INTERNATIONAL RAILWAY SAFETY COUNCIL 2022

IRSC Spain

IRSC 2022

INTERNATIONAL RAILWAY SAFETY COUNCIL

SEVILLA, OCTOBER 16-21, 2022

ineco

EUROPEAN UNION AGENCY FOR RAILWAYS

AESF AGENCIA ESTATAL DE SEGURIDAD FERROVIARIA

adif

TATIANA RUEDA MARTÍNEZ

Technical Manager. INECO

IRSC Spain

IRSC 2022

INTERNATIONAL RAILWAY SAFETY COUNCIL

SEVILLA, OCTOBER 16-21, 2022

EUROPEAN UNION AGENCY FOR RAILWAYS

AESF AGENCIA ESTATAL DE SEGURIDAD FERROVIARIA

adif

ineco

HUMAN FIRST

When Human Factors and Safety Walk Together

IRSC Spain

IRSC 2022

INTERNATIONAL RAILWAY SAFETY COUNCIL

SEVILLA, OCTOBER 16-21, 2022

EUROPEAN UNION AGENCY FOR RAILWAYS

AESF AGENCIA ESTATAL DE SEGURIDAD FERROVIARIA

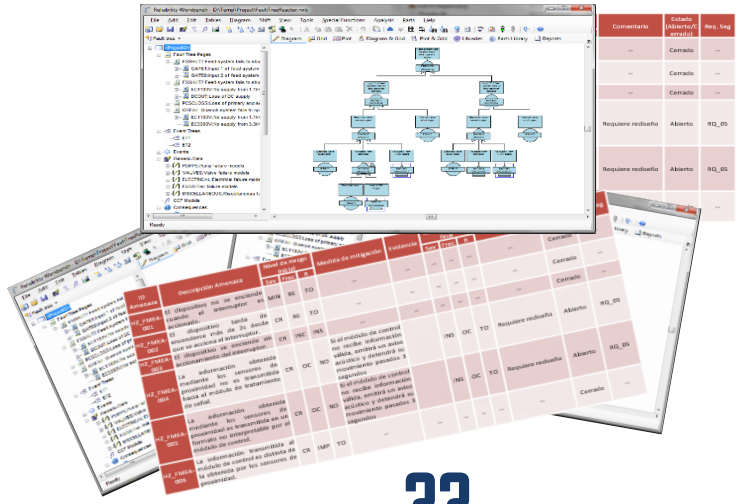
adif

ineco

INDEX

CHAPTER 1
Introduction

INTRODUCTION



INTRODUCTION

EUROPEAN STANDARD **EN 50126-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM October 2017

ICS 29.280; 45.020 Supersedes EN 50126-1:1999

English Version

Railway Applications - The Specification and Demonstration of Reliability, Availability, Maintainability and Safety (RAMS) - Part 1: Generic RAMS Process

Applications ferroviaires - Spécification et démonstration de la fiabilité, de la disponibilité, de la maintenabilité et de la sécurité (FDMS) - Partie 1: Processus FMDS générique

Bahnanwendungen - Spezifikation und Nachweis von Zuverlässigkeit, Verfügbarkeit, Instandhaltbarkeit und Sicherheit (RAMS) - Teil 1: Generischer RAMS Prozess

This European Standard was approved by CENELEC on 2017-07-03. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

5.6.4 Human factors

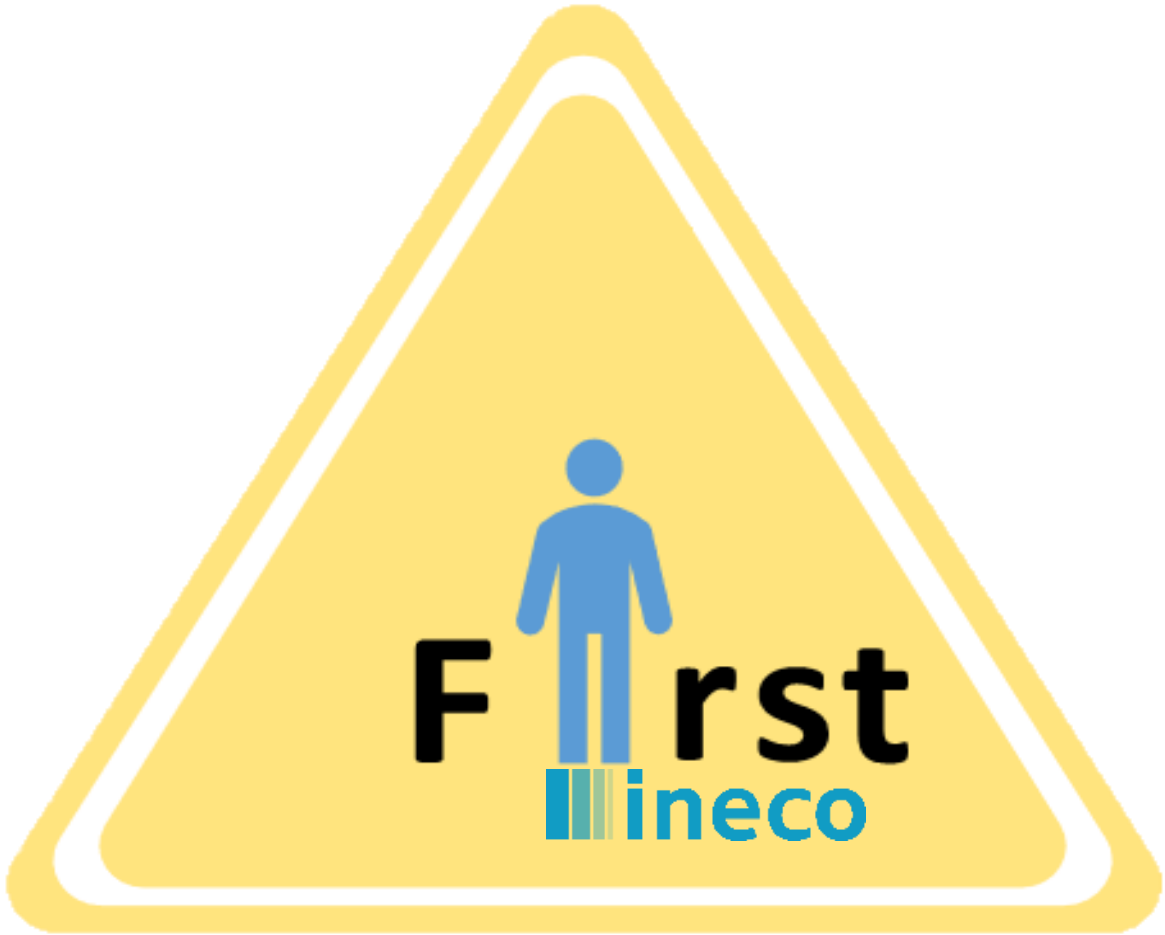
Human factors are a core aspect within an integrated RAMS management process. An analysis of human factors, with respect to their effect on system RAMS, is inherent within the "systems approach" applied by this standard.

NOTE Guidance given by standards is rare but can be found in further European Standards, such as guidance on ergonomic design in EN 614.

INTRODUCTION

INTRODUCTION

HUMAN First



INTRODUCTION

Railway Safety Area

Innovation Area

Aeronautical Safety Area

First benefits, before even starting!

- ✓ Finding a lot in common, knowledge and experience to share
- ✓ Transversal orientation of the project
- ✓ method valid for Railways and Aircraft operation, would be suitable for any other sector

INTRODUCTION

2016-2017

- ✓ Benchmarking of the Human Factors techniques
- ✓ Integration into risk analysis processes : practical and transversal
- ✓ First version of the Integration of the Human Factor into the Risk Assessments methodology

2018

- ✓ Improving methodology, changing the process, adapting and improving evaluation techniques
- ✓ University cooperation in the project

2019-2020

- ✓ Award for the best Ineco innovation project.
- ✓ CANSO Award
- ✓ Firts international Ineco's webinar

2021-2022

- ✓ Development of a tool for the application of the methodology.
- ✓ Human Performance Analysis using Data Science.
- ✓ Development of new products within the product line"Human First": InFact, BioMaF and GFA tool.

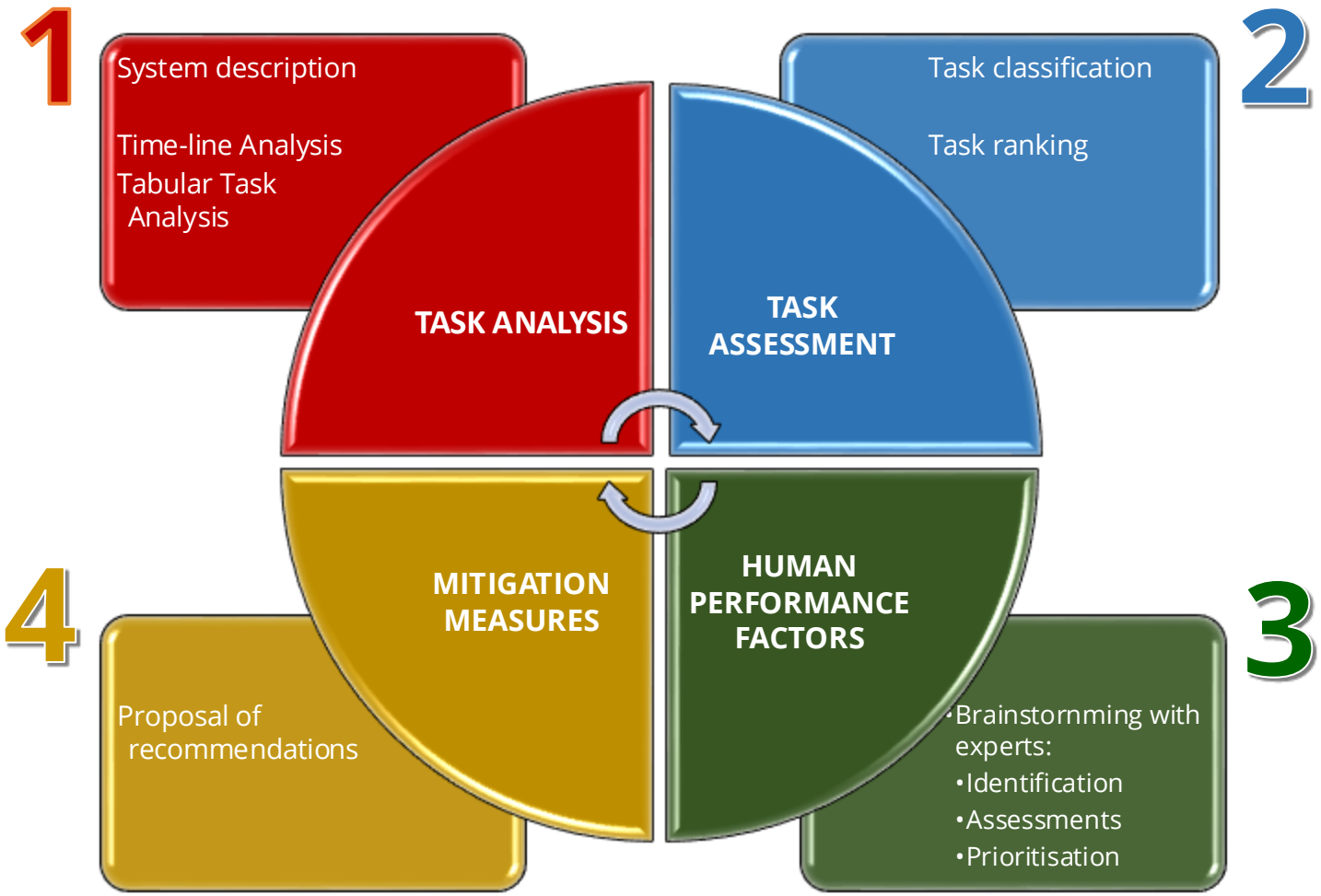
NEXT

- ✓ Consolidation of the Human First line product.
- ✓ Research on new trends (resilience engineering, Safety II).

CHAPTER 2

Integrating Human Factors in Risk Analysis

INTEGRATING HUMAN FACTORS IN RISK ANALYSIS

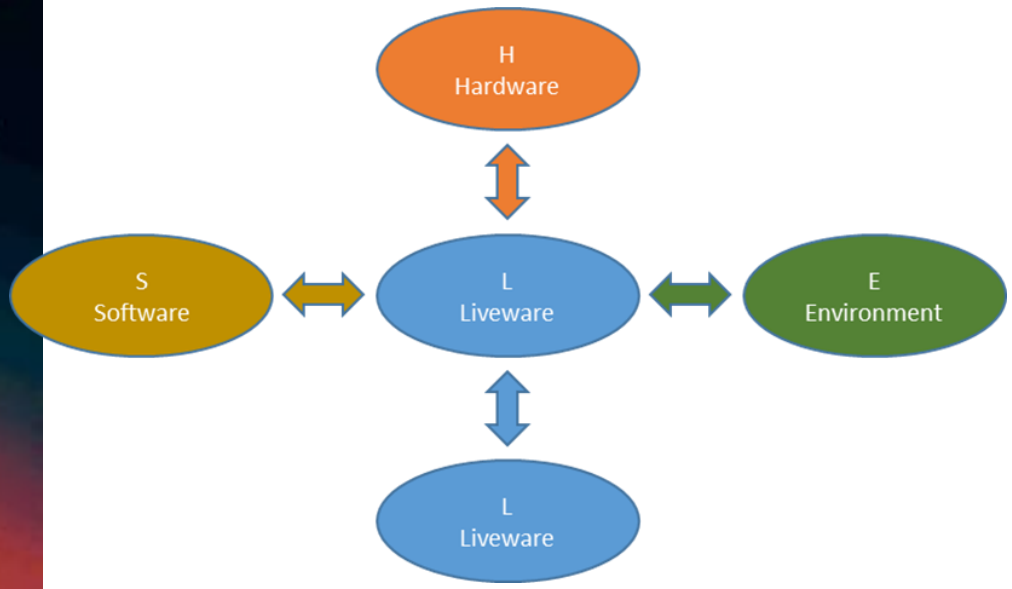


INTEGRATING HUMAN FACTORS IN RISK ANALYSIS

System Description 1

INTEGRATING HUMAN FACTORS IN RISK ANALYSIS

1 System Description



Shell Model

INTEGRATING HUMAN FACTORS IN RISK ANALYSIS

2 Task Assessment

INTEGRATING HUMAN FACTORS IN RISK ANALYSIS

3

Human Performance Factors

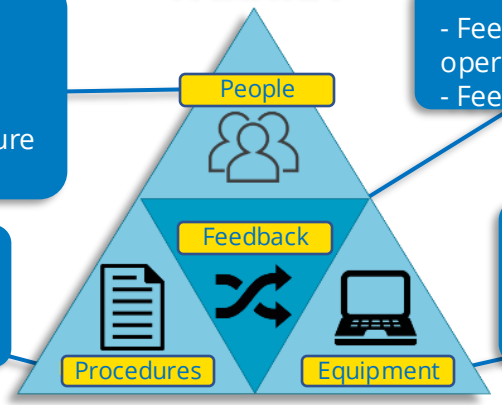
INTEGRATING HUMAN FACTORS IN RISK ANALYSIS

4 Mitigation Measures

People:
- Competencies
- Psychophysical condition
- Organizational culture
- Human team

Procedures:
- Procedures
- Standards

FARHRA



Feedback:
- Feedback during operation
- Feedback after operation

Equipment:
- Software
- Hardware
- Ergonomics

Feasible Action Rules for Human Reliability Assessment

INTEGRATING HUMAN FACTORS IN RISK ANALYSIS

- Systematic and practical methodology
- Work as done VS work as imagine
- Comprehensive and transversal
- Specific recommendations for the improvement of human performance

CANSO Award Winning Methodology

Ineco wins CANSO Global Safety Achievement Award 2019

https://www.atc-network.com/atc-news/canso-and-ineco/ineco-wins-canso-global-safety-achievement-award-2019

CHAPTER 3

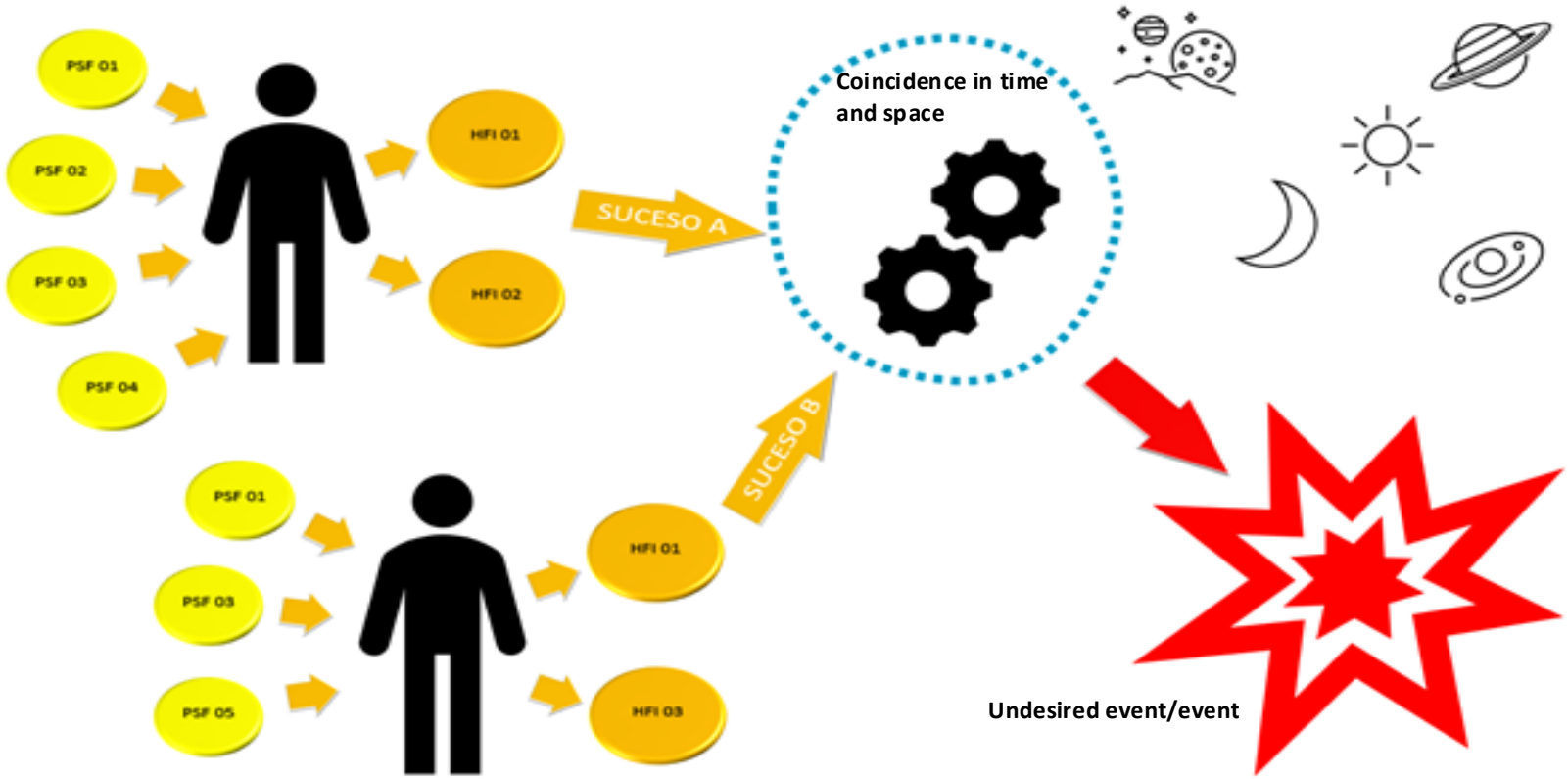
Next steps: Process automation and the use of the data science

NEXT STEPS: PROCESS AUTOMATION AND THE USE OF THE DATA SCIENCE

Our **iHISA** tool…

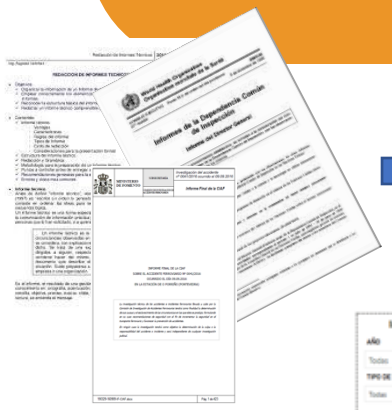
NEXT STEPS: PROCESS AUTOMATION AND THE USE OF THE DATA SCIENCE

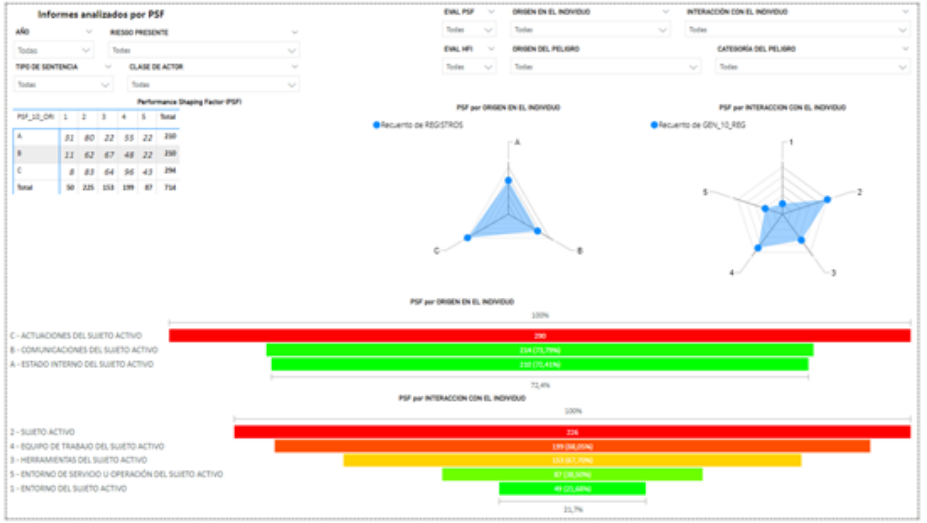
The **InFact** tool and data base

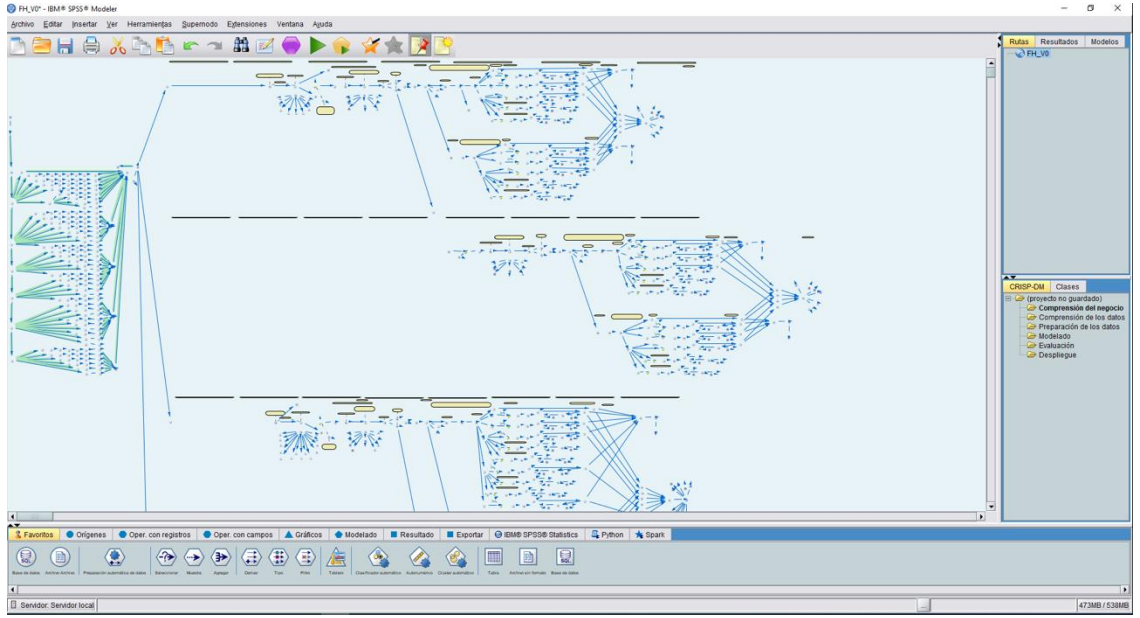


NEXT STEPS: PROCESS AUTOMATION AND THE USE OF THE DATA SCIENCE

The **InFact** tool and data base







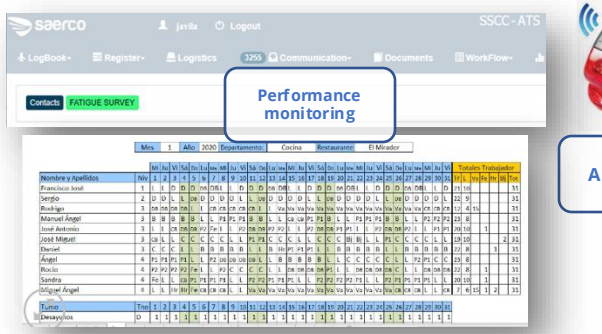
NEXT STEPS: PROCESS AUTOMATION AND THE USE OF THE DATA SCIENCE

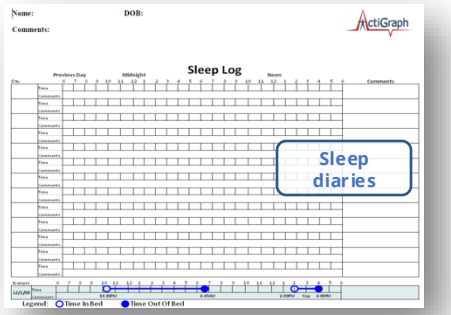
The **BioMaF** model

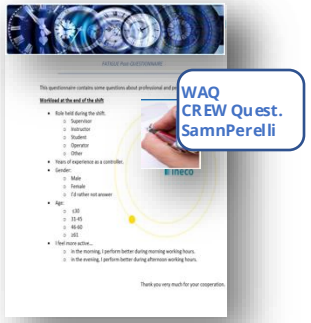
Objective

FATIGUE

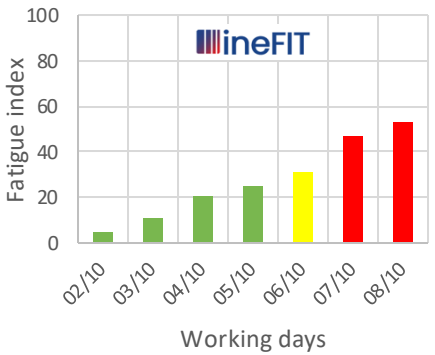
Subjective





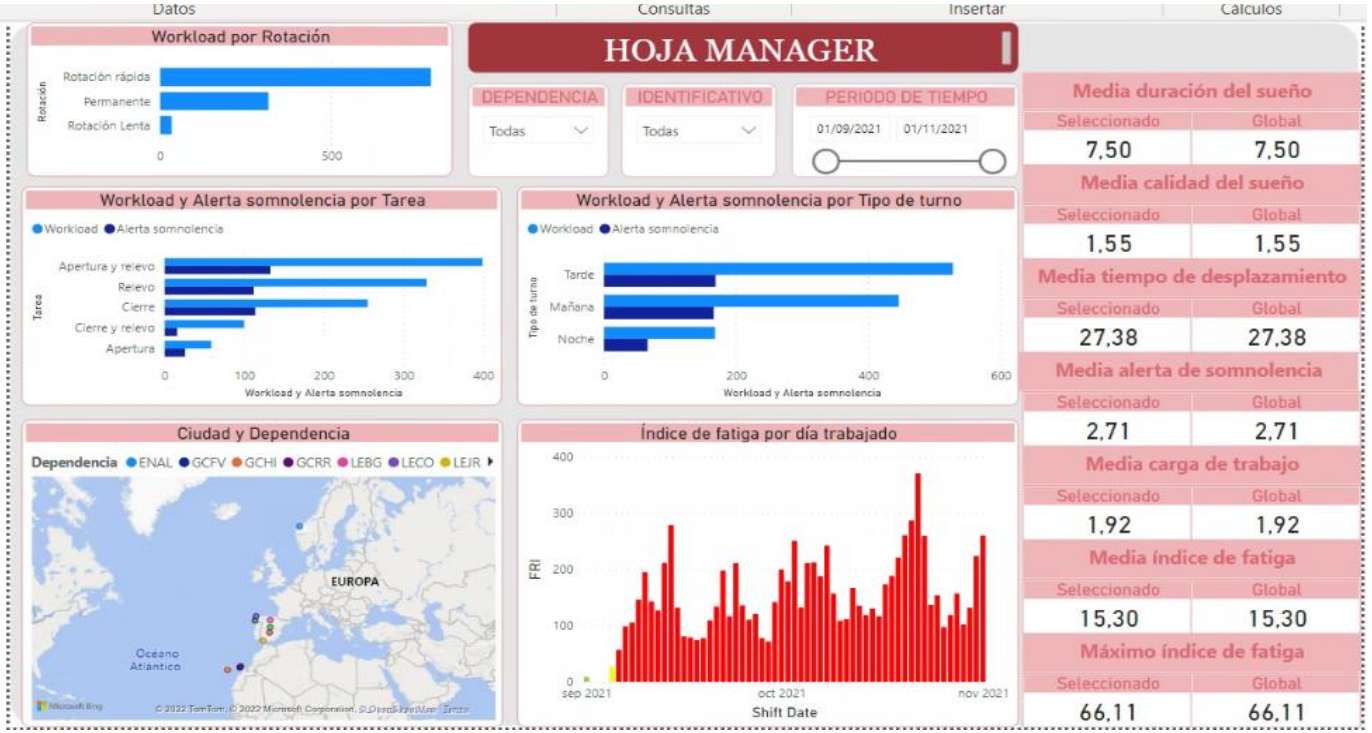


(Samn & Perelli, 1982; Samel et al, 1997)



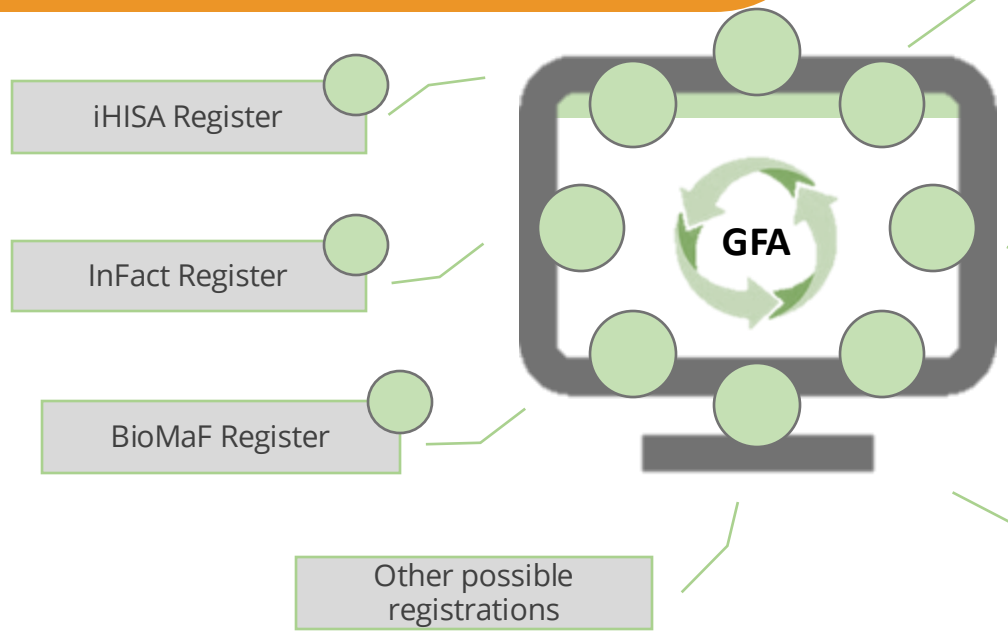
NEXT STEPS: PROCESS AUTOMATION AND THE USE OF THE DATA SCIENCE

The **BioMaF** model



NEXT STEPS: PROCESS AUTOMATION AND THE USE OF THE DATA SCIENCE

The **GFA** tool



Module 1. Evaluation and assessment panel

- Hazard identification and analysis, approach:
  - Reactive (inFact)
  - Proactive (iHISA)
- Exposure to operational fatigue (BioMaF)

(Hazard Log -> Human factor risk catalogue)

Module 2. Control panel

- Status of FFHH in the organisation
- Customised dashboard

Module 3. Monitoring Panel

- Follow-up of corrective and/or improvement actions.
- Monitoring of the system's indicators (KPIs)


INTERNATIONAL RAILWAY
SAFETY COUNCIL 2022
IRSC
Spain
COMPANY
LOGO
www.irsc2022.com
EUROPEAN
UNION
AGENCY
FOR RAILWAYS
AESF
AGENCIA ESTATAL
DE SEGURIDAD FERROVIARIA
adif