



SKILLING, UPSKILLING, RESKILLING IN THE FUTURE AIR TRANSPORT

D5.4 Online Training Modules

(August 2022)

(Partner Responsible: UNINETTUNO)

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SKILLING, UPSKILLING, RESKILLING
IN THE FUTURE AIR TRANSPORT

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List of Acronyms

Acronyms List	
ATCO	Air Traffic Control Officer
RPAS	Remotely Piloted Aircraft System
VET	Vocational Education and Training

Executive summary

This document presents the online structure of the Training Modules, designed and developed to offer VET training to ATCOs, Pilots, RPAS operators and airport operators on the Skill-UP Knowledge Centre Platform <https://skillup.uninettuno.it/en/skill-up.aspx>, implemented by Uninettuno on the basis of the psychopedagogic model of Maria Amata Garito.

The document presents the modules developed and described the main components of each module.

1 Project overview

The skill-UP project aims to define the knowledge, skills and competencies required by the current and future workforce of the air transport industry so that the educational and training programmes can be better aligned to the requirements of different occupational profiles. The project looks at four occupational profiles: air traffic controllers, pilots, airport operators and drone operators.

The project seeks to develop initial and continuing VET training programmes based on suitable and innovative teaching and training methodologies and study pathways to aid in the skilling, upskilling and reskilling of the future workforce of the air transport sector. The skills and knowledge required by the future workforce will change, mainly because of an increase in digitization, automation and advancement in artificial intelligence. New competencies will become essential, amongst which are: the ability to work with data to perform descriptive diagnostics, predictive and prescriptive tasks; increased ICT knowledge, including multimodal interaction with advanced HMIs, automation and robotics; and teamwork and communication skills, in scenarios where the team would be composed of both humans and advanced automation.

The skill-UP project aims to identify such new required competencies and address the training needs required to fill the current/future gaps in skills and knowledge.

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1.1 Purpose of the document and overview of WP5

The main purpose of this document is to present the online structure of the Training Modules that will be available and delivered through the skill-UP Knowledge Centre Platform.

The Training Modules provided on the platform will be in total seven, four of them are designed and developed to target the four types of professionals addressed by the project (air traffic controllers, pilots, airport operators and drone operators) and are called “transversal modules”:

1. Deepening Of Situational Awareness provided by ENAC - Ecole Nationale de l'Aviation Civile
2. Artificial Intelligence And Machine Learning For Aviation Applications provided by the University of Malta
3. “Houston, We Have A Problem!”: Problem Solving And Decision-Making provided by QSR
4. Strengthening Psychological Capital (Psycap) provided by Kastamonu University

Three “specific modules” are custom tailored to three of the professionals addressed by the project (air traffic controllers, airport operators and drone operators):

1. Change Management For Automation And Emerging Technologies In Airport Operations provided by Eskisehir Technical University and Kastamonu University,
2. How To Cope With Stress And Change To Fit In Future Roles provided by Deep Blue and
3. “Managing My Self: Towards A Safer Life” provided by QSR and Deep Blue.

A specific module dedicated to aircraft pilots, Learning And Practice Of Aircraft Procedures, will be provided directly by ENAC - Ecole Nationale de l'Aviation Civile, using a dedicated simulation environment.

The skill-UP Knowledge Centre Platform will present a general introduction to the training modules and the information for the enrolment and the participation.

1.2 Deliverable structure

This document consists in three sections:

- Section 1 – Project overview – gives a brief overview of the skill-UP Project, the purpose of the document and its structure;
- Section 2 – Online Transversal Modules – presents the online structure and the digital contents of the transversal Modules;
- Section 3 – Online Specific Modules - presents the online structure and the digital contents of the specific modules.

2 *Transversal Modules*

The transversal modules provided through the skill-UP Knowledge Centre are in total four and namely:

1. Deepening Of Situational Awareness provided by ENAC - Ecole Nationale de l'Aviation Civile
2. Artificial Intelligence and Machine Learning For Aviation Applications provided by the University of Malta
3. “Houston, We Have A Problem!”: Problem Solving And Decision-Making provided by QSR
4. Strengthening Psychological Capital (Psycap) provided by Kastamonu University

The modules Deepening Of Situational Awareness, Artificial Intelligence And Machine Learning For Aviation Applications and “Houston, We Have A Problem!” Problem Solving and Decision-Making provide only asynchronous training.

The module Strengthening Psychological Capital (Psycap) is a hybrid, therefore provided also synchronous training but the materials of the synchronous lessons are all available on the platform in the dedicated Module page.

In the next sub-section, the transversal modules are presented in detail.

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2.1 Deepening Of Situational Awareness, ENAC - Ecole Nationale de l'Aviation Civile

The Module aims at having a deep understanding of the concept of situational awareness and its relationship with other related concepts (like perception, understanding, decision making...).

The Module presents two online multiple-choice questionnaires.

In order to access both questionnaires, the trainee must click on “Lesson 1 Entry Questionnaires” from the Syllabus page that introduces the module.

Once the trainee has completed the first questionnaire, the trainee clicks the button “interactive exercises” to access the second questionnaire.

Both questionnaires are mandatory and must be filled in to access the entire training and the video lessons.

This is valid for all training modules.

The video lessons developed for this module advisable on the skill-UP Knowledge Center platform are five.

SKILL-UP FULL TRAINING PROGRAMME

Deepening of situational Awareness

Lesson n.1: Questionnaires Entry [Following >](#)

[Interactive exercises](#)

First pre assessment questionnaire to access to module M1T “Deepening of Situation Awareness” “Deepening of Situation Awareness”

Question n. 1 of 5
Which are examples of metacognition?

- F) Knowing how to best learn a poem
- D) Knowing how to ride a bike
- B) Knowing what we ate yesterday evening
- E) Knowing how to compute a mean
- C) Knowing the year of the French revolution
- A) Knowing one's first name
- G) Knowing which mental calculations are the most difficult

[Reset delle risposte](#) [Conferma](#)

Figure 1 - online multiple-choice entry questionnaire

SKILL-UP FULL TRAINING PROGRAMME

Deepening of situational Awareness

[Previous](#) Lesson n.2: FUNDAMENTALS OF SITUATIONAL AWARENESS [Following >](#)

Professor: Prof. Nadine Matton Video Professor:

[Videolesson](#)

Lesson 2: Subjects

- Situation awareness definition and theories
- Principles of situation awareness measurement

Didactic Materials related to this Lesson

- Video lessons
- Slides
- Books and articles
- Exercises

Professor

- Syllabus
- Concept map
- Add New Didactic Material
- Didactic plan
- Exam Guide
- Agenda
- Evaluations and statistics

Learning Environment

- Videolessons
- Slides
- Books and Articles
- Multimedia
- Bibliography
- Siteography
- Laboratory
- Interactive exercises
- Exercises
- Forum
- Access the interactive class
- Past interactive classes
- Done Virtual Classrooms

Programme Schedule

Figure 2 – Example of video lesson

As showed in figure 2, each video lesson is indexed; this allows the trainee to be pointed to a specific topic along the video lesson.

Each video lesson of this module is made of the following materials:

- the slides presented in the video lesson visible directly on the platform and downloadable in pdf version (figure 3)
- the reading and resources labelled “Books and articles” (figure 4)
- the exercises, that can be downloaded and uploaded by the trainee (figures 5 and 6).

SKILL-UP FULL TRAINING PROGRAMME



Figure 3 - slide visible on the platform

SKILL-UP FULL TRAINING PROGRAMME

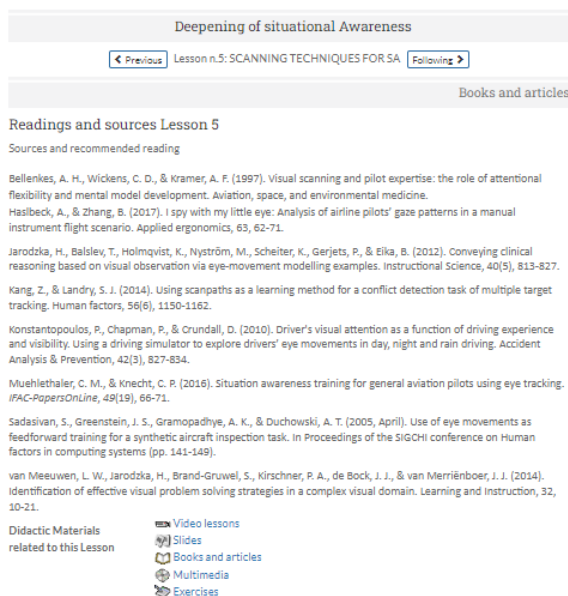


Figure 4 - readings and resources

SKILL-UP FULL TRAINING PROGRAMME

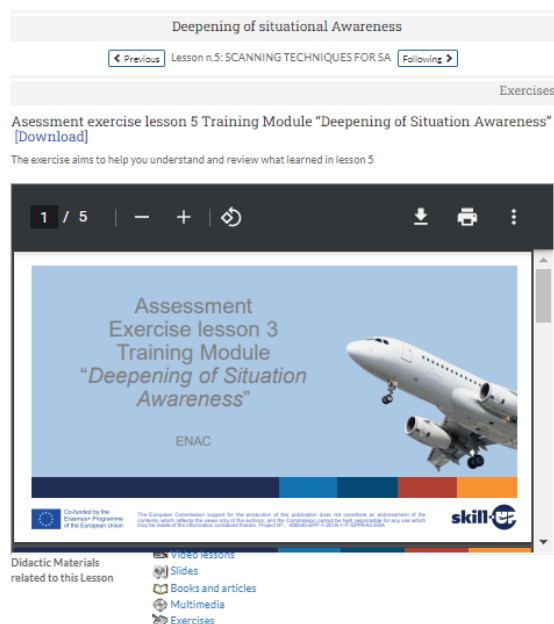


Figure 5 - exercise downloadable

skill-UP FULL TRAINING PROGRAMME

The screenshot shows the 'Exercises' section of the Skill-UP platform. At the top, there are filters: 'Filter by academic year:' with a dropdown menu set to 'Select one or more years', and 'Filter by type of exercise:' with a dropdown menu set to 'All'. Below the filters, a list of lessons is displayed: 'Lesson n.1: Questionnaires Entry', 'Lesson n.2: FUNDAMENTALS OF SITUATION AWARENESS', and '- Assessment Exercise lesson 1 (A.Y. 2022-2023) (Teacher)'. A blue button with a document icon and the text 'Go to the lesson's materials' is located to the right of the lesson list. The 'Assessment Exercise lesson 1' entry has a small circular icon with a minus sign next to it, which is circled in blue, indicating the upload button.

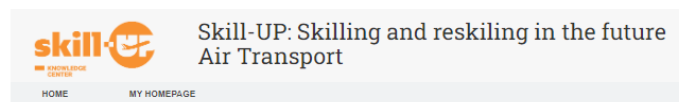
Figure 6 – exercise's uploading button

Each video lesson has some associated exercises:

- Lesson 2: Assessment Exercise, Concept MAP exercise, One Minute Essay exercise, Drag and Drop exercise, Glossary.
- Lesson 3: Assessment Exercise
- Lesson 4: Assessment Exercise
- Lesson 5: Assessment Exercise and One Sentence Summary exercise

All the exercise can be downloaded and uploaded as showed in Figure 6. Lesson 5 of this module presents also multimedia material, visible directly on the platform.

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The screenshot shows the 'Multimedia' section of the Skill-UP platform. On the left, there is a sidebar with navigation links: 'Professor' (with sub-links: Syllabus, Concept map, Add New Didactic Material, Didactic plan, Exam Guide, Agenda, Evaluations and statistics), 'Learning Environment' (with sub-links: Videolections, Slides, Books and Articles, Multimedia, Bibliography, Siteography, Laboratory, Interactive exercises, Exercises, Forum, Access the Interactive class, Past Interactive classes, Done Virtual Classrooms), and 'Programme Schedule'. The main content area is titled 'SKILL-UP FULL TRAINING PROGRAMME' and 'Deepening of situational Awareness'. It shows a navigation bar with 'Previous' and 'Following' buttons, and a 'Multimedia' tab. Below the tab, there is a section titled '"Commentary drive" exercise' with a 'Video example' link. A video player is displayed, showing a presentation titled 'Presentation 2 02 v4 Commentary Drive'. Below the video player, there is a section titled 'Didactic Materials related to this Lesson' with links to 'Videolections', 'Slides', 'Books and articles', 'Multimedia', and 'Exercises'.

Figure 7 - video available under Multimedia section

The module presents four final tests available in the section “Exercises”, downloadable and unloadable for submission to the trainer:

- one multiple choice final test,
- two multiple-choice online questionnaires
- one Case Study.

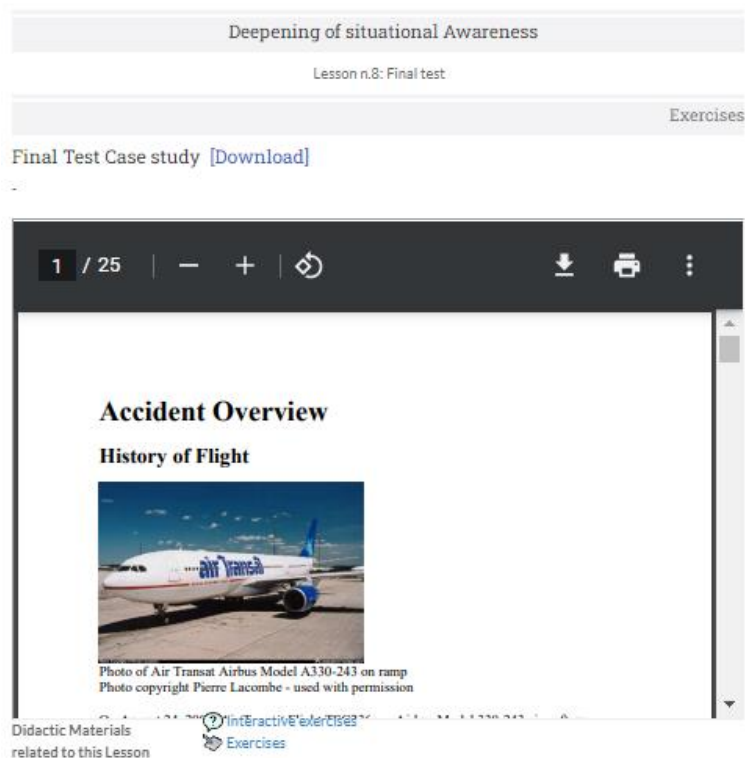


Figure 8 - final test downloadable

2.2 Artificial intelligence and machine learning for aviation applications

This module gives an introduction to AI and ML and is intended for aviation professionals (including pilots, air traffic controllers, drone operators, and airport operators) of all levels who would like to get a basic understanding of AI/ML technology and who would like to explore some of the challenges associated with AI/ML and its application to aviation.

The course is completely delivered in an asynchronous manner using video lessons and contains various exercises to assess trainees learning throughout the course.

This Module includes two online multiple-choice entry questionnaires, accessible from “Lesson n.1: Questionnaires Entry” and mandatory entry point to the training.

Each lesson includes slides presented in the video lesson visible directly on the platform and downloadable in pdf version, Books and Articles and Multimedia Materials.

The Exercises downloadable and uploadable are related to lessons 3 and 4 and properly Drag and Drop. Concept map exercise, Glossary are saved under “exercises” section, because are common didactic materials.

The other assessment exercises for lesson 1, 4 and 5 are provided using the “Forum”.

The Trainer launches the exercise on the forum clicking on “New Topic” (figure 9) and writing the question (figure 10) specifying the subject, the priority and if necessary attaching materials that the trainee has to download (figure 11) and finally clicking on “Post New Topic”.

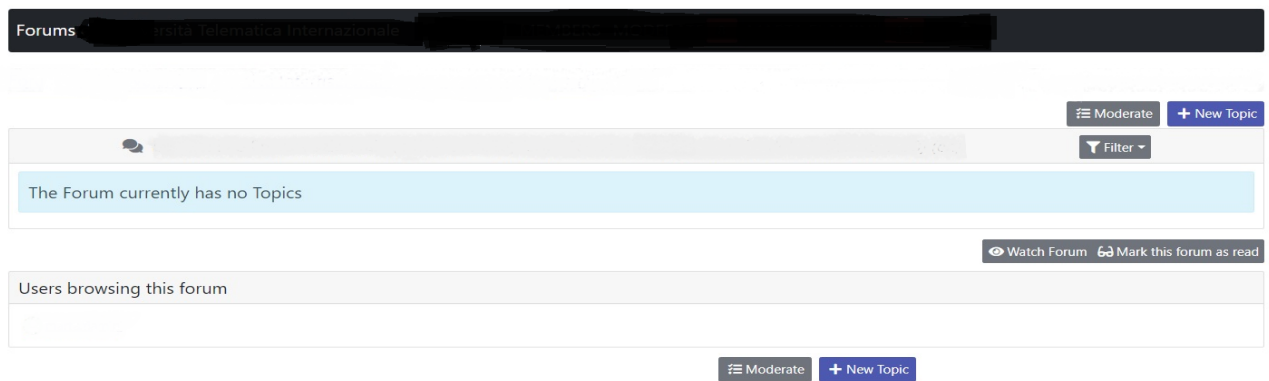


Figure 9 - Forum page

Post New Topic

Subject

Description

Priority
Normal

Tags:

Message:

Options:

☐ Add Poll?

☒ Is this topic persistent? (Persistent topics are not pruned)

Preview Post New Topic Cancel

Figure 10 - box for the launch of the topic into the Forum

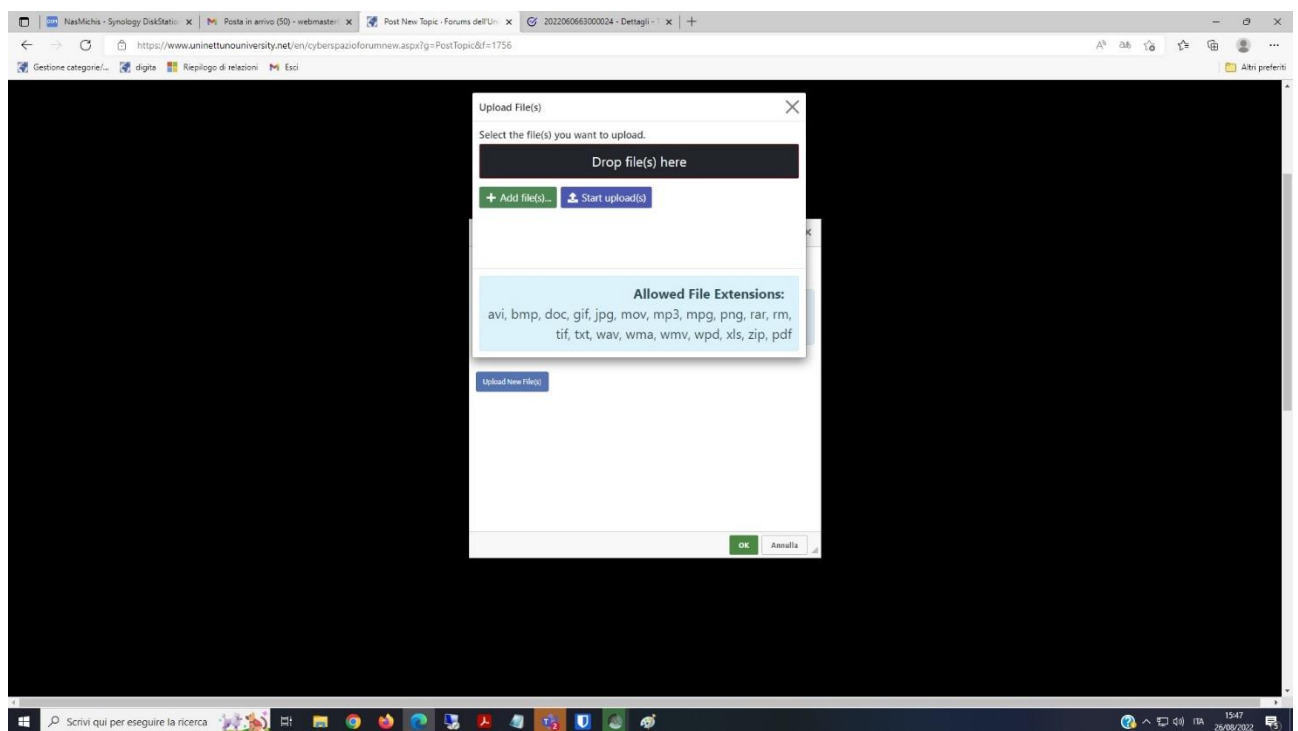


Figure 11 - upload file(s)

The system allows to attach documents with the following extensions: avi, bmp, doc, gif, mov, mp3, mpg, png, rar, rm, tif, txt, wav, wmv, wpd, xls,zip and pdg.

In addition, this module presents four final tests saved in the section “Exercises”, downloadable and uplodable for the submission to the trainer:

- one multiple-choice final test,
- two multiple-choice online questionnaires
- one Case Study.

2.3 “Houston, We Have A Problem!”: Problem Solving And Decision-Making

This module aims at potentiating the problem-solving and decision-making skills of the trainees in order to solve problems more efficiently and make better decisions in professional and personal life.

The module presents 4 video lessons, which are complemented by Work Books.

The pre assessment questionnaires are two: the first one saved in “exercise” area, downloadable and uplodable for the submission to the trainer and the second one interactive online with multiple-choice.

The exercises linked to lessons 2 and 4 titled “One minute essay” are downloadable and uplodable.

Also for this Module Concept map exercise, Glossary are saved under “exercises” section, because are common didactic materials.

As the previous two transversal modules, the final assessment presents four final tests: one multiple-choice final test, two multiple-choice online questionnaires and one Case Study, saved in the section “Exercises”, downloadable and uplodable for the submission to the trainer.

2.4 Strengthening Psychological Capital (Psycap)

This is the last Transversal Module and is structured for the participants (including pilots, air traffic controllers, drone operators, and airport operators) to have a deep understanding of how to strengthen their psychological capital. In terms of the reskilling and upskilling process, participants able to gain "self-management and continuous development" competence identified as non-technical/behavioral skills needed.

The course is provided in hybrid version: lessons 2, 3, 4, 5, 7 and 8 are delivered in asynchronous, therefore on the platform is possible to see the video lessons and download their presentation; lessons 6, 9 and 10 are synchronous, but their presentations are visible and downloadable on the platform and if the trainer considering useful also all exercises and didactic materials linked to the synchronous lesson can be available for the trainees on the platform. Moreover, in fact for lesson 10 it is possible to see the References saved on “Books and Articles” section and download and upload the exercises “One Sentence Summary” and “One Question Quiz”.

For each video lesson are present the references and three exercises downloadable and uplodable: “One Sentence Summary exercise”, “One Question Quiz exercise” and “Drag and Drop exercise”. All the material is visible in the video lesson page as well as in “Exercises” and “Books and Articles” Sections.

The Glossary is saved only in “exercise” section because is a didactic material common to the entire module.

Also for this Module the pre assessment questionnaires are two: the first one saved in “exercise” area, downloadable and uplodable for the submission to the trainer and the second one interactive online with multiple-choice.

Finally, for this module the final assessment two multiple-choice online questionnaires are present.

3 *Specific Modules*

The Specific modules provided through the Skill-UP Knowledge Centre are the following:

- Change Management For Automation And Emerging Technologies In Airport Operations provided by ESTU and KU,
- How To Cope With Stress And Change To Fit In Future Roles provided by DBL
- “Managing My Self: Towards A Safer Life” provided by QSR.

The specific module Learning And Practice Of Aircraft Procedures, is provided directly by ENAC in hybrid version, in presence and via dedicated “pilot” platform managed by ENAC.

On the skill-UP Knowledge Centre the trainees can find the general presentation of the training module and the information for the enrolment and the training participation.

In the next subsection the specific modules are presented in details.

3.1 Change Management For Automation And Emerging Technologies In Airport Operations

This module provides learning opportunity for trainees to understand and explain change management in airport operations considering future technological challenges and needs. The trainees will be able to learn and discuss change management aspects in airport operations.

This module is provided in a hybrid version: lessons 2, 5, 6, 8 and 9 are asynchronous the others are synchronous, but, as for the transversal module Strengthening Psychological Capital (Psycap), on Skill-UP Knowledge Centre platform is possible to see and download the presentations of the lessons realised in presence.

Also for this Module the pre assessment questionnaires are two: the first one saved in “exercise” area, downloadable and uploadable for the submission to the trainer and the second one interactive online with multiple-choice.

For each video lesson are present two exercises the first one is “One Minute Essay exercise” and is downloadable and uploadable and available not only on the dedicated video lesson’s page but also in “Exercises” Section. The second one titled “One Question Quiz exercise” is an interactive exercise to make online, available always in the dedicated video lesson’s page but also in the “interactive exercise” section.

The Glossary is saved only in “exercise” section because is a didactic material common to the entire module.

Regarding the final assessment, three final tests are provided: one multiple-choice final test, one multiple-choice online questionnaires and one final questionnaire, saved in the section “Exercises”, downloadable and uploadable for the submission to the trainer.

3.2 How To Cope With Stress And Change To Fit In Future Roles

This specific training module aims at enabling the trainees to be aware on how they deal with change and stress when the environment requires fitting in new roles.

The participants will learn about the stress and change mechanisms and will receive tools for self-empowering themselves.

Also this module is in hybrid form: lessons 2,4 and 9 are asynchronous lessons 3, 5, 6, 7 and 9 are synchronous, but as for the previous specific module and the transversal module on Skill-UP Knowledge Centre platform is possible to see and download the presentations of the lessons realised in presence.

For the following lessons the following exercises are provided, all downloadable and uplodable for the submission to the trainer:

- Lesson 2: One sentence Summary exercise, Concept Maps exercise, Drag and Drop exercise and Glossary;
- Lesson 9: One sentence Summary exercise;
- Lesson 10: Mis-conception Check exercise.

All the exercises are available on the dedicated lesson's page, but also in "Exercises" Section.

As for the previous specific module, the pre assessment questionnaires are two: the first one saved in "exercise" area, downloadable and updatable for the submission to the trainer and the second one interactive online with multiple-choice.

Finally, about the final assessment, also for this module three final tests are provided: one multiple-choice final test, one multiple-choice online questionnaires and one final questionnaire, saved in the section "Exercises", downloadable and updatable for the submission to the trainer.

3.3 "Managing My Self: Towards A Safer Life"

The last specific module available on Skill-UP Knowledge Centre platform aims at developing the RPAS trainees' safety-based judgement skill as a whole, with a particular focus on workload management and stress management.

The module is completely delivered in an asynchronous manner using video lessons. The total of video lessons is three, which are complemented by Works Books available and downloadable both on the video lesson's page as well as on "Books and Articles" section.

The pre assessment questionnaires are two: the first one saved in "exercise" area, downloadable and updatable for the submission to the trainer and the second one interactive online with multiple-choice.

All the following exercises linked to the following lessons are downloadable and updatable for the submission to the trainer:

- Lesson 2: Concept Map exercise, Glossary exercise, Mis-Conception Check;
- Lesson 3: One Sentence Summary exercise;
- Lesson 4: One Minute Essay exercise.

Lesson 4 provides also a One Question Quiz, an interactive exercise to make online, available always in the dedicated video lesson's page but also in the "interactive exercise" section.

The module presents four final tests: one multiple-choice final test, two multiple-choice online questionnaires and one Case Study, saved in the section "Exercises", downloadable and updatable for the submission to the trainer.

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4 CONCLUSIONS

These modules will be tested with professionals and stakeholders during pilot studies that will take place between September and November 2022.

On the following link is possible to see and navigate in to the Air Sector Skills Transformation Map <https://www.futureskillsmap.eu/#/>, developed by Deep Blue.



www.skill-UP-air.eu

www.skill-UP-air.eu



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