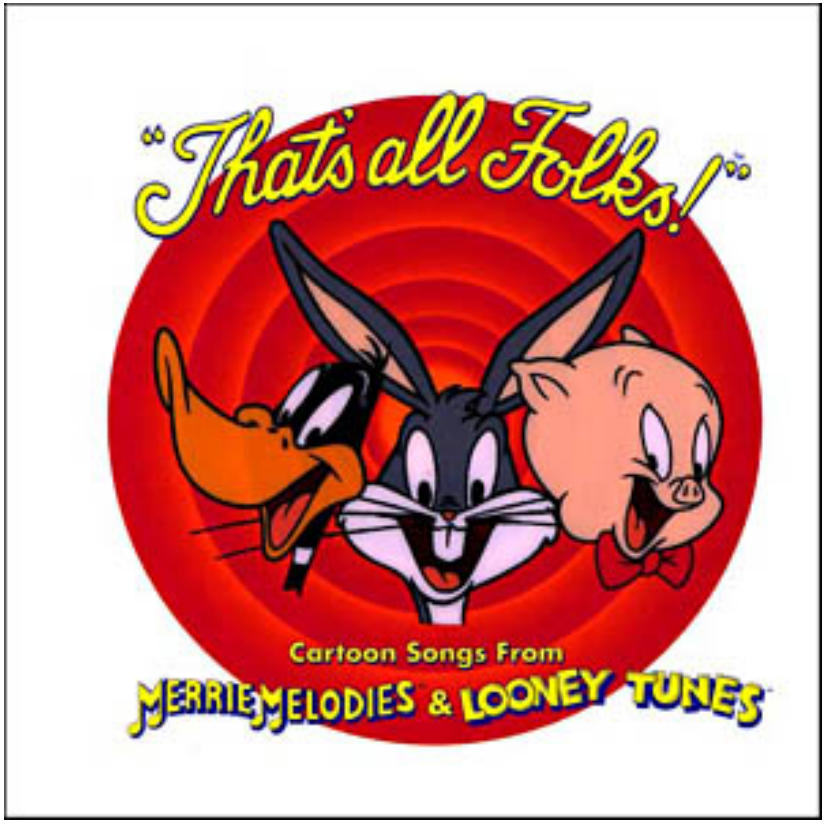


# BIOMECHANICS

- Ned Cervical
- Ned Lumbar
- Ned AMH
- Ned SVE

IBV INSTITUTO DE BIOMECÁNICA DE VALENCIA

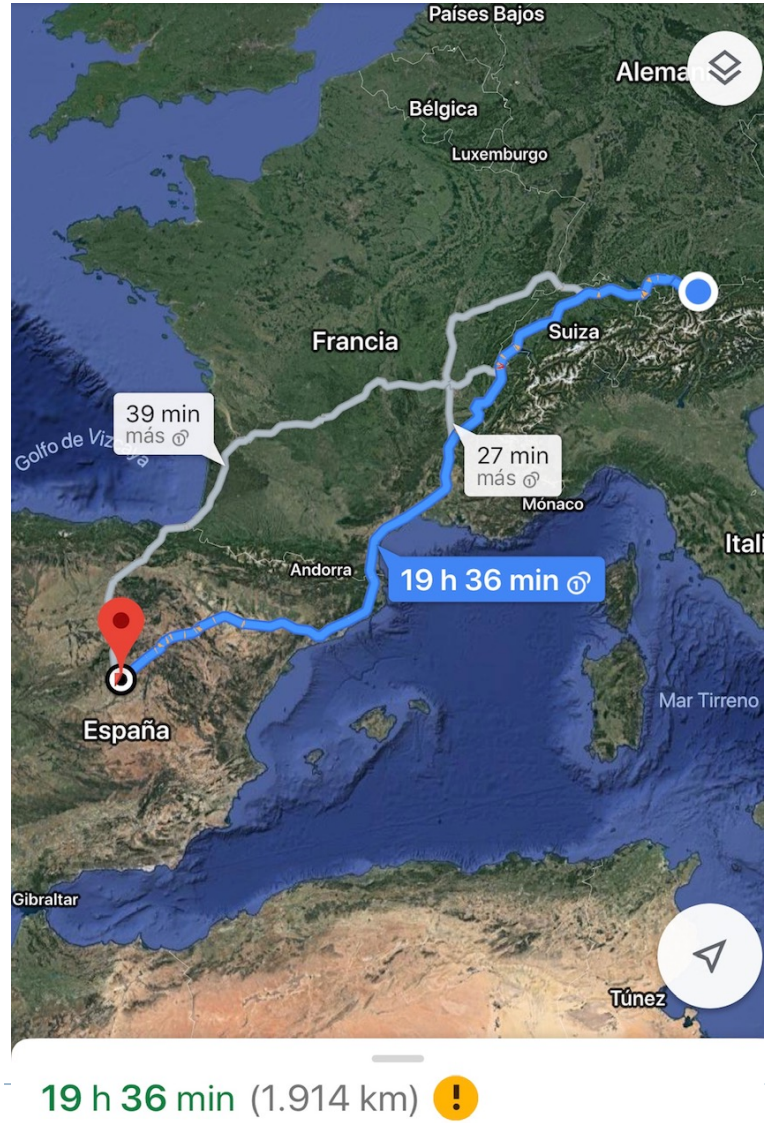




"That's all Folks!"
Cartoon Songs From
MERRIE MELODIES & LOONEY TUNES

# CIMA

- > 75 years of experience
- You´re welcome to come and visit us!

**Thank you for your attention!**

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http://www.ejercitodelaire.mde.es/EA/cima/