



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ

**Α.ΔΙ.Π.**

ΑΡΧΗ ΔΙΑΣΦΑΛΙΣΗΣ & ΠΙΣΤΟΠΟΙΗΣΗΣ  
ΤΗΣ ΠΟΙΟΤΗΤΑΣ ΣΤΗΝ ΑΝΩΤΑΤΗ ΕΚΠΑΙΔΕΥΣΗ

HELLENIC REPUBLIC

**H.Q.A.**

HELLENIC QUALITY ASSURANCE  
AND ACCREDITATION AGENCY

## EXTERNAL EVALUATION REPORT

Department of Aeronautical Sciences

**Hellenic Air Force Academy**

**May 2015**



**European Union**  
European Social Fund



MINISTRY OF EDUCATION & RELIGIOUS AFFAIRS, CULTURE & SPORTS  
MANAGING AUTHORITY

Co-financed by Greece and the European Union



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### **External Evaluation Committee**

The Committee responsible for the External Evaluation of the Hellenic Air Force Academy consisted of the following four (4) expert evaluators drawn from the Registry constituted by the HQA in accordance with Law 3374/2005 :

1. ***Prof C. Xydeas*** (Coordinator)

Lancaster University

2. ***Dr Fivos Andritsos***

European Commission – Joint Research Centre

3. ***Prof Konstantinos Kontis***

University of Glasgow, United Kingdom

4. ***Prof. George Yadigaroglu***

ETH-Zurich, Switzerland

**N.B.** The structure of the “Template” proposed for the External Evaluation Report mirrors the requirements of Law 3374/2005 and corresponds overall to the structure of the Internal Evaluation Report submitted by the Department.

The length of text in each box is free. Questions included in each box are not exclusive nor should they always be answered separately; they are meant to provide a general outline of matters that should be addressed by the Committee when formulating its comments.

## **Introduction**

### Preliminaries

The Hellenic Air Force Academy (HAFA) is a military educational academy which in 2003 was recognized by law as a Higher Education Institution (equivalent to University) providing equivalent University-level education and degrees. Thus, while HAFA retains its traditional Air Force Academy characteristics, it currently offers a four-year undergraduate program and conducts a certain amount of research. Academy students are enlisted Air Force personnel and therefore are subject to military rules and discipline, as well as to a dual regime of i) intense academic study and ii) a highly demanding military training. The Committee being aware of HAFA’s particular nature took this into account during the evaluation. Furthermore, the general evaluation criteria set by HQA were accordingly applied to the *academic* educational aspects of HAFA.

### External Evaluation Procedure

- **Dates and brief account of the site visit.**
- **Whom did the Committee meet?**
- **List of Reports, documents, other data examined by the Committee.**
- **Groups of teaching and administrative staff and students interviewed**
- **Facilities visited by the External Evaluation Committee.**

The External Evaluation Committee (referred here as “EEC” or “the Committee”) visited HAFA, which is located within the Dekeleia Air Force Base, during the period of 27<sup>th</sup> to 29<sup>th</sup> of April 2015. More specifically, in the morning of the 27<sup>th</sup>, EEC visited Dekeleia and was first welcomed by the Academy’s Dean, Professor P. Kotsiopoulos. Next EEC visited and was warmly welcomed by the Academy’s Commander, Major General P. *Sapantzoglou*, who introduced the overall HAFA structure and operational framework. The two fundamental dimensions which underpin HAFA, i.e. i) Military Education, and ii) Academic Education, were presented, at a high level, together with their integration within a novel educational/training framework. This effectively brings together and in harmony both educational aspects and assures excellence of the “end product”, i.e., Air Force officers.

In addition, EEC had a most informative session with the Internal Evaluation Committee (OMEA/MOΔIII) members in general and the following academic and military staff *in particular*: Prof. A. Zagorianos, Prof. A. Andreatos, Prof. A. Koutsomixalis, Prof. R. Papagiannakis, Brig. Gen. K. Sevastatos, Col. G. Pantelis, Col A. Mosxos, Col V. Zisis, LtCol P. Vatakis, LtCol E. Klinakis, LtCol A. Ntisios, LtCol K. Karapetsas. Furthermore, during the entire evaluation period, the committee has had lengthy discussions on student (ικαροι, cadets) Educational and Training aspects with the: Academy Dean, Prof. Kotsiopoulos, Deputy Dean Prof. Kokalis as well as with other academic staff, students from all four years, Teaching Associates and Teaching Air Force Officers, Laboratory and other technical staff, Administrative staff, Physical Education staff and of course staff /instructors delivering

military education and flight training. Moreover, specific presentations were provided to EEC, by the Dean and other Academics, on major academic topics such as the Academy's undergraduate teaching program and activities, student exchange activities, administrative services and infrastructure, as well as IT support.

The committee also met with the Academy's Technical Support personnel, and Administrative personnel from both Academic and Military areas of education.

It is important to repeat at this point that, the EEC focused this appraisal on HAFA's academic, rather than military aspects of education.

The EEC also had an extensive tour of the Academy's Library, various teaching facilities, student accommodations and restaurant, athletics stadium and swimming pool, areas for combat training, the Dekeleia Airport, the 360 Flight Training Squadron and the Air Force Museum. Note that throughout the visit additional information was requested and appropriate documents were provided and scrutinised by EEC. A detailed list of documents made available to EEC is presented below. On the 30<sup>th</sup> of April a partial draft of the external evaluation report was compiled. As the 1<sup>st</sup> of May was a national holiday, the report was finalized via extensive email exchanges between its members.

The Committee was provided before the visit with:

- The Internal Evaluation report (of January, 2015) prepared by HAFA according to H.Q.A. guidelines.
- The program of Undergraduate studies.
- The HAFA Studies Guide.
- The HAFA Scientific Policy report.

In addition, during the visit the Committee had access to numerous additional documents such as:

- Examples of examination papers.
- Examples of textbooks and notes used.
- Laboratory notes/instructions.
- Examples of student questionnaires and evaluation reports.
- Course syllabus, specifications and reviews.
- Staff CVs.
- Course grade statistics.
- Student final-year project reports.
- Lists of Faculty Journal publications / Conference Proceedings and edited volumes.

The EEC members were provided promptly with all the information and documentation that was requested within the context of the evaluation exercise.

The Committee visited the teaching laboratories, including:

- Physics
- Fluid Mechanics
- Aerodynamics
- Propulsion systems
- Mechanical structures, Tribology
- Material Technologies, Strength of materials
- Thermodynamics and Energy systems
- Electrical Machines, power electronics
- Electronics, Telecommunication systems

- Computer systems and Networks
- Control Systems
- Air traffic control.

The academic structure of HAFA is in line with that of all Greek Higher-Education Institutions. There is a unique Department of Aeronautical Sciences subdivided in sectors and related laboratories which are historically derived from the old structures built around University Chairs.

#### **The Internal Evaluation Procedure**

**Please comment on:**

- **Appropriateness of sources and documentation used**
- **Quality and completeness of evidence reviewed and provided**
- **To what extent have the objectives of the internal evaluation process been met by the Department?**

EEC was particularly impressed with the quality and completeness of most of the documentation provided. Furthermore the concept of i) fair and timely student assessment and ii) internal performance evaluations resulting into actions and general feedback across the various hierarchical levels of military and academic educational streams, is well understood and implemented. This leads into an operational structure with appropriate quality assurance mechanisms.

## A. Curriculum

### APPROACH

- **What are the goals and objectives of the Curriculum? What is the plan for achieving them?**
- **How were the objectives decided? Which factors were taken into account? Were they set against appropriate standards? Did the unit consult other stakeholders?**
- **Is the curriculum consistent with the objectives of the Curriculum and the requirements of the society?**
- **How was the curriculum decided? Were all constituents of the Department, including students and other stakeholders, consulted?**
- **Has the unit set a procedure for the revision of the curriculum?**

The objective of HAFA's undergraduate course curriculum is twofold:

1. Provide cadets with all the necessary basic and specialised knowledge and skills required to form a first class Air-Force officer;
2. Inject and cultivate all the qualities, i.e., moral values, discipline, leadership and initiative spirit which are necessary for cadets to become efficient and effective Air-Force officers.

These objectives are set by the Hellenic Ministry of Defence (MOD) in general and by the Hellenic Air-Force General Staff in particular, the major stakeholder of HAFA. Their implementation is achieved through:

- An academic curriculum, and
- Air-Force military training.

Although this report focuses exclusively on the academic curriculum, it also takes into account constraints and necessities generated by the Air-Force training, as well as of other specificities related to the military nature of the establishment.

Note that, whereas the general curriculum objectives are clear (i.e., to yield highly competent Air-Force officers), the *logic and strategy* underpinning the curriculum were not presented in a systematic and detailed way to the Committee (partly due to lack of time), although all the information regarding courses etc. was made available.

The curriculum is approved by the Educational Council subject to proposals from the Military Training Director for military education issues and the Dean for Academic Studies. Feedback from cadets is taken into consideration through an annual evaluation procedure and, in certain cases, through the Air-Force command chain (complaints, remarks etc.).

Furthermore individual members of staff have active collaborations, exchanges and interactions with other academic staff within Greece and abroad and as a result, the content of individual academic subjects is regularly renewed, thus benefiting from best practices observed in the Higher Education Sector.

*The academic curriculum is, in broad lines, consistent with the legislated and stated objectives and the requirements / expectations of Society and State.*

*Mechanisms for curriculum update / revision exist and are adequate. Procedural details can be found in the IER document.*

## IMPLEMENTATION

- **How effectively is the Department's goal implemented by the curriculum?**
- **How does the curriculum compare with appropriate, universally accepted standards for the specific area of study?**
- **Is the structure of the curriculum rational and clearly articulated?**
- **Is the curriculum coherent and functional?**
- **Is the material for each course appropriate and the time offered sufficient?**
- **Does the Department have the necessary resources and appropriately qualified and trained staff to implement the curriculum?**

HAFAs provide three Air-Force cadet specializations: Air-Force Pilots, Engineers and Air-Defence Controllers; the corresponding curricula are distinct and adapted carefully to the needs of each specialisation with a variable degree of commonality. For example, emphasis in the Air-Force Pilot specialisation is placed on flight training. Cadets choose their specializations before entering HAFAs via the national higher-education entrance-examination procedure. In addition, pilot cadets have the option to transfer to the Air-Defence Controller specialisation or alternatively to another outside of HAFAs University discipline, depending on their success or otherwise in the flight training part of the programme. All cadets in the Engineers specialisation have a common first-year curriculum, before taking one of three streams, that is Aircraft Engineering, Telecommunications and Electronics Engineering, and Civil Engineering. Note that the total curriculum corresponds to 240 ECTS units from which 180 are covered by academic subjects.

*The Committee was pleased to find out that HAFAs enjoy the unusual privilege, among Greek Higher Education Institutions, of being able to define the details of its undergraduate curriculum internally and without the need of cumbersome and often lengthy Ministerial approvals.*

Part of the curriculum, essentially that related to basic academic disciplines, like mathematics and physical sciences, aerodynamics and flight mechanics, electric circuits and electronics etc., is delivered mainly by *Academic Faculty Staff* (AFS), i.e., professors, associate professors, assistant professors and lecturers. In addition, the remaining part which is specifically related to Air-Force-profession disciplines and skills (including flight training) is implemented by the *Air-Force Faculty* (AFF). AFF comprises of experienced officers, often having doctoral degrees and other specialised academic and/or professional qualifications.

It must be noted that Military Training (MT) is an integral part of the curriculum and provides cadets with a valuable complement to their classroom and laboratory based studies. MT is implemented through daily exercises and physical training, special training trips, or through cadet participation in Air-Force missions. On top of this and only for flying cadets, flight training is provided, which is fully adapted to the needs and mission of the Hellenic Air-Force.

*The academic curriculum, together with military training, implements quite effectively the legislated and stated aims of HAFAs.* Despite the unavoidable scheduling constraints imposed on academic studies, due to the added military education in general and flight training in particular, the HAFAs curriculum seems to be well articulated and in line with international standards. HAFAs students are often overloaded in their studies, but always responsive to academic and military educational challenges.

Thus, the curriculum is, in general, coherent and functional. Some minor issues that were noted by the Committee can be dealt with through the established annual review and appropriate revision procedures. These issues are outlined below and are also discussed in the improvements section.

*EEC believes that greater emphasis should be placed on design group projects as a means of enhancing the curriculum.* Such projects would bring together the knowledge and understanding gained from individual subjects, and thus open up a valuable experience path which would seamlessly lead to a better appreciation of aeronautical engineering products (e.g., UAVs, aviation systems, Air Traffic Management, etc), and safety and security issues (e.g. air accident investigation). *Another possible enhancement would be the allocation of more practical laboratory related work across various academic subjects.* This will be particularly beneficial to Engineering students. In addition and in relation to Engineering students, greater emphasis could be placed in certain generic subjects, e.g., Multi-Rate Signal Processing. Teaching material could be also enhanced in other subject areas, for example in the detailed coverage of materials such as polymers, polymeric or metal composites, ceramics and light alloys.

Generally, current curriculum contents are up-to-date and appropriate, while efforts are made by staff to incorporate new material in rapidly developing subject areas.

*Teaching staffing levels and space related resources are very appropriate. This is due to new spacious HAFA buildings and to a large number of recently allocated staff posts. However, laboratory equipment should be improved.* To this end, HAFA makes strenuous efforts to implement its curriculum with financial resources needed to implement laboratory based training that is presently scarce. This means that laboratory equipment has not been renewed for decades and in certain cases is not available due to either lack of spare parts or near-obsolence.

Finally the previously mentioned limited engagement of students in laboratory based practical work, raises concerns on the seamless progression of knowledge acquired from basic courses, such as electric circuits and electronics, aerodynamics and flight mechanics, structures and materials etc, to the advanced state-of-the-art knowledge required to fulfil the professional needs of aeronautical cadets.

The functionality/effectiveness of the curriculum could be substantially improved by taking into consideration the above remarks.

## RESULTS

- **How well is the implementation achieving the Department's predefined goals and objectives?**
- **If not, why is it so? How is this problem dealt with?**
- **Does the Department understand why and how it achieved or failed to achieve these results?**

Based on the performance of its alumni in:

- their function/performance within the Air-Force and
- their professional / scientific careers in other institutions (i.e. specialisation courses, postgraduate studies etc.),

it can be deduced that *HAFA's stated goals and objectives are fully met. The only significant problem that the Academy faces is the non-existence of a postgraduate curriculum;* efforts are, however, underway in this direction.

Some subjects need revision to include modern materials and advancements in technologies. There is also need for greater integration of individual subjects through design exercises and projects (throughout the four years, not just in the final major degree project), where knowledge from different subjects is brought together and is effectively integrated into aeronautical engineering products and systems. HAFA has a raised awareness of these issues and we believe will be receptive to EEC suggestions made in this report.

## IMPROVEMENT

- **Does the Department know how the Curriculum should be improved?**
- **Which improvements does the Department plan to introduce?**

HAFAs have conducted a thorough internal evaluation that will continue in terms of periodic assessments and constantly updated statistical data. HAFAs are also well aware of their considerable needs for Laboratory refurbishments and the significant difficulty is facing from the lack of funding for equipment maintenance.

The urgency for improving Laboratory-based education is also recognized. Furthermore, EEC believes that the current and often inadequate status of proper practical/experimental based learning, as applied to several important topics, represents a serious threat to both Curriculum completeness and level of acquired knowledge and skills.

The Committee welcomes the presence of a diploma project in the HAFAs curriculum as an integral part of the curriculum delivery.

*HAFAs should continue to consider potential reductions of teaching hours in all future revisions of the curriculum, shedding material that is not of primary significance so that the cadets can better focus on the important subjects and bring in a variety of design exercises and group projects. The recent approval for the employment of new staff makes curriculum updates feasible, important and necessary.*

*It should be investigated though, whether it would be more appropriate to further improve the commonality of the three cadet specialisations; this would produce a common first-year curriculum with some minor adjustments to accommodate the flight training part of the programme for the Air-Force Pilots stream.*

Finally and based on the well accepted premise that postgraduate teaching and research act as catalysts for updating and raising the level of UG curriculums, *HAFAs need to assess and define in a systematic way its core research / postgraduate application areas, so that it can best fulfil its stated aims, provide an effective added value, and gradually define its areas of technical excellence.* HAFAs have a procedure outlined in the IER for continuously adjusting its curriculum. *The Committee is pleased to learn that HAFAs enjoy the privilege of deciding within limits its curriculum internally and has the possibility of adjusting it on an annual basis. The planned creation of a graduate programme is a very positive step.*

## POSTGRADUATE CURRICULUM

There is presently no graduate programme. *The systematic setting up of institutional research capacity and postgraduate courses will further improve HAFAs' efficiency and efficacy.* However, such research should be *targeted to specific application areas* that are of priority to the Air-Force needs. Thus, HAFAs should be encouraged and be given the means necessary to gradually build research excellence in selected application areas of primary interest to stakeholders. Furthermore, the introduction of well targeted MSc courses will be a smart way to further improve the educational level of cadets, in general and Engineering cadets in particular, specializing in state-of-the-art technologies and collaborative operational (information fusion, situation awareness and understanding) methodologies.

The planned creation of a graduate programme is a very positive step in enhancing the quality of undergraduate education.

## ***B. Teaching***

### APPROACH:

The present evaluation focuses solely on the academic teaching aspects. The teaching methods used and the evaluation needs listed in the HQA IER template are discussed in detail in the IER document provided to the EEC and details will not be repeated here; only particularities and strong/weak points and good practices will be noted.

For the time being, HAFA offers only a four-year undergraduate program. There are, however, *plans to produce a postgraduate studies program specializing in Flight Safety that the Committee welcomes*, as it will also reinforce missing links between teaching and research.

#### **- Does the Department have a defined pedagogic policy with regard to teaching approach and methodology?**

In line with the two other Hellenic Military Academies, HAFA has a clear mission defined by law, namely to produce highly educated and competent officers for the Hellenic Air Force (HAF), with leadership and moral qualities; these additional qualifications are provided by the military education that is delivered in parallel to the purely academic one. The graduating cadets become officers of the HAF, their unique future employer; HAF defines to a large extent the qualifications needed for its future officers, both “flying” pilots and HAF “engineers.” Consequently, the pedagogic policy of HAFA is defined in full accordance with its clearly defined dual mission.

Admissions to HAFA are through the Panhellenic Examination system. The entering class has extremely high grades and has indicated HAFA as its first choice. This results in a highly motivated, well prepared and bright student body that greatly facilitates teaching and makes it rewarding to the Faculty. *The Committee feels that admissions made via the Panhellenic examination system serve very well HAF aims so that HAF future officers have the right qualifications in a world where technological military demands are evolving rapidly and becoming increasingly complex.*

#### **- Teaching methods used**

The teaching methods used include both cathedra courses and a limited number of hours in various laboratories. As the cadets are occupied in the afternoons by their military education, the laboratory sessions must take place, in shifts and in small groups, during teaching hours. The disadvantage of missing some classes is compensated by the small size of the groups in the laboratories (typically four groups of three each) and the high number of instructors. The hands-on education of the cadets is, however, completed after their graduation by training in HAF bases and specialized laboratories.

The curriculum provides for a very useful in the opinion of the Committee final year project (Διπλωματική εργασία) that gives the cadets the opportunity to conduct hands-on design/construction and research activities and thus to widen their horizons.

There are numerous athletic activities conducted in the excellent facilities of HAFA.

The Air-Force Pilots receive during the first year of their studies about **20** flight hours of active flight training including one last session of “solo” flying. Cadets who do not succeed at this stage are dismissed from HAFA. Cadets who do not succeed in the second or subsequent years of their flight training are permitted to follow the Air Defence Controllers direction of

studies, should they choose to stay in HAFA

- **Teaching staff/ student ratio**
- **Teacher/student collaboration**

The number of entering cadets has been recently reduced by the limiting austerity measures imposed by the State. The Academic body, that had not a sufficient number of permanent positions, has been recently complemented with a large number of new positions and following appointments after years of serious shortages. Additional teaching support is provided by seconded to HAFA Air Force officers lecturing in their areas of competence.

There is a very large number of diverse academic subjects that must be covered by specialists to meet the needs of HAF. As a result, the staff/student ratio is very high with subjects and laboratory sessions taught personally by Faculty staff, a positive finding. For the same reason, the Committee gained the impression that there is good student/teacher collaboration, enhanced by the fact that cadets reside on campus, study in common rooms, and use to interact among themselves, etc.

- **Adequacy of means and resources**
- **Use of information technologies**

The teaching facilities (auditoria, laboratory space) are excellent, due to the recent rebuilding of the campus after its catastrophic destruction by the 1999 earthquake. Laboratory equipment dating from the 80's that has been salvaged from the destruction is still used and has not been replaced by more recent acquisitions, due to financial limitations and the general austerity measures that took place after the opening of the rebuilt campus in 2008. In spite of this, and thanks to the efforts of the Faculty, the Committee felt that the existing laboratory equipment was used in a good pedagogic way and provided some laboratory experience to the cadets.

*The Committee recommends modernization of the laboratory equipment as a high-priority measure, as soon as the economic situation permits.*

Resources seemed to be adequate regarding rooms and teaching materials. There are a few printed textbooks and all subjects offered appeared to have printed notes for both courses and laboratories. Although the Committee could not examine these in detail, the samples examined were of high quality. The Committee visited all laboratories used for teaching.

The two main shortcomings noted are due to factors external to the HAFA. They concern: i) the lack of financial resources to secure book acquisitions (both as hard copies and as e-books and e-journals) in the otherwise outstanding Library building and, ii) the lack of Information Technology (IT) infrastructure within the HAFA, which is made even more difficult to establish due to HAFA's presence within a military base and related IT connection limitations imposed apparently by security considerations. The library e-acquisition limitations are partly due to the dual character of HAFA and its special status as a *Military Institution of Higher Education* (under the Ministry of Defence). Thus HAFA has not been provided yet with access to e-journal and book resources enjoyed by the other institutions of higher learning. *The Committee recommends that both the above library operational issue and the apparent lack of appropriate IT infrastructure issue are pursued as high priority items so that the Ministries of Defence and Education reach an agreement and proceed with the implementation of necessary solutions.*

- **Examination system**

The examination system relies mainly on written tests conducted in ways to avoid plagiarism. The course grade depends partly (30%) on performance during the semester

measured by various means, such as mid-term examination, is in line with say the US educational practice. Final examinations account for 70%. *The Committee considers this as a good practice.*

*The Committee applauds the measures taken to ensure fairness in grading of the written examinations* (such as anonymous examination sheets, physical separation during the written tests, possible remarking of scripts by senior staff and documentation of reasons leading to mark changes, etc.).

Contrary to older practices in other Institutions of Higher Education where the students can advance in their study years without having successfully completed examinations in previous courses, academy cadets are allowed to repeat only once (summer re-examination) a failed examination. Another failure leads to repetition of the year of studies, whereas a further failure signals the end of studies in the Academy for the cadet. This results in a six-year maximum duration of studies. These rather strenuous measures ensure, however, the diligence of the student body

#### IMPLEMENTATION

As noted above, the military nature of the HAFA and the resulting discipline in all areas, have positive results on the teaching and examination activities that are conducted without interruptions and disruptions. There is no absenteeism from classes, due to their compulsory nature, although sometimes cadets miss some classes while attending other military duties.

Indeed, the two parallel legs of their education, i.e., the military and the academic one produce inevitably competing demands on the cadets. The challenging task of balancing these competing demands seems to be well addressed by both the Military and the Academic leaderships of HAFA.

- **Quality of teaching procedures**

As stated and emphasized to the Committee, the combination of a relatively small number of highly educated and experienced permanent, mainly senior Faculty staff, that is complemented with annually recruited, limited- (one-year), and part-time academic appointments of competent and carefully selected staff (Ειδικό Προσωπικό με Σύμβαση, ΕΠΣ – Ειδικοί Επιστήμονες) and is further reinforced by the Military Faculty (Στρατιωτικό Διδακτικό Προσωπικό) composed of officers, provides an excellent mix of teaching personnel and ensures an adequate level and quality of teaching. Teaching is facilitated by the relatively low numbers of cadets in classes and laboratories (partly due to the large numbers of courses offered and to the diminished number of admissions) and a modern building infrastructure offering plenty of high quality space.

Contrary to findings in other institutions of higher learning, the cadets did not express any reservations about teaching, their contacts with the Faculty members, their qualifications and attitude, but they noted the lack of sufficient laboratory, library and IT resources.

- **Quality and adequacy of teaching materials and resources.**

- **Quality of course material. Is it brought up to date?**

Samples of the teaching materials used from all Academy sectors (a few text books and notes and laboratory guides that the Committee believes exist for all if not most courses) were given to the Committee for its perusal. All subjects offered appeared to have printed notes for

both the courses and the laboratories. Although, of course, no complete examination of this material could be conducted during the visit, they seem to be of uniformly high quality and state-of-the-art. *The Committee regrets the non-availability of this material on an IT teaching platform, due to the already mentioned IT limitations.*

As noted above, due to lack of financial resources, most of the laboratory equipment is fairly old but the Committee felt that it was used in pedagogically good ways. *Hafa is encouraged to seek all possible means for upgrading its laboratories and bringing them up to the state-of-the-art and thus effectively address the challenges that future military technologies will bring. The introduction of graduate programs and participation in research projects will also help upgrade laboratory equipment and is highly recommended by the Committee.*

- **Linking of research with teaching**

The absence of graduate programs and a sparse research infrastructure imply that there is very little on-campus research at Hafa. Thus, cadets are not exposed to research activities, except during their one year duration, final year *diploma project that the Committee qualifies as an excellent practice.* The diploma theses perused revealed a diversity of current, state-of-the-art projects; they were well written and researched and the Committee learned that some even led to publications.

The link between teaching and research will be improved, in the future if Hafa plans regarding the initiation of a Graduate programme materialize; that will also generate research opportunities on campus.

- **Mobility of academic staff and students**

The mobility of the cadets during their studies is almost inexistent due to the programme and the rules of the Academy. However, good opportunities are offered to them after their graduation.

On the contrary, there is some mobility of cadets from foreign countries to Hafa, as made evident by the presence of a number of cadets from a variety of countries; after an initial year of study of the Greek language, they are very well integrated and usually successful in their studies and integration in the daily life of the Academy.

Hafa cadets are coming to some contact with their counterparts in other foreign similar academies via the Military Erasmus activities and with visits to foreign laboratories and institutions (tight finances permitting).

- **Evaluation by the students of (a) the teaching and (b) the course content and study material/resources**

The quality of teaching is measured by systematic course/instructor evaluations conducted for the first time at the end of the academic year 2013-2014 and set to be applied on a continuous basis, *a good practice that the Committee applauds.* The details of the procedure followed and the average grades in all the questions that can be found in the IER are judged as very adequate by the Committee. The questionnaires are filled anonymously and on-line by the cadets and the data analysed and presented in electronic form. The evaluations were conducted in a way to ensure high participation of the cadets. The Committee learned that there are not many "outliers" in the results from individual courses and that in such cases the Dean discusses these with the Faculty member concerned to arrive at remedial actions, something that the *Committee considers as a good practice.*

## RESULTS

- **Efficacy of teaching.**
- **Discrepancies in the success/failure percentage between courses and how they are justified.**
- **Differences between students in (a) the time to graduation, and (b) final degree grades.**
- **Whether the Department understands the reasons of such positive or negative results?**

As noted above, the Committee is pleased to find that the efficacy of teaching is enhanced by the lack of external disturbances and the forced compliance and discipline of the cadets. For the same reasons, the failure rates in courses are very low, as it is the overall failure rate of the cadets. There is very limited dropping off of cadets from HAFA, except after the first year of studies and the very large differences regarding time to graduation, that plague the Greek Higher Education system, are nearly non-existent. The reasons for these positive aspects are to be found in the military nature and discipline of HAFA. The Faculty and Staff fully recognize and exploit these advantages.

On the other hand, there were some remarks by cadets regarding time conflicts between their military and academic duties and of living under a regime of continuous pressure (long days including military training). The HAFA command commented that such pressures are part of military training, to ensure that future officers are capable of acting under adverse conditions. Although the Committee agrees that pressure may be beneficial to the building of highly competent officers, it is also of the opinion that lack of sufficient study time is detrimental to in-depth learning of required material. *The Committee recommends that the issue of the time available to cadets for their academic study is considered again carefully and in conjunction with the extent of the curriculum and the number of courses offered.*

## IMPROVEMENT

- **Does the Department propose methods and ways for improvement?**
- **What initiatives does it take in this direction?**

The Department is well aware of the ways to improve teaching, but is unfortunately limited in their implementation by external factors. (budgets and regulations). As already noted several times in this report, the lack of campus-wide IT access to the external world and of internal electronic communications has also an impact on teaching. The Committee also noted the obsolescence of some of the teaching laboratories equipment.

*The introduction of web-based teaching (at least at the level of distribution of teaching materials) will improve teaching, as well as the modernization of the laboratory equipment.*

## C. Research

### APPROACH

- **What is the Department's policy and main objective in research?**
- **Has the Department set internal standards for assessing research?**

*HAF*A did not have historically specific aims or policy for research. However, HAFA has published recently a document on its Research Strategy, outlining the legislative framework, background and goals for its future research activities. *EEC* praises HAFA's initiative for such a document. The Research Strategy Document presents in a very precise way the legal and institutional framework for research and can be used indeed as an excellent manual. The document lists all the numerous research areas investigated by the Faculty, without defining any areas of future concentration or excellence and priorities. *The Committee recommends that the strategy document be complemented by a section where carefully selected and justified research priority areas are defined.*

HAFA aims, in the short term, to establish a postgraduate course on *Flight Safety*. This seems very logical and is in line with the *EEC* recommendations (see later section).

HAFA's Academic Faculty members *must* conduct publishable research to assure their academic promotion. Many of the HAFA Faculty, Academic and Military, have attended prominent academies and universities in Greece and abroad. Most research by HAFA Faculty is conducted via external collaborations and, consequently, some research topics are not necessarily clearly relevant to the mission of HAFA.

Negative factors affecting HAFA research include:

1. The lack of postgraduate programmes that are a minimum prerequisite for promoting / framing research activities.
2. The often perceived notion that HAFA's mission to graduate first-class Air Force officers is detached from research activities. The limited or non-existing access of the Academic Faculty to research funds based on regulations of the Greek funding agencies and adverse effects due to the dependence of HAFA on the MOD. *To this end EEC argues that there must be established a Special Research Account (Ειδικός λογαριασμός) for HAF*A and associated operational procedures as those operating in Greek Universities.
3. The lack of post-graduate students conducting research, whose absence cannot be filled by the cadet diploma thesis activities even if, in some cases, such theses are of very high quality.
4. The lack of campus-wide access to electronic books and journals that makes bibliographic searches quasi-impossible.

There appear to be no *internal standards for assessing research*, other than the legislated standard procedures for evaluating the career advancement of the Academic Faculty. *The Committee recommends the setting up of such standards, together with the implementation of a research strategy that is based on prioritized areas and corresponding aims.*

## IMPLEMENTATION

- **How does the Department promote and support research?**
- **Quality and adequacy of research infrastructure and support.**
- **Scientific publications.**
- **Research projects.**
- **Research collaborations.**

Although HAFA buildings infrastructure is excellent for teaching purposes, *the quality and adequacy of its research infrastructure is rather limited compared to what is expected in a typical academic institution.* This can be attributed partly to the lack, until very recently, of permanent academic staff.

There is also lack of administrative support for handling research grants, even in cases where grants have been awarded. At this particular moment and due to the acute financial crisis, there is scarce financial support for staff travelling to scientific conferences. Having said that, *the Committee commends the efforts of the Academic Faculty to overcome these serious obstacles and create the foundation of the prerequisites needed to perform research,* even without the existence of a proper institutional framework.

In the IER there are statistics regarding the Faculty publications. Many of these publications concern Faculty members' activities prior to their (recent) employment in HAFA. The Committee has not taken any thorough actions to evaluate the scientific quality of the referenced publications other than observe the data presented in the IER. However, it appears that some of the publications are of high quality, published in prominent journals and, sometimes, going well beyond the applied nature expected by the mission aims of HAFA.

External collaborations, in Greece and abroad, are mentioned in the IER and were also noted during the extensive discussions with the Academic Faculty. These collaborations are essential for HAFA Faculty, given the limitations quoted above. The Committee was not presented any particular details for most of these collaborations, especially the ones with institutions abroad. Collaborations with Greek institutions were better defined.

*The lack of a proper HAFA postgraduate / research program as well as the existence of a non-research-oriented administrative framework (e.g., lack of HAFA's own special research account) hinders the collaboration of HAFA with other research institutions on an equal basis, as should be the case in a number of research fields.*

## RESULTS

- **How successfully were the Department's research objectives implemented?**
- **Scientific publications.**
- **Research projects.**
- **Research collaborations.**
- **Efficacy of research work. Applied results. Patents etc.**
- **Is the Department's research acknowledged and visible outside the Department? Rewards and awards.**

As already noted, up until recently, there was no formal policy in HAFA regarding research other than the formal requirements and the mechanisms for the evaluation and promotion of academic staff. The Academic Faculty is trying to promote and support research with various mechanisms:

- External collaborations with Universities in Greece and abroad.

- Applications for research grants as principal investigators, which, as mentioned earlier are difficult to secure in HAFAs.
- Participation in research grants as partners with leading Greek Universities that have a notably higher probability of success in the existing research framework of funding in Greece.
- Development of research programmes of immediate relevance to the Hellenic Air Force.
- Development of test facilities that are used to benefit immediate needs of the Air Force, e.g. flutter in F16 planes.

It was not possible for the Committee to evaluate the efficacy of the HAFAs research work, which, as was mentioned earlier, is rather limited. One patent filing is mentioned in the IER. However, based on the visits to the various laboratories, the impression was that there is potential for applied research of immediate relevance to the operations of the Hellenic Air Force.

Based on the data included in the IER and the discussions with the Academic Faculty, it is concluded that *the external visibility of the HAFAs research is limited compared to research performed in a typical non-military academic institution in Greece*. Again, this observation does not constitute a criticism but instead is a result of the nature of the Academy, the obstacles that HAFAs Academic Faculty has to overcome in carrying out research and, mainly, is partly due to the fact that most of the HAFAs Faculty posts were filled with permanent staff only very recently.

#### IMPROVEMENT

- **Improvements in research proposed by the Department, if necessary.**
- **Initiatives in this direction undertaken by the Department.**

As noted above, HAFAs has published recently a document on its Research Strategy that should, however, include research priorities and areas of concentration.

The Committee thinks that Research activities within HAFAs should be given a high priority for a number of reasons:

- Active research, including in-house experimental and computational capacity, collaboration with Academia, Research Establishments and Industry in Greece and abroad is vital for the fulfilment of HAFAs main mission, that is the formation of first class officers whose task is to defend the Nation under critical circumstances while operating in a demanding and extremely high-tech environment.
- Faculty, Academic and Military, cannot maintain and further develop their expertise without a proper research environment. Without research, even the best Faculty will degrade and lose motivation and capacity for high quality teaching.
- HAFAs has now most of the pre-requisites (good buildings and infrastructure, ample space, prestige, committed academic and military faculty, well defined 'client' etc.) required so as to prosecute and excel in research.
- Finally, given the very high cost (capital and running) per cadet training, the additional relative cost for implementing an appropriate research environment in HAFAs is relatively much lower than that required in other academic establishments.

For all these reasons, investment on research in HAFAs is expected to have a high return, in terms of the quality of the future officers and the consequent efficacy of the Hellenic Air Force. The Committee thinks that, in principle, such expenditure would be fully justified

even in times of financial crisis and fiscal consolidation. In particular:

- The cadets will be able to understand better the science behind today's technologies that evolve at an exponential pace. These advances are made frequently for military applications and an officer cannot always take full advantage of them by relying on manuals or just a formal training based on the understanding of equipment operation.
- The horizons of the cadets will be expanded and they can make meaningful future decisions in choosing Institutions and disciplines to complete advanced degrees.
- Research involves typically the solution of rather challenging problems and the cadets will be able to think deeper into problems and will learn the art of debugging complex systems.
- It will help the cadets in their decision making when leading the Air Force 20-30 years down the road, when science will be even more dominant in military operations.
- It will allow for carrying out classified research of relevance to the HAF.

It should be brought to the attention of Air Force General Staff and the Hellenic State, that a number of actions are needed in order to effectively promote research activities and excellence. That is:

- Establishment of post-graduate programmes in subjects such as Flight Safety, etc. where their relevance to the Hellenic Air Force (and HAFA) is unquestionable.
- Framework, and support mechanisms allowing HAFA as a whole and/or individual academic Faculty members to have visibility, bid and have a realistic chance to secure competitive research funds.
- Establishment of procedures and support mechanisms for administering grants and contracts within HAFA.
- Academic mobility: procedures that would allow visiting Academics from Greece or abroad to be hosted at HAFA and, vice-versa, HAFA Faculty members to be hosted by other academic and/or research institutions.
- The Ministries of Defence and Education should find appropriate ways to reverse the existing complex legal and regulatory research micro-management framework that has adverse effects on research activity.

*The HAFA Faculty generally realizes the validity of the above issues. The Committee feels though that the Academic Faculty may be powerless to successfully pursue its research goals within the existing funding framework and the existing rather unhelpful perception regarding the connection between Military Academies and research. Thus, it is essential that both the Air Force General Staff and the Ministry of Defence take into account the importance of offering modern/advanced education to Air Force officers, beyond traditional practices and therefore take decisive steps towards the establishment of in-house research activities. These activities don't need to be as broad as those in non-military Universities and they could scale, in a way, similar to those adopted in the Air Force Academies of selected European countries and the US.*

Finally EEC believes that HAFA's *Dean should represent the Academy in meetings of Greek University Rectors*, dealing with academic matters and interacting with the Ministry of Education.

## ***D. All Other Services***

### APPROACH

- **How does the Department view the various services provided to the members of the academic community (teaching staff, students).**
- **Does the Department have a policy to simplify administrative procedures? Are most procedures processed electronically?**
- **Does the Department have a policy to increase student presence on Campus?**

*Most services needed for a smoothly running Academic Institution are available to a satisfactory degree. They are well structured and offered both by Academic and by Military staff.*

Military personnel are attached to their posts for an average period of three to four years.

Administrative, academic secretarial support is limited and current staff seems to be overloaded with a plethora of different jobs.

Administrative services are, to a certain extent, electronic but not fully integrated yet. There are a number of issues limiting HAFA's effective administration as an academic unit, namely lack of integrated IT infrastructure, expected academic/research/equipment maintenance budgeting, and very small group of IT support staff.

IT support is ensured by just two military staff that has to: (a) manage the installed applications, (b) maintain the internal and external networks and (c) provide ad-hoc technical support.

The fact that the HAFA campus is located inside an operational Air Force base causes significant complexities both at regulatory and practical levels concerning IT and communications/networking security. It also increases the workload of the IT support staff. Some practical solutions around these issues should be found in order to obtain the required, academic, IT functionality.

### IMPLEMENTATION & RESULTS

- **Organization and infrastructure of the Department's administration (e.g. secretariat of the Department).**
- **Form and function of academic services and infrastructure for students (e.g. library, PCs and free internet access, student counselling, athletic- cultural activity etc.).**
- **Are administrative and other services adequate and functional?**
- **How does the Department view the particular results.**

Registration, records and transcripts of the cadets are, to a large extent, electronic but separate between the Academic and Military parts of HAFA. The goal would be to arrive at a completely integrated electronic administrative service platform (equivalent to "e-class" or "Moodle" used in the University sector). However, *the current administrative structures and procedures followed are satisfactory.*

The Library holds a very limited collection of titles, in most cases older versions of internationally renowned textbooks. It is also noted that HAFA cannot participate and be part of the online subscription scheme employed by libraries in other Greek Universities to provide Technical Journals and Periodicals. This anomaly certainly limits academic research for both Faculty members and cadets.

HAFA boasts an excellent amphitheatre that is designed to accommodate academic functions including ceremonial functions, seminars, examinations, etc.

Extensive athletic and gymnasium facilities are available (Olympic size swimming pool; indoors basketball/volleyball, weightlifting; football ground and field and track stadium). Most of these facilities are well maintained.

A medical first response and emergency unit is located within the Dekeleia base.

*Classrooms and office spaces are spacious and of high quality. Cadet accommodation is also of high standard.* Cadets study and prepare for their classes in their classrooms and library. Wireless internet access is not available to cadets and staff.

#### IMPROVEMENTS

- **Has the Department identified ways and methods to improve the services provided?**
- **Initiatives undertaken in this direction.**

Legal support for interpreting legislation for various academic functions of the Academy is required. Such in-house legal support is deemed necessary because of the complexity and the frequent changes of Greek legislation. The dual nature of HAFA is an additional reason of concern regarding the lack of appropriate in-house legal support.

Improvements in secretarial support (i.e., number of personnel) are needed and HAFA's Faculty is well aware of this.

Notable IT infrastructure gaps and in general IT services, as mentioned above, must be corrected and the number of IT support staff increased. Internet access needs to be implemented in all classrooms. The existing Internet ports in the classrooms need to become active.

#### **Collaboration with social, cultural and production organizations**

**Please, comment on quality, originality and significance of the Department's initiatives.**

The Dekeleia based Aircraft Museum is exceptionally populated with different types of old and more recent planes. It presents a unique display of aircraft technologies and historical documentation of Greek and International aviation. The Museum is open to the public every week end and is therefore a valuable way of bringing HAF in general and HAFA in particular closer to the community.

Academic HAFA staff has a long-standing co-operation with many domestic and foreign educational, research and professional organisations. As explained in the IER, there are no established processes (except Erasmus) and procedures for such collaborations and these are mostly based on personal contacts.

Finally HAFA operates "open days" when high school students visit Dekeleia and learn more about HAFA and its operation.

### ***E. Strategic Planning, Perspectives for Improvement and Dealing with Potential Inhibiting Factors***

- **Potential inhibiting factors at State, Institutional and Departmental level, and proposals on ways to overcome them.**
- **Short-, medium- and long-term goals.**
- **Plan and actions for improvement by the Department/Academic Unit**
- **Long-term actions proposed by the Department.**

HAFAs have well defined objectives and goals for its Undergraduate teaching operation. The Hellenic Air Force is its major stakeholder and end-user. As detailed in other parts of this report, the HAFAs' undergraduate program is well established; it has been running for many decades achieving its main aim of producing qualified Air Force officers. There are also procedures and mechanisms in place, as detailed in the IER, to cater for any necessary adjustments and updates of the Undergraduate program.

However in addition to Undergraduate activities there is need for emphasis to be placed into the Postgraduate and Research areas. Their relevance and importance to HAFAs' mission has been discussed earlier in this report. HAFAs' academic leadership understands well the necessity for encompassing these two types of activities and plans are already in place for the introduction of a postgraduate course.

In addition there are a number of institutional constraints to be overcome, including a complex legal regime and the lack of a required financial infrastructure, e.g., the establishment in essence of the special account (*ειδικός λογαριασμός*) to support research; the Postgraduate and Research issues should be seen as an opportunity for raising even further the Academy's quality and status and effectiveness in fulfilling its mission. HAFAs should be therefore highly proactive with both Ministries of Defence and Education in finding solutions to current constraints.

In the opinion of the Committee, *a HAFAs Special Strategy Committee (SSC) should be established, consisting of HAFAs leadership as well as prominent Air Force and external Civilian experts from both the Academia and the Manufacturing sectors. This committee should be tasked to elaborate a detailed strategic plan with short, medium and long term objectives, actions and expected results within the context of:*

- The effects of the recent technological evolution and future projections on Hellenic Air Force equipment and tactics, with emphasis on their implications to the training and educational requirements of future Air Force officers.
- The various means and methods by which: i) HAFAs Research is funded, ii) Research collaborations are created and supported and iii) HAFAs Research activity and outcomes are assessed.
- i) The identification of core application areas for in-house HAFAs research to focus and develop. ii) The development of postgraduate programmes in house or in collaboration with other universities or research institutes in Greece and abroad.

## ***F. Final Conclusions and recommendations of the EEC***

- **The development of the Department to this date and its present situation, including explicit comments on good practices and weaknesses identified through the External Evaluation process and recommendations for improvement**
- **The Department's readiness and capability to change/improve**
- **The Department's quality assurance.**

The Committee focused on the academic, rather than military aspects of HAFA and offers the following commendations and recommendations.

### COMMENDATIONS

The Committee praises the significant effort made by HAFA staff to i) provide an excellent higher education experience to its Air Force cadets ii) promote quality assurance, and iii) produce a complete and valuable Internal Evaluation Report.

*Thus the Committee commends the enthusiasm of staff to serve HAFA's objectives and the ethos of careful planning and continuous striving for success that is embedded within the Academy. One can rarely find Greek Higher Education Institutions with such commitment and dedication to quality assurance and service to their students.*

### GENERAL REMARKS AND RECOMMENDATIONS

HAF's importance and key role in the defence of the Nation is absolute and this in turn demands excellence in HAFA operations. The Committee was pleased to find a well-organized dual in nature i.e. Academic / Military Higher Educational Institution with an extremely motivated Faculty staff and, above all, excellent cadets.

In general the Committee is of the opinion that HAFA activities should be further developed to achieve, in addition to its present high-quality Undergraduate cadet education and training, i) a portfolio of advanced Postgraduate courses and ii) a competitive, well supported activity of high quality applied Aeronautical and related Engineering research. These developments should be based on strategic and well defined Air Force based objectives, while operating with clear and measurable outcomes of progress and success.

Other important findings and recommendations can be found in the preceding sections; these are highlighted in *italics*. The most important conclusions and recommendations are summarized below.

### CURRICULUM

- The HAFA Undergraduate academic Curriculum is, in broad lines, consistent with the legislated and stated objectives and the requirements / expectations of Society and State.
- The specific aims of the Curriculum in terms of courses and content are a moving target and the procedures to address these in a strategic way should be reinforced, taking into consideration the emerging Air Force needs in a technologically fast developing environment.
- Internal procedures which allow the curriculum to be revised, if necessary, exist and are applied annually. Furthermore quality assurance procedures exist and are applied systematically.
- The level of content in certain subjects could be raised and also the content of certain

subjects could be augmented.

- Greater emphasis should be placed on design group-projects as a means of enhancing the Curriculum.
- The allocation of more practical laboratory related work across various academic subjects is highly recommended by the Committee.

#### GRADUATE STUDIES

- HAFA needs to identify in a strategic manner important graduate programme areas and thus establish a portfolio of advanced Postgraduate courses.

#### TEACHING

- HAFA enjoys the privilege of not having its academic activities disrupted by external events such as strikes and occupations and is blessed with having cadet students of the highest possible entrance qualifications.
- The Committee recommends modernization of laboratory equipment as a high-priority measure and as soon as the economic situation permits.
- The Committee recommends action in order to enable HAFA's Library to i) be well-stocked with conventional books and certainly with e- books and thus access to appropriate technical and scientific databases, and ii) operate over longer periods.
- The apparent lack across HAFA of appropriate academic and administrative IT hardware and software infrastructure is another limitation to be resolved urgently.

#### RESEARCH

- HAFA's research effort and external visibility are limited as compared to that performed in a typical non-military Greek academic institution.
- The Committee recommends that HAF and HAFA invest in the adoption of in-house, targeted and applied Aeronautical-related research.
- A HAFA Special Research Account (Ειδικός λογαριασμός) should be established together with appropriate financial procedures similar to those operating in Greek Universities

#### OTHER SERVICES

Administrative, academic secretarial support is limited and current staff seems to be overloaded with a plethora of different jobs.

There is lack of an integrated IT infrastructure and expected academic/equipment maintenance budgeting. The limited in size IT support group is overloaded with networking, and software / hardware equipment set-up / maintenance work. The Committee is fully aware of the sacrifices required at times of financial crisis for the renewal and maintenance of infrastructures but at the same time encourages HAFA and HAF to carefully consider and allow for a speedy resolution.

#### STRATEGIC PLANNING

A HAFA Special Strategy Committee (SSC) should be established, consisting of HAFA leadership as well as prominent Air Force and external civilian experts from both the Academia and Manufacturing sectors. This committee should be tasked to elaborate a detailed strategic plan with short, medium and long-term objectives, actions and expected results within the context of:

- The effects of the recent technological evolution and future projections on Greek Air Force equipment and tactics, with emphasis on their implications to the training / educational requirements of future Air Force officers.
- The various means / methods by which i) HAFA Research is funded, ii) Research collaborations are created and supported, and iii) HAFA Research activity and outcomes are assessed.
- i) The identification of core application areas for in-house HAFA research to focus and develop. ii) The development of postgraduate programmes in-house or in collaboration with other universities or research institutes in Greece and abroad.