



# Unmanned Aerial Systems Common Module



**Hellenic Air Force Academy**  
*Dekelia Air Base, 14-18 February 2022*

## External Evaluation Report

**Prepared by:**  
BA, M.Sc, BAMPENKO Ilona



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UAS's Certificate



*“Unmanned Aerial Systems” Common Module  
Hellenic Air Force Academy  
Dekelia Air Base, 14-18 February 2022*



### **Acknowledgments**

*In order to ensure continuity among EMILYO activities, this External Evaluation Report is based on the corresponding Report evaluating the Common Modules, organised by the Hellenic Military Academies, between 4-8 May 2015, prepared by Mr PAILE CALVO Sylvain, (European Studies Unit – University of Liege) and the respective Report evaluating the Common Module on CSDP organised by the HAFA between 15-19 May 2017, prepared by Major (HE AF) STRATIKIS Nikolaos. The high-quality background offered by their work to the preparation of this document is, thus, gratefully acknowledged.*

*The author also expresses her gratitude to the Hellenic Air Force Academy and the European Security and Defence College for their commitment and support in this evaluation Major TSANAKAS Konstantinos, Captain KOUMOVSOU Despina, Lieutenant GIDARI Evangelia and the ESDC Military Training Manager – MAKRIS Ilias.*



## **1. Introduction**

Within the frame of the European initiative for the exchange of military young officers (EMILYO) in their initial education, inspired by Erasmus, Hellenic Air Force Academy (HAFA), under the auspices of the European Security and Defence College (ESDC), organised for the first time the Unmanned Aerial Systems Common Module (UAS). The module consisted in an e-Learning part, which was a prerequisite for the following residential session, held in Greece, at the seat of the HAFA in Dekelia Air Base, from 14 - 18 February 2022. The main objective of this module was to provide the participants with a general overview on the unmanned aerial systems. Furthermore, the UAS Common Module does not only intend to spread knowledge, but also to raise skills and competences, which will contribute in building a common European spirit and the future European Union (EU) capabilities.

In order to ensure the quality of the training to be provided with regard to the general objectives defined under the EMILYO, the organising academy requested support from an External Evaluator during the preparation and implementation phases of the module. Consequently, this External Evaluation Report was conducted by Ms. BAMPENKO Ilona, who has been involved in the introductory phase of the Common Module, prepared and collected appropriate evaluation questionnaires, attended the lectures, discussed extensively with all participants (organisers, cadets/students and lecturers) and witnessed in general the overall Common Module implementation. Therefore, the evaluation was based on actual observations from the field and the collection of concrete data from the participating cadets/students, the lecturers and the organisers themselves.

The main areas included into this evaluation and the corresponding “evaluation tools” are listed below:

- Evaluation of the acquisition of knowledge enabled by cadets’/students’ attendance of the Common Module, through completion twice (before and after the module) of the same pre-formatted general knowledge questionnaire.
- Evaluation of the lectures, the lecturers and the overall syllabus, through completion of the pre-formatted and free-text “Individual Course’s Evaluation” specially prepared questionnaire.
- Evaluation of the overall satisfaction of the participants, through private/group discussions and free-text questionnaires.
- Evaluation of the overall organization, the administrative arrangements and the support provided to the students, through private / group discussions and free-text questionnaires.

Responses to the Individual Course’s Evaluation represent an important part of the observations and conclusions presented in this report, with the objective of providing suggestions for future organisers of the UAS or other similar modules, addressing young officers.

The closing remark to this document is taken from the Individual Evaluation Reports where several participants, synthetically and clearly, commented that the UAS Common Module implemented by the HAFA was a quite well organised Common Module which provided qualified knowledge.



## **2. Main aspects of the UAS Common Module**

The Hellenic Air Force Academy has the honour to organised the first Unmanned Aerial Systems Common Module between 14-18 February 2022.

### **a. Sequence of Events**

At the beginning of the residential phase, an opening ceremony was organized by HAFA to welcome the participants. The HAFA Commandant Major General VASILEIOU Antonios, on behalf of all the military and the faculty personnel, welcomed the participants and stated the main objective of the UAS Common Module. Moreover, he underlined that the seminar was also an opportunity for civilian students to gain experience and work in an international environment with military cadets, in order to build up a better understanding of each other. Introduction to the course was also made by the ESDC Military Training Manager MAKRIS Ilias. The role and the structure of European Security and Defence College were also presented.

Before starting the individual courses, the students were invited to complete for the first time the UAS questionnaire. Starting Monday 14/2 and finishing Friday 18/2, the academic lectures took place at the main HAFA auditorium with incredible presentations from distinguished speakers.

A syndicate work was successfully accomplished after the participants gained the necessary knowledge, while the UAS simulation exercise was held at different lecture room in HAFA, specially organised and prepared for that reason.

During the last day, after the end of all academic sessions and re - completion of the UAS questionnaire, a hot wash-up of the seminar was performed by the Air and Military Education Director Colonel AOSPORIS Panagiotis, Major TSANAKAS Konstantinos and Dean KOTSIPOULOS Petros highlighting the main findings and results of the module.

To conclude this UAS Common Module residential phase, the HAFA Commandant awarded the certificates of attendance, provided by the ESDC and signed by the High Representative of the EU for Foreign Affairs and Security Policy and Vice-President of the European Commission (HR/VP), Mr. BORRELL Josep, to all the contributors of the module. Examples of such a certificate is presented in Annex III, attached to this report.

### **b. The lecturing team:**

In order to provide a clear picture of the module the background of the different speakers can greatly assist in understanding the comments deriving from the participants, as depicted in the Individual Course's Evaluation.





The lecturing team was composed of sixteen (16) lecturers - tutors, with proven and relevant experience in the UAS, thus providing the broadest picture of the policy, including:

- Ten (10) HAFA Professors
- One (1) Hellenic Military Academy
- One (1) European Defence Agency
- One (1) Frontex Poland
- One (1) University of Piraeus
- One (1) University of West Attica
- One (1) Hellenic Drones Company

**c. The organising team:**

The current Course Director of the UAS Common Module, TSANAKAS Kostantinos, is simultaneously a representative of HAFA at the EMILYO IG. As such, he was highly familiar with the expected outcomes and “best practices” designed along the different rounds of organisation of the module across EU.

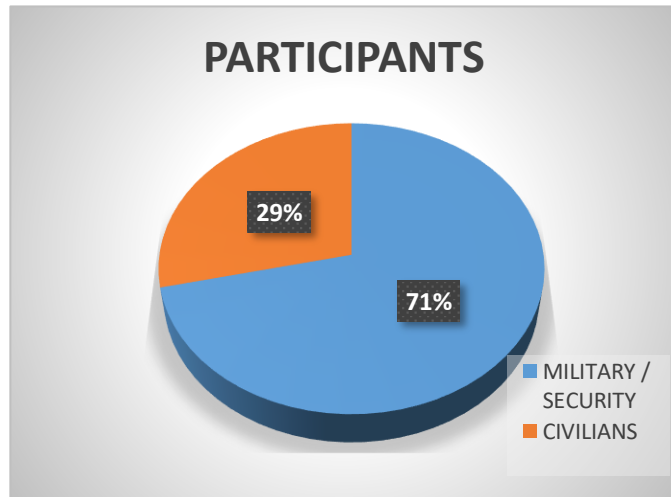
He was supported in his tasks by the HAFA personnel, which provided logistics support for the conduct of the residential phase. Special thanks are given to Captain KOUMOUTSOU Despoina and Lieutenant GIDARI Evangelia. The operational choices in relation with the design and organisation of the module, which represent a very important amount of work for a single person, were mainly the responsibility of the Course Director.

The hosting cadets, themselves, took a share in the conduct of the residential phase in accompanying the guest participants and providing them with a friendly and learning-prone environment. Considering the workload that such organisation represents, it could be envisaged to increase this share with view to future events, in order to support the organisers and take responsibility for aspects of the module.



#### **d. The Participants:**

Forty four (44) trainees coming from different military institutions and security corps colleges of seven (7) Member States (BE, ES, GR, IT, NL, PL, PT), as well as from the University of Patras, the Institute of International Relations, the Technical University of Crete (Department of computer & Electrical engineering), the National Technical University of Athens and the National and Kapodistrian University of Athens, attended the UAS Common Module and received two (2) ECTS credits for their successful completion of the course.



Reviewing this Table, it can be summarized that 30 participants had a military/security background, while 12 of them have been studying social sciences. This diversity of backgrounds was the source of a great variety of questions, which further enriched the transversal character of the module.

The international participation amounted to approximately 31,8% (14 out of 44) of the audience, which could be considered adequate for such kind of seminars. International representation is one of the key issues for the success of such courses.

In the same way, it must be noted that the breakdown in terms of Armed Forces' branches showed an excellent balance, as HAFA invited not only participants from other MS but also from the other Hellenic Armed Forces Academies. This allowed a concrete exchange of experiences on the challenges faced by officers in their profession and insights on services' interoperability challenges.

#### **e. Administration and Support**

The organisers provided the participants at the beginning of the residential phase with a welcome package, containing information and material for their stay in Athens (such as cultural booklets, city maps and information, a folder and a notebook).

Through international participation, the purpose of the current module is to provide the participants with an insight of the interoperable environment, through sharing their cultures, their visions on the conduct of operations, the traditions of their educational systems and, more concretely, sharing time and a common living environment. This immersion into the European diversity was again successfully implemented by the HAFA, as the afternoon part of the programme was of a "social" nature, including both "formal" and "informal" activities after the working hours, with the participation of most students. The cultural programme included a visit to the Hellenic Air Force Museum, Acropolis Museum and two cities' tours – Kifisia and centre of Athens.



### **3. Academic aspects of the UAS Common Module**

As already discussed, the UAS Common Module participants were offered with the possibility to get an introductory overview of the UAS through the completion of an IDL module, using the means of the ESDC network. Then, they were invited to attend the residential part of the seminar at the HAFA, which included both academic lectures and a simulation exercise. These main constituents of the Common Module are now analysed, mainly from an academic point of view.

#### **a. The IDL: a self-introduction to UAS**

The HAFA, as it is the practice in other Common Modules set in the framework of the EMILYO, opted for introducing the cadets to UAS through IDL studies, using the ESDC resources. The IDL preparatory module was made available on an ILIAS Learning Management System administered by the ESDC. The cadets/students had to complete the following two sections for this module as an integral condition for completing the course and obtain the ECTS credits.

(1) *“History and context of the CSDP development” (AKU1)*, containing explanations and illustrative documents related to the evolution from the origins of the cooperation (the birth of the Western European Union, the European co-operation, the shaping of the CFSP) to the developments of the CSDP (foundation and links with the CFSP);

(2) *“European Union Global Strategy” (AKU2)*, starting from before the European Security Strategy (ESS), then going through the adoption of ESS, its content, main characteristics, role and impact, and finishing with the ESS revision prospects;

The AKUs consist of synthetic texts presenting the topic and recommended reading, usually short essential documents, illustrating and explaining a subject area. They were prepared, for use by the ESDC in its different activities, in cooperation with highly recognised standards scientific societies, such as the Geneva Centre for Security Policy (AKU1) and the Egmont Institute for International Relations (AKU2). Nonetheless, it should be mention that specific sections specialised on UAS Common Module suggested to be created. Therefore, it does not belong to this evaluation to review the content of the corresponding IDL modules, but only the level of its contribution, as an integral part of the UAS Common Module.

The cadets/students went through the AKUs, fulfilling a short knowledge test at the end of each of them, in order to confirm they achieved the learning objectives. The results from these tests were not made available to them, because they do not give relevant information regarding the evolution of their knowledge. They had to succeed in the AKU1 and AKU2 tests successively, after as many attempts as necessary, before being granted access to the UAS Common Module. For the support of the cadets/students in their learning, a series of links towards relevant institutions or scientific societies’ websites and of videos and web documentaries were made available on the IDL platform. All participants had successfully and in time (before the beginning of the residential phase) completed the IDL phase.





**b. The Residential Phase of the UAS Module – Courses**

The titles of the courses proposed by the HAFA for the first UAS Common Module are presented in the following Table:

<b>UAS Module Implemented Courses</b>
- European Institutional Framework
- An overview of future UAVs with emphasis on path planning and applications
- EU & NATO classification
- Military UASs capabilities and missions
- UAS sensors
- UAS detectability
- UAV mission design and spatial data. Research, perspectives and new ideas
- Automated target, tracking and detection
- Networking low earth orbit satellites with swarms of unmanned aerial systems as tactical and strategic force multiplier
- Urban air mobility: cooperative tracking for swarm based UAV missions a TS framework
- Modern UAS military missions / European missions
- UASs future trends
- Planning and flight safety considerations
- UAS mission planning under uncertainty (Syndicate work)
- Drone forensics
- UAS/Drones and international humanitarian law, drones in “Targeting Killings”

The lectures had different durations (from 45 to 90 minutes), depending on their subject, and were completed by formal and informal interaction between the participants and the lecturers as well as among themselves. The lectures in plenary group, which provide the basic knowledge under this approach, were completed by group works, in the form of a simulation exercise.

### c. The Residential Phase of the UAS Common Module - The simulation exercise

The HAFA brought an interactive compound into the UAS Common Module, in proposing to the participants to take part into a simulation exercise in the form of a role play in a Command Operations Center, under the title “UAS mission planning under uncertainty”. The preparation of the simulation exercise was performed by military officers - Maj LAPPAS Dimitrios, Maj TSANAKAS Konstantinos in parallel with professor- Ass Prof. Dr. KARAMPELAS Panagiotis, which shows the necessity of the collaboration between military and civilian in order to achieve the interdisciplinarity.



The exercise itself was conducted on the fourth day of the module, when the participants had acquired a contextual knowledge of the UAS topics. The fictitious scenario involved:

*On the February 6th, in Galapagos islands, is celebrated as the day of Santa Aguadilla. It is a public holiday for the residents and many celebrations and special events held, such as parades, masses, and processions. For this reason, many tourists are going to fly to Galapagos the morning of that day. Furthermore, on that day this year, air demonstration teams with fighter aircrafts have been scheduled to fly over the Baltra Island, from 8.00 am to 12.00 pm showcasing aerobatics. Every flight will take place in 15 minutes (from T.00 to T.15 of each hour). The frigate «HMS Danae» of Ecuador’s Navy has also already reached the Galapagos Islands and has anchored 10 km north of Baltra. A group of officers, part of the frigate’s crew, are to attend the celebratory events in Baltra.*

*6th February, 8.00 am North of San Cristobal: a cargo ship issues an emergency SOS call, stating that one of the engineers onboard has been injured and is bleeding due to an accident.*

*The authorities in Puerto Baquerizo Moreno issued the order for a Search and Rescue helicopter to depart immediately from San Cristóbal Airport to reach the ship and transfer the wounded man to the local hospital. Estimated take off time: 8.30 am. Estimated flight duration 1 hour.*

*6th February, 8.15 am on the island of Marchena: a citizen of a village locates a boat near a cliff edge that used to transport refugees to the island during the night hours. Alongside the boat, a family of migrants has climbed on the steep rocks. Some of them wandered on Marchena island the past few hours, while others did not make it on the rocks and were probably carried away by the waves.*

*The authorities in Puerto Baquerizo Moreno will send two coast guard boats (from Baltra's port) to search and rescue the carried away refugees. The boats' departure from the port is estimated at 09:00 (for more details, look at the coast guard boat list in the respective folder in Milanote).*



*At the same time, because of the unique nature of the island’s terrain, citizens and police forces will cover the territory to find and transfer the remaining migrants to a safer place. The completion of this process will last at least 6 hours.*

*6th February, Galapagos Islands: The weather forecast included in the respective folder in Milanote.*

*6th February, Galapagos Islands: Four Unmanned Aerial Vehicles are located in the islands and are ready for use at any time (for more details, look at the UAVs list included in the respective folder in Milanote).*

#### **MISSION**

*6th February, Operational Control Centre, Galapagos Islands:*

*You are an expert staff officer – consultant on matters related to UAS, having a significant part in the decision-making process.*

*The Chief of Staff has asked for your reasoned opinion on whether the UAS should (or should not) be used in this search and rescue (SAR) operation. Justifications of your opinion and mission details are mandatory (you must complete the Expert Recommendation Form - ERF included in the Report folder in Milanote).*

*(you can suggest the use of more than one UAV).*

*Important: Due to the existence of the coast guard in the area, involved in the search and rescue mission, the Chief of Staff wants suggestions of the use of UAVs only when the risk of the flight is LOW*

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The students were divided into twelve (12) groups and the simulation tasking was to consult as an expert the Chief of Staff on matters related to the UAS. The tutors briefed the participants about the objectives and the specificities of the simulation. In addition, they presented the questions on which the participants were asked to work and the workspace environment which provided the necessary information. A specific order of small questions presented as a report was one of the deliverables. The other two deliverables were an Operational Risk Management Form (ORM) and a slide with the mission on Google Earth Pro. The above mentioned documents are attached in the Annex.





#### **4. UAS Common Module Evaluation**

The UAS Common Module evaluation contains comments and suggestions concerning three parts, namely the overall syllabus, the individual courses (including the simulation) and the organisational aspects of the residential phase of the seminar organized by HAFA. The information to perform this evaluation comes from the following sources:

- Questionnaire on UAS issues, conducted both at the beginning and at the end of the residential phase.
- The “Individual Courses’ Evaluation” questionnaire, completed by all students.
- Interaction and discussions of the External Evaluator with the Course Director, the lecturers and the students before, during and after the completion of the course.

##### **a. Overall UAS knowledge.**

In order to assess their progress along the UAS Common Module, a test on the global level of knowledge on UAS issues was conducted at the beginning and at the end of the residential phase. The questions and the multiple answers (4/5/6 per question) proposed were the same for the two rounds. In order for the reader of this document to have a better understanding of the UAS areas covered, the questions included in the UAS questionnaire are presented in the following Table.

<b>UAS Questionnaire</b>	
<b>Q1</b>	What are the main categories of UAVs?
<b>Q2</b>	In a smart agriculture application of UAVs, what are the main issues?
<b>Q3</b>	The aerial measurement subsystem (UAS) of Green Water Drone consists of two types of UAVs. A quadcopter platform UAS1 and A fixed-wing platform UAS2.
<b>Q4</b>	Can I fly my drone anywhere I want to?
<b>Q5</b>	How high can I fly my drone?
<b>Q6</b>	Who issues the remote pilot competency certificate for the ‘open’ category and how long is it valid for?
<b>Q7</b>	Which are the basic parameters of a drone mission?
<b>Q8</b>	The main reason of the use /no use of Drones in many military applications are the low cost, the short training period to be efficient the operator, the big range of possibilities the have and the fact that can operate from huge distances and the operators be safe from enemies responds.
<b>Q9</b>	The parameters to be specified (amongst others) for a military drone operation are the objective, the number: solo drone, many drones, swarm, the drone equipment, the type of mission: attack, defence, surveillance, arrest, transport, cartography, but not the time (night,day).
<b>Q10</b>	Cooperative systems are ...
<b>Q11</b>	The role of an official (expert in UAV missions) in an operation control center is ...
<b>Q12</b>	Mission risk assessment in a UAV mission can include...
<b>Q13</b>	Risk assessment is a crucial factor in a UAV mission planning process
<b>Q14</b>	What are the difficulties in handing Digital Evidence from a drone?
<b>Q15</b>	In which components of an Unmanned Aerial Systems can we found Digital Evidence?
<b>Q16</b>	Which of the below is a criminal use of an Unmanned Aerial System?



*“Unmanned Aerial Systems” Common Module*  
*Hellenic Air Force Academy*  
*Dekelia Air Base, 14-18 February 2022*



The results to those questionnaires are presented in the following Tables.

<b>STUDENT ID</b>	<b>SCORE (initial test)</b>	<b>SCORE (final test)</b>	<b>STUDENT ID</b>	<b>SCORE (initial test)</b>	<b>SCORE (final test)</b>
<b>S1</b>	60%	80%	<b>S23</b>	65%	75%
<b>S2</b>	55%	80%	<b>S24</b>	60%	90%
<b>S3</b>	60%	80%	<b>S25</b>	70%	95%
<b>S4</b>	55%	95%	<b>S26</b>	70%	90%
<b>S5</b>	50%	90%	<b>S27</b>	75%	95%
<b>S6</b>	70%	95%	<b>S28</b>	50%	95%
<b>S7</b>	70%	90%	<b>S29</b>	70%	75%
<b>S8</b>	60%	80%	<b>S30</b>	55%	80%
<b>S9</b>	65%	80%	<b>S31</b>	60%	80%
<b>S10</b>	50%	75%	<b>S32</b>	65%	80%
<b>S11</b>	60%	80%	<b>S33</b>	70%	90%
<b>S12</b>	60%	80%	<b>S34</b>	60%	90%
<b>S13</b>	75%	95%	<b>S35</b>	65%	75%
<b>S14</b>	70%	80%	<b>S36</b>	55%	70%
<b>S15</b>	60%	75%	<b>S37</b>	60%	80%
<b>S16</b>	80%	90%	<b>S38</b>	60%	80%
<b>S17</b>	65%	95%	<b>S39</b>	70%	85%
<b>S18</b>	95%	100%	<b>S40</b>	65%	90%
<b>S19</b>	80%	95%	<b>S41</b>	75%	85%
<b>S20</b>	60%	80%	<b>S42</b>	65%	85%
<b>S21</b>	70%	70%	<b>S43</b>	65%	80%
<b>S22</b>	70%	95%	<b>S44</b>	*	
			<b>AVERAGE</b>	<b>68.25%</b>	<b>84.65%</b>

\* One of the participated did not take the final test and his/her first score did not count to the average.

The scores obtained during the second completion of the UAS Questionnaire (Final Results), presented an average of 84,65% corresponding to 68,25%. This demonstrates a slight improvement. It should be highlighted that ALL of the participants achieved better result during the final test.



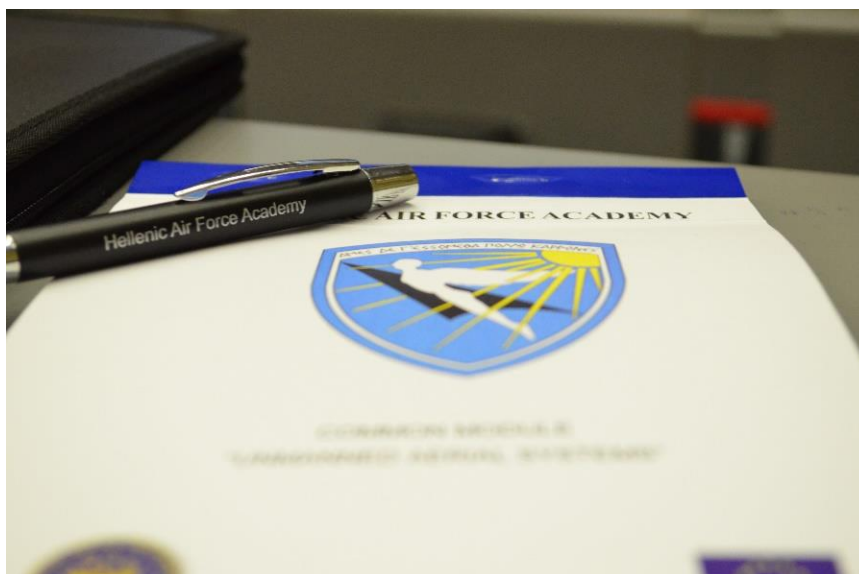
**b. “Individual Courses’ Evaluation (ICE)”**

In order to assess the real effect that the lectures had among participants, an “Individual Courses’ Evaluation” questionnaire has been prepared and distributed, which was completed by all students, requesting them to score between 1 (Low appreciation) and 6 (High appreciation) for each of the lectures performed during the UAS Common Module, against the following criteria:

Overall Interest Level	Course Relevance to UAS	Individual Course Duration	Quality of presentation / slides / videos	Course’s Subject Coverage	Individual Course should be:
Limited: 1 High:6	Limited: 1 High:6	Inadequate:1 Adequate: 6	Low: 1 High:6	Low: 1 High:6	Cancelled:1 Retained: 6

Apart from scoring against the pre-formatted questions, the participants were additionally invited to share their views for further and future improvements, through free-text suggestions. Naturally, both the ICE and the suggestions were requested anonymously. Despite the diversity of the audience and even though responses were almost never unanimous, reliable conclusions could be drawn, reflecting the opinion of the majority of participants, thanks to the significant number of students participating to this survey.

The results of the questionnaires collected have been statistically processed and the average values obtained per lecture and per criterion are presented in the following Table. To facilitate review of the Table, average scores above 5 (High appreciation) are marked in green and average scores below 4 (Low appreciation) are marked in red. An average on all Criteria is also included at the last column of the table, as an overall index of appreciation for each lecture / lecturer.





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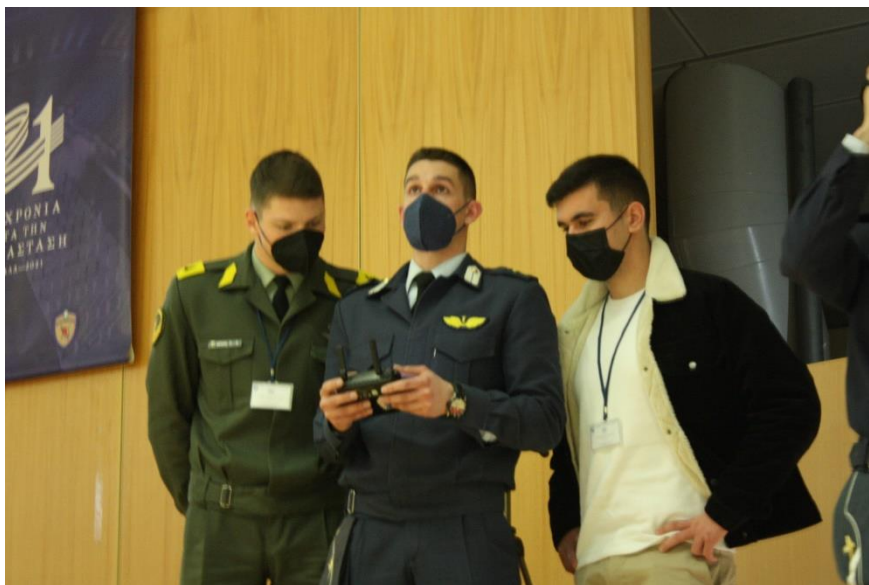


UAS Course	Overall Interest Level	Course Relevance to UAS	Individual Course Duration	Quality of presentations / slides / videos	Courses' subject coverage	Individual course should be:	AVG 1 to 6
	Limited: 1	Limited: 1	Inadequate: 1	Low: 1	Low: 1	Cancelled: 1	
	High: 6	High: 6	Adequate: 6	High: 6	High: 6	Retained: 6	
European Institutional Framework	4,93	5,18	5,43	5,18	5,09	5,18	5,16
An overview of future UAVs with emphasis on path planning and applications	5,03	4,65	5,18	4,90	4,93	5,09	4,96
EU & NATO classification	5,06	5,18	4,84	4,78	4,96	4,90	4,95
Military UASs capabilities and missions	4,93	5,15	4,71	4,62	4,65	5,06	4,85
UAS sensors	5,56	4,96	5,54	5,32	5,32	5,74	5,40
UAS detectability	5,39	4,81	5,30	5	4,78	5,48	5,12
UAV mission design and spatial data. Research, perspectives and new ideas	4,31	4,34	4,62	3,96	4,12	3,81	4,19
Automated target, tracking and detection	4,93	4,43	4,84	4,71	4,56	4,65	4,68
Networking low earth orbit satellites with swarms of unmanned aerial systems as tactical and strategic force multiplier	3,93	4,09	4	3,75	3,75	4,06	3,93
Urban air mobility: cooperative tracking for swarm based UAV missions a TS framework	4,68	5,75	4,90	4,65	4,71	4,37	4,84
Modern UAS military missions / European missions	5,43	5,34	5,21	5,12	5,34	5,46	5,31
UASs future trends	5	4,93	5	4,78	4,96	5,06	4,95
Planning and flight safety considerations	5,54	5,29	5,51	5,41	5,32	5,51	5,43
UAS mission planning under uncertainty (Syndicate work)	5,6	5,53	5,26	5,46	5,4	5,56	5,46
Drone forensics	5,38	4,96	5,51	5,51	5,38	5,45	5,36
UAS/Drones and international humanitarian law, drones in “Targeting Killings”	4,51	5	4,67	4,09	4,74	4,67	4,61

Concerning the overall method used for teaching UAS, the participants’ satisfaction can be judged as almost excellent. Their comments showed that they were overall and highly satisfied with the level of expertise of the lectures and the lecturers selected.

Reviewing in detail the above mentioned results and further to discussions with the Course Director, the lecturers and the cadets/students, the following conclusions – suggestions can be drawn:

- The combination of civilian and military lecturers and their availability for discussing on UAS issues was highly appreciated by the participants.
- The use of appropriately prepared presentations, slides and videos is of paramount importance in order to keep the audience interested.
- The participants requested information about the UAS related jobs.
- Some of the presentations were relative between each other and it is suggested to pre-read them by the course director in order to avoid the duplication of information.
- The foreign guests of the UAS Common Module express their gratitude to the HAFA cadets for their hospitality and support during their stay.
- The difference between a lecture in a conference and in a seminar should be always reminded to speakers, who are not professionally involved in academic issues.
- The timing of the syndicate work in the fourth day can be considered appropriate as the participants received the background knowledge for playing their roles.
- The simulation exercise was organised perfectly and the satisfaction of the participants were clearly mentioned.
- The comments provided by the participants stressed the excellent organization (administrative aspects) and working environment (including infrastructure) that was provided.





## **5. Conclusions – Suggestions**

I formed my opinion on the UAS Common Module, which took place at the HAFA between 14-18 February 2022, by reviewing the UAS and ICE Questionnaires, as well as through extensive interaction and discussions with the Air and Military Education Director Colonel APOSPORIS Panagiotis and Major TSANAKAS Konstantinos and the cadets/students before, during and after the completion of the course. The main conclusion is that:

**The first UAS common module organised by the Hellenic Air Force Academy has overall met the success in providing knowledge, skills and competences to its participants.**

Evidently, this opinion was fully shared by all participants. Therefore, the following points should be less considered as remarks from the seminar’s implementation and more as suggestions for future events, focusing on nine on the following critical organisational points:

- The use of appropriately prepared presentations, slides and videos by lecturers is of paramount importance in order to keep the audience interested. The keyword is “Interaction”!
- International participation remains an important element for the success of the Common Module.
- The preparatory sections suggested to be focus on UAS topics and not in general knowledge.
- Appropriate knowledge of the English language is a definite prerequisite for the implementation of the course.
- The interdisciplinarity was achieved through collaboration between military officers and professors through the simulation exercise.

The UAS Common Module does not only intend to spread knowledge, but also to raise skills and competences, which will contribute in building a common European spirit and future EU capabilities. Therefore, the closing remark to this document is the fact that

**the first UAS Common Module implemented by the Hellenic Air Force Academy was accomplished successfully!**





<b>Country</b> GR	<b>Institution</b> Hellenic Air Force Academy (HAFA)	<b>Common Module</b> Unmanned Aerial Systems (UASs)	<b>ECTS</b> 2.0
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<b>Service</b> ALL	<b>Minimum Qualification of Instructors</b>
<b>Language</b> English	

- **Officers:**
  - English: Common European Framework of Reference for Languages (CEFR) Level B2 or NATO STANAG Level 3.
  - Relevant expertise on Unmanned Aerial Systems as pilot or technician.
  - Experience of collaboration with multinational military personnel.
- **Civilian Lecturers:**
  - English: Common European Framework of Reference for Languages (CEFR) Level B2 or NATO STANAG Level 3.
  - Expertise on relevant topics.
  - Relevant academic publications.

<b>Prerequisites for international participants:</b>	<b>Goals of the Module</b>
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- English: Common European Framework of Reference for Languages (CEFR) Level B1 (preferably B2) or NATO STANAG Level 2.
- At least 1 year of national (military) higher education.

- Basic principles of the technologies supporting the Unmanned Aerial Systems (UASs) and their applications.
- Specification and classification of different UAS categories, types, and sensors used for civilian and military applications.
- Different perspectives for integrating UAS to CSDP missions.
- Technologies and challenges to counter malicious use of UAS.

<b>Learning outcomes</b>	<b>Knowledge</b>	<ul style="list-style-type: none"> <li>• Knows the basic principles of the technologies involved in UAS.</li> <li>• Understands the trends and challenges related to UAS.</li> <li>• Knows the modern threats and technologies to counter hostile UAS.</li> </ul>
	<b>Skills</b>	<ul style="list-style-type: none"> <li>• Analyses the configuration and components based on the application.</li> <li>• Is able to incorporate UAS to CSDP missions.</li> <li>• Explains the legal and ethical issues related to UAS.</li> </ul>
	<b>Responsibility and autonomy</b>	<ul style="list-style-type: none"> <li>• Takes some responsibility for analysing available technological solutions for improving UAS capabilities.</li> <li>• Takes some responsibility for applying new technologies regarding future UAS applications to CSDP missions.</li> <li>• Examines and correctly assesses UAS technologies and challenges.</li> </ul>

<b>Verification of learning outcomes</b>
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- **Observation:** Throughout the module students will be presented all technologies involved in Unmanned Aerial Systems and they will discuss the given topics in the plenary and present teamwork results. During these work students are evaluated to verify their performance.
- **Evaluation:** Group presentations of given topics related to UAS technologies and applications. Working groups will focus on the basic description and characteristics of a selected subject.
- **Test:** Written exam at the end of the Module.

<b>Module Details</b>		
<b>Main Topic</b>	<b>Recom- mended WH</b>	<b>Details</b>
Introduction to Unmanned Aerial Systems (UAS)	4	<ul style="list-style-type: none"> <li>History</li> <li>Terminology</li> <li>Types &amp; Categories</li> <li>EU &amp; NATO Classification</li> </ul>
Aerodynamics, Automated Control Systems and Flight Techniques	5	<ul style="list-style-type: none"> <li>Basic Aerodynamic principles</li> <li>Automated Control Systems and Autonomy</li> <li>Air Traffic Control &amp; Flight Rules</li> <li>Flight Safety</li> <li>Human factor</li> </ul>
Anatomy, Communications and Sensors	5	<ul style="list-style-type: none"> <li>Vehicle's main parts and subsystems</li> <li>Communications and Control Station</li> <li>Gimbals &amp; Payloads</li> <li>Sensors types</li> </ul>
European Institutional Framework	2	<ul style="list-style-type: none"> <li>EU decisions</li> <li>U-Space</li> <li>National Regulations</li> </ul>
UAS Applications & CSDP Missions	6	<ul style="list-style-type: none"> <li>Remote Sensing Applications.</li> <li>UAS civilian applications</li> <li>Crisis Management and Disaster Response</li> <li>Law enforcement &amp; Security</li> </ul>
Military UAS missions and Unmanned Combat Aerial Vehicles (UCAV)	6	<ul style="list-style-type: none"> <li>History of military UAS applications</li> <li>Military UAS capabilities</li> <li>Modern UAS military missions</li> <li>Unmanned Combat Aerial Vehicles (UCAV) or Lethal Drones</li> <li>Challenges and Ethics</li> </ul>
Counter UAS	5	<ul style="list-style-type: none"> <li>Modern threats and challenges</li> <li>Detection and tracking Technologies</li> <li>Passive defence</li> <li>Active defence</li> </ul>
<b>Total</b>	<b>33</b>	
<b>Additional hours (WH) to increase the learning outcomes</b>		
Self-Studies	27	<ul style="list-style-type: none"> <li>Preparation for the upcoming lessons and for exam(s).</li> <li>Reflection of the topics issued.</li> <li>E-learning may also be counted to the self-studies.</li> </ul>
<b>Total WH</b>	<b>60</b>	The detailed amount of hours for the respective main topic is up to the course director according to national law or home institution's rules. During which topic(s) the syndicate elaborations and presentations will take place is up to the course director.



## List of Abbreviations:

- CEFR ..... Common European Framework of Reference for Languages  
 ECTS ..... European Credit Transfer and Accumulation System  
 NATO ..... North Atlantic Treaty Organization  
 STANAG ..... Standardization Agreement  
 WH ..... Working Hour  
 ICT ..... Information and Communications Technology  
 CSDP ..... Common Security and Defence Policy  
 EU ..... European Union  
 UAS ..... Unmanned Aerial System  
 UAV ..... Unmanned Aerial Vehicle  
 UCAV ..... Unmanned Combat Aerial Vehicles  
 UASs ..... Unmanned Aerial Systems

# Syndicate Workspace Environment


Home / UAS MISSION PLANNING / UAS Team\_1 Refer a friend, get more space >

**UAS Team\_1** +4 Share Export Zoom out


- Note
- To-do
- Line
- Board
- Add image
- Upload
- Draw
- Trash

### Welcome to your team workspace.


First, please read the scenario of the mission. Then, look at the information posted in the icons below and, finally, complete the report template with your course of action and submit it in the corresponding area (Report).




**Scenario**  
1 card




**Your mission**  
1 card




**Information about Galapagos**  
5 cards




**Weather Forecast**  
4 cards




**Coast Quard Boats**  
7 cards




**Available UAVs**  
8 cards



**Risk assesment**  
1 card, 1 file



**Google Earth Pro**  
1 card, 2 files



**Report**  
1 card, 1 file

0 Unsorted

The screenshot shows the Google Earth Pro interface with a satellite view of the Galapagos Islands. Several mission points are marked with letters A through H. A yellow line connects point F to point A. Labels on the map include 'SEGS', 'Frigate', 'Santa Cruz', 'Puerto Villamil', 'Puerto Baquerizo Moreno', 'Cargo Ship', and 'SEST'. The Google Earth logo and version information are visible at the bottom.





**To:** Operational Commander

**Service Report**

**From: (TEAM NAME)**

Date:

Time:

**Expert Recommendation for UAS use in Galapagos mission**

Is any UAS suitable for the specific mission? (Yes/No – Short Justification)		e.g. No, none UAS is suitable for transferring water supplies in dessert terrain
UAS Type		e.g. Helios
Mission Type		e.g. Fire Patrol
Mission Objective		e.g. Information transferring
Risk Assessment		e.g. High
Flight Duration		e.g. 104 min
Flight Distance		e.g. 78 Km
UAV Endurance (time)		e.g. 150 min
UAV Range (distance)		e.g. 150 km
Departure Time		e.g. 07:15 am
Route (List of turn points – Google earth)		e.g. round F-E-O-D-F
Flight altitude		e.g. 10000 feet
Weather conditions		e.g. sunny
Cooperation with (whom, justification)		e.g. NOTAM (points on Google earth), police, etc

**European Security and Defence College  
Collège Européen de Sécurité et de Défense**



**CERTIFICATE**

**Alessandro ARESU**

Attended the

**Unmanned Aerial Systems Common Module**

**Athens, 14 – 18 February 2022**

Josep BORRELL FONTELLES  
High Representative of the Union for  
Foreign Affairs and Security Policy