



KAUHAVA WORKING GROUP

A working group investigating the potential for setting up a common European flight training center at Kauhava

SUMMARY OF THE FINAL REPORT 16 May 2006



Puolustusministeriö
Försvarsministeriet
Ministry of Defence

FINAL REPORT OF KAUHAVA WORKING GROUP, SUMMARY

This document is an abridged version of a more comprehensive classified report.

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1. Introduction

Training of fighter pilots and related economic pressures, common European cooperation in the field of training, and possible training of foreign pilots in Finland have all been discussed during the past few years in meetings of the President of the Republic and the Cabinet Committee on Foreign and Security Policy. One of the topics under discussion has been an interest that has emerged in a number of European countries in the establishment of common, multinational fighter pilot training centers. The Committee has deemed appropriate to investigate the possibility of setting up one of these common European training centers in Finland and carrying out military flying training in the Finnish territory under monitoring by the Finnish military aviation authority and adhering to the effective Finnish civil aviation regulations.

The 2004 Government report on Finnish security and defense policy contains the following statement: "The Air Force Hawks will be concentrated in Kauhava in 2006, and the potential for setting up a common European flight training centre at Kauhava will be investigated. Common European flight training could also be initiated under bilateral agreements."

On 30 June 2005 the Ministry of Defence set up, after a proposal from the Air Force, a working group to carry out a feasibility study of establishing a common European flying training center at Kauhava ("Kauhava Working Group"). The working group was tasked to investigate at least the following issues:

- possibilities of establishing a common European flying training center at Kauhava
- prerequisites and conditions for training of foreign aircrews in Finland
- costs of different options and their effects on the Air Force and Kauhava base
- socio-economic and environmental effects of an international flying training center
- roles of various authorities and contributors involved in marketing and establishment of a flying training center.

The working group was chaired by Director of Unit Brigadier General Arto Rätty of the Ministry of Defense, with Deputy Chief of Division Brigadier General Jarkko Numminen of the Defense Staff (Air Force Chief of Staff from 1 February 2006) as the vice chairman.

The members of the working group were:

- Ministerial Adviser Seija Kivinen of the Budget Department of the Ministry of Finance
- Counsellor Mikko Kinnunen of the Unit for Security Policy of the Ministry for Foreign Affairs
- Senior Adviser Kaj Niemi of the Trade Department of the Ministry of Trade and Industry
- Senior Adviser, Legal Affairs (o. d.) Yrjö Mäkelä of the Transport Policy Department of the Ministry of Transport and Communications
- District Manager Antero Mero of the Civil Aviation Administration
- Member of European Parliament Kyösti Virrankoski
- Director of Unit Antti Kivipelto of the Resource Policy Department of the Ministry of Defense
- Financial Affairs Coordinator Jorma Kiviniemi of the Resource Policy Department of the Ministry of Defense
- Senior Adviser, Legal Affairs Timo Turkki of the Administration Policy Department of the Ministry of Defense
- Adviser Karoliina Honkanen of the Defense Policy Department of the Ministry of Defense (secretary of the working group)
- Commander of the Training Air Wing Colonel Kari Janhunen of the Air Force
- Chief of Flight Training, Lieutenant Colonel Jyrki Myyryläinen of the Air Force Headquarters (second secretary of the working group).

Participating in the writing of the final report was Major (Engineering) Kari Renko of the Air Force in the capacity of a permanently appointed specialist. Major Renko is the chairman of the Advisory Committee for the Advanced European Jet Pilot Training (AEJPT) program.

The objective of retaining pilot training capability in Finland was the foundation of work undertaken by the working group. The ownership and control of aircraft emerged as an essential issue. In accordance with its tasking, the working group assessed only the possibilities of establishing an international training center at Kauhava, leaving detailed analyses of issues pertaining to possible operational uses of training aircraft to be undertaken within the defence administration.

The working group's task was limited to the study of alternative solutions for jet training at Kauhava. The term "common European flight training center" is here regarded as a broad concept that also covers arrangements in which two or more countries cooperate in flying training. The report covers essentially the time period after the current training aircraft have reached the end of their life cycle. The group did not investigate in a comprehensive manner possible alternative uses of the current Hawk trainer fleet during the period of transition while

Kauhava is being established as an international training center. The working group did not embark on a detailed study of purchase of training from abroad as an alternative to training at Kauhava.

The working group familiarized with the Training Air Wing, heard a number of specialists, and utilized studies conducted within the Air Force as its primary source material. The Air Force has during several years actively investigated options for future training systems and their feasibility.

The 2001 Government report on Finnish security and defense policy stated that the Air Force should investigate alternatives for the fighter pilot training system by 2004. Based on this report, the Air Force Commander-in-Chief set up a Flying Training Working Group tasked to, among other objectives, to determine parallel alternatives for the Air Force's existing flying training system, outsourcing options, questions related to the life span of training aircraft and successors of the current trainers, and avenues for international cooperation. The Flying Training Working Group's final report, which was forwarded in March 2003, contained, among other conclusions, an assessment of future options for, and proposed changes to, the pilot training system.

The working group commenced its task by charting both the existing status of the Air Force's flying training system and availability of operators for, and arrangements of, international flying training programs. In the second phase the group identified options for international flying training at Kauhava as follows:





- In option 1, Kauhava is a component of an international flying training center.
- In option 2, international cooperation takes the form of bilateral or multilateral flying training in which outsourced aircraft and training system are used.
- In option 3, bilateral or multilateral flying training is provided using aircraft and training system that are property of the Defense Forces. This option may also involve cooperation with a partner company.

Feasibility of these options was investigated in an all-encompassing manner taking into consideration issues related to airspace management, legislation, socio-economic and environmental effects, as well as various commercial, economic and personnel related effects. In the assessment of the options the main criterion was their effects on national defense, while other relevant factors were also taken into account.

2. The Air Force's Flying Training System

"Flying training system" is a term that covers the different training phases of a pilot and their contents as the pilot moves progressively from elementary training to operational fighter training. The primary objective of the Air Force's training system is to produce trained pilots in a manner which is compatible with existing training requirements and results in the attainment of mission qualification in the shortest possible time. while providing pilots with education for officer's higher academic degree in accordance with the Bologna process and Universities Act. Skills and competences required by the Air Force are received in the main Service School, i.e., the Air Force Academy in Tikkakoski, and the Branch School, i.e., the Training Air Wing in Kauhava.

The phases of the new three-tier training curriculum make up a comprehensive program, and efforts have been made to merge flying training into this system in a way that makes progressive and safe flying training possible. The structure of the Air Force's flying training system is shown in figures 1 and 2.

AFA SPRT SQN		TAW FTR SQN 41		OPERATIONAL FLYING FTR SQN 11, 21, 31 and FTC	
					
Primary and Basic Flying Training (Tikkakoski)		Advanced and Tactical Training (Kauhava)		HN-training and operational flying (Rovaniemi, Pirkkala, Rissala, Halli)	
Conscripts	Cadet Course		HW 2 Tactical 130 h		
VN 1 Primary 40 h	VN 2 Basic 60 h	HW 1 Advanced 90 h			
1 Year	4 Years		1 Year	Hawk advanced training, support sorties and test flying (Kauhava ja Halli/FTC)	

FTR SQN Fighter Squadron
SPRT SQN Support Squadron

AFA Air Force Academy
TAW Training Air Wing

FTC Flight Test Centre

Figure 1 Structure of the Air Force's flying training system. VN1 and VN2 are Vinka flying training syllabi while HW1 and HW2 represent Hawk training phases.

Source: Air Force flying training syllabi

Flying training in the Air Force has traditionally been given in its entirety in Air Force units using aircraft that are Air Force property. In the fall of 2005 the Air Force outsourced Vinka training and associated technical support using an arrangement in which training operations remain as military aviation but a service provider from the private sector assumes an overall responsibility for operations. This training organization employs as instructors both active duty Air Force personnel and flight instructors retired from the Air Force, the latter being on the service provider's payroll.

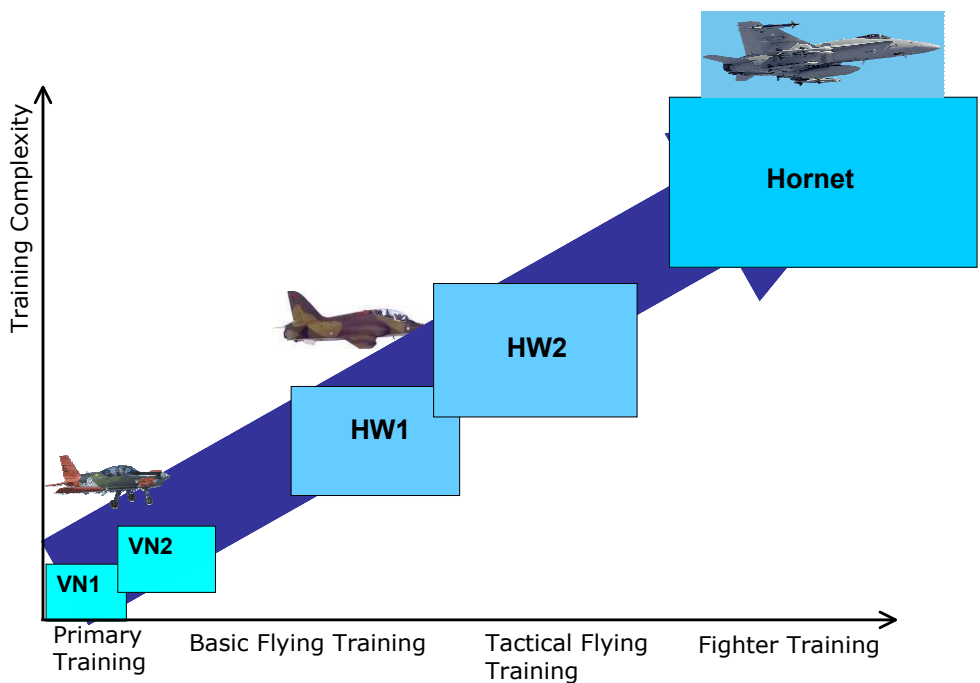


Figure 2 Air Force's flying training in 2006
Source: Air Force flying training syllabi

Vinka training consists of approximately 100 hours of flying training as laid down in two distinct flying training syllabi (VN1 and VN2). During these training phases cadets accomplish a major part of officer's academic studies, then move up the ladder to Hawk training. The Vinka's performance is modest compared with turboprop aircraft widely used for primary training, yet the aircraft enables teaching of the basics of various flight types to such an extent that makes possible safe transition from a slow piston engined aircraft direct to a high-performance advanced jet trainer.

The two-phase (HW1 and HW2) Hawk training program of approximately 220 flight hours covers a wide scope of skills and also includes advanced tactical training, which is more comprehensive than weapons training in the respective training phase in most European air forces. Finland also uses the Hawk for basic training – for which role turboprops are employed in most other countries.

Due to the wide scope of Hawk training, the performance of individual pilots in air combat can be developed and analyzed effectively, and a prediction can be prepared for each pilot of his or her eligibility for advanced fighter training. So far, pilots have not encountered difficulties in moving up to Hornet training.

The goal of this comprehensive training program is to ensure that pilots master to a high degree the basics of air combat before commencing Hornet training, which in turn guarantees that suitable individuals get selected for Hornet training, maintains a high standard of flight safety and cuts down the number of markedly costlier flight hours, in particular those of only seven two-seat fighters in the Air Force's inventory. Experiences of this flying training system have been good, and no need to alter its structure has emerged when training is undertaken using the current aircraft types.

Changes in Flying Training System

Although the BAE Systems Hawk and Patria (Valmet) Vinka, which comprise the Air Force's current trainer fleet, have undergone a structural life extension program, they are scheduled for retirement upon the expiration of their structural life around 2015-2020. During the past few years the Air Force has studied alternative flying training solutions after withdrawal from service of the Hawk and Vinka with the objective of identifying an option that would enable retention of high-quality cost-effective military flying training in Finland despite the modest number of trainees and mounting technical costs of training equipment. An option under investigation is international cooperation in flying training.

To achieve an objective issued by the Chief of Defense, the Air Force has made attempts to increase the number of Hornet flight hours during the past years with associated reduction of annual Hawk flight hours.

Major changes have taken place within the Air Force during the past years. These changes enable efficacious and economic pilot training and fighter operations also in future and include:

- revision of roles of the Air Force's educational units, the Air Force C3 (Command, Control and Communications) School in Tikkakoski becoming the Service School and the Air Force Academy at Kauhava essentially assuming the role of a Hawk training unit
- renaming of the Air Force's educational units to reflect their new roles, with the Tikkakoski unit becoming the Air Force Academy and the Kauhava unit being renamed the Training Air Wing
- consolidation of the Hawk fleet at Kauhava in early 2006
- relocation of Vinka training to Tikkakoski in fall 2005 combined with extensive outsourcing of these operations.

The foregoing changes, which resulted in the replacement of a dispersed training system with a more centralized structure, were made with the aim of directing available resources, and especially aircraft maintenance personnel, to Hornet operations.

At the beginning of this century the Air Force initiated actions with the aim of creating conditions conducive to international flying training at Kauhava. The following measures, among others, have been taken with the purpose of facilitating international flying training at Kauhava:

- Vinka training was relocated to Tikkakoski,
- information of flying training programs has been collected from several countries in a systematic manner,
- all pilots are given training that qualifies them to use the English language in radio communications,
- pilots and fighter controllers are also given comprehensive English language training in issues related to tactical air operations,
- metric units in cockpit instruments and displays have been replaced with imperial units, which are in universal use in aviation,
- modification of the cockpit layout and associated systems is at a planning stage for Hawks; these will improve the aircraft's suitability for training use,
- training airspace and airfield aprons have been enlarged.

Training Air Wing at Kauhava Today

The Training Air Wing, based at Kauhava, is an Air Force unit subordinated to the Air Force's Commander-in-Chief. Its primary mission is to provide Hawk flying training that meets both national and international standards. The Training Air Wing contributes with its Hawks to safeguarding of the nation's territorial integrity and is prepared to carry out air sampling missions.

The Kauhava air base is one of the Air Force's six main operating bases that host resident Air Force units while forming part of the service's ground support network during a time of crisis.

The Training Air Wing's staff numbers (as of 1 February 2006) a total of 216 persons, of whom 160 are officers, officer specialists, warrant officers and non-commissioned officers, while the number of civilian employees is 56. In addition to these, approximately 40 Defense Forces Construction Establishment personnel and around 20 Defense Forces Communication and Information Systems Center employees are stationed in the base. In the area of the former Vaasa Province the Training Air Wing is the sole Defense Forces unit to undertake conscript training with approximately 200 conscripts entering military service each year.

Role of National Flying Training in Finland's Defense

The Defense Staff had previously stated that retention of national flying training capability shall be the main objective in the planning of the Air Force's future training system, and this objective also was the foundation of work undertaken by Kauhava Working Group. The primary goal is to carry out training as a component of an international training program or, alternatively, as national operation - using own aircraft. The essential issue is the ownership and control of aircraft and the significance placed on their envisaged operational roles.

The following are recognized as the main advantages of national military flying training:

- a better position to influence the contents and execution of training syllabi when compared with training abroad,
- more flexible use of hired workforce and lower personnel costs,
- possibility to support Finnish military aviation industry,
- positive effects on the economy and employment in the surrounding community,
- possibility to assign aircraft war-time tasks in support of air defense,
- possibility to use aircraft in supporting roles, which results in savings in more costly fighter flight hours.

The Hawk also has a specific role as a component of the total war-time air defense system. It would be most appropriate if the Hawk's successor were primarily optimized for training role in order to enable training to be carried out in a cost-effective manner; consequently, several features characteristic of fighters, as well as cockpit displays (or equivalent), would be made available through simulation or other technical solutions, thereby avoiding the installation of costly fighter-type systems. Aircraft intended to be used as trainers can be designed to have provisions for armament and other functions required for the conduct of various types of air operations.

3. International Cooperation in Flying Training

Profound changes are taking place in international cooperation in the field of flying training. European nations are under pressure to enter cooperation due to the fact that their aircraft are aging simultaneously while unit prices of trainers are going up and numbers of trainee pilots are going down. Benefits would be drawn from international cooperation in the form of sharing overhead costs of a flying training system over a larger number of trainees. Some European countries are also ushered towards cooperation by lack of airspace.

The most comprehensive cooperation program under discussion is **AEJPT** (Advanced European Jet Pilot Training), which was born in a meeting of the European air commanders in 1996. At the time of writing, AEJPT is a common project of eleven Western European nations (Austria, Belgium, Finland, France, Germany, Greece, Italy, Portugal, Spain, Sweden, and Switzerland) which seek to establish a cooperation arrangement for next generation flying training. A working group analyzed flying training requirements and existing training syllabi of the member nations, then drafted preliminary specifications for a future flying training system.

An AEJPT feasibility study was undertaken within a European aviation industry consortium in 2002-2004. A common European flying training program was found feasible in its proposed form. Two or three training bases will in all probability be selected for the program, Kauhava being one of its ten base candidates. All bases that were evaluated during the study were found usable, with no major differences of operational or economic nature between them being discovered.

Possible AEJPT cooperation would consist of primary and basic training of future combat aircraft pilots before their move to actual combat aircraft training phases. Training would be provided on two aircraft types: a turboprop and a jet.

Yet, several open issues and risks remain in the AEJPT program which, should they materialize, could result in delay of the program, individual member nations leaving the project, or even its cancellation. The AEJPT organization continues

giving finishing touches to the final specification and proceeds with commercial preparations for purchases. A decision of the initiation of the procurement phase of the project cannot be expected before the end of 2006.

Other international training programs that are currently underway or about to be launched are:

- **AJeTS** (Advanced Jet Training School) is a project for coordination of training set up in France by the French and Belgians in 2004, and it is also open for other European air forces. The plan is to provide training with current aircraft until 2018 when these aircraft are retired from service.
- **NFTC** (Nato Flying Training in Canada) is a common project set up and marketed by the Canadian Defense Forces and Bombardier Company, in which all nations, also non-Nato countries, may participate. In addition to the Canadian Air Force Italy, Denmark, Hungary, Singapore, and also the United Kingdom under a shorter-term contract, train their pilots under the auspices of the NFTC scheme. Training contracts may at the time of writing be negotiated to cover time periods of up to 2020.
- **ENJJPT** (Euro-Nato Joint Jet Pilot Training) is a multinational flying training system in which training is provided in the United States under the umbrella of the United States Air Force's flying training with the objective of training pilots of Nato countries for entry into combat aircraft training. European countries utilizing this training system include Germany, the Netherlands, Denmark, Italy, and Norway. Training is planned to continue until 2016 or beyond.
- **MFTS** (Military Flying Training System) is a training scheme under planning in the United Kingdom to provide training, by private service providers, to pilots and weapon systems officers of all services. The first elements of the system should be operational in 2008. Possibilities of selling training to third parties may exist.

In the event of Finland not launching a project for purchase of the Hawk's successor it is important to ensure that training that meets the Air Force's requirements is available within an existing training system.

Several operators from various industries possessing different interests are active in the field of international cooperation in flying training. Most European defense companies have aircraft manufacturing capability or are potential responsible providers of flying training systems, or both.

It takes a minimum of ten years to develop a new jet trainer from a design go-ahead to entry into operational service. Most Western European countries have to replace jet trainers they currently use to support their flying training systems in 2015-2020 due to the expiration of their service lives. All potential successors

of the current aircraft are most likely on the drawing board or at more advanced stages of their lifespan due to a long time of, and considerable investments required for, their development.

Training aircraft are the most expensive component of a flying training system, their purchase price and operating costs making up for more than fifty percent of total training costs. Other expensive components of a training system, which also require long design and delivery times, are flight simulators and airborne simulation systems (such as radar and weapon system simulators), which are produced by a number of specialized multinational companies.

Major European aviation and defense consortiums have shown interest in contributing to international European training programs also in future. EADS (European Aeronautics Defence and Space) has been an active player, in this capacity assuming, for example, the leading role in the industrial consortium of the AEJPT program. The Italian Aermacchi company has developed the M-346 trainer and embarked on an aggressive sales push for the type. Also, the British BAES (BAE Systems) is marketing a development of the Hawk trainer – which is also in service with the Air Force – worldwide; this aircraft, designated the Hawk 128, has been selected for Britain’s future MFTS (Military Flight Training System) training system. Of non-European jet trainers, the South Korean T-50 “Golden Eagle” is expected to emerge an important player in jet trainer replacement programs that are being launched worldwide.

Pilatus of Switzerland is in the process of developing the high-performance PC-21 turboprop with a fighter-like cockpit layout. The Swiss Air Force is studying a new training concept in which pilots are trained to convert from this turboprop direct to fighters.

In the national aviation industry, only Patria can be regarded as a potential service provider for large-scale jet flying training and jet operations.

4. Alternative Flying Training Solutions for Kauhava

This chapter presents on basic level three optional solutions for the establishment of a common European flying training center at Kauhava towards undertaking multinational training there. The alternatives described are regarded as realistic possibilities that already exist at operational or planning stages in several countries. The alternatives are not mutually exclusive; instead, they exist in a number of variations and, consequently, with a degree of intentional overlap.

Option 1: Training as Part of an International Flying Training Center

In this option a flying training center wholly owned by a private service provider is operational at Kauhava. The Air Force purchases its flying training from the service provider in the same manner as other air forces that train their students in the center. The center employs aircraft that are property of the service provider or participant countries in accordance with an appropriate arrangement.

The Kauhava base and those parts of its infrastructure that are needed for training are released to the service provider's use as laid down in an appropriate contract. The service provider would come from aviation industry (flying training company, international defense company, or equivalent) and operate with the objective of generating business profit. In the capacity of a training service provider, the company would compete with similar flying training providers worldwide, yet essentially within the EU. The Finnish Government may receive income from renting property, facilities and infrastructure for use by the training center.

Servicing and maintenance of training aircraft is either undertaken by the service provider or purchased from a suitable sub-contractor, these activities being outsourced if the participants so decide. The program is purely commercial, and financial support for it may under certain conditions be sought in the form of Government support or regional support for improvements in infrastructure and development of training facilities as laid down in Article 87 of the EC Treaty.

The Kauhava based training unit described in the foregoing paragraphs could be part of the AEJPT program or an element of another international flying training center that is either existing or under planning. Finland must be in a position to submit an official proposal for the use of the Kauhava base to support a common European flying training center no later than 2007, when the AEJPT program moves to a phase in which drafting of requests for quotation commences. Should the AEJPT scheme materialize and the current schedule be adhered to, selection of training bases will take place during 2008.

Option 2: Bilateral or Multilateral Cooperation Using Outsourced Aircraft and System

This option may be based on an arrangement between two or more air forces or governments (option 2a below) or a contract signed between participant air forces and a service provider (option 2b).

The project is a common military pilot training program established by the defense forces (air forces) of the participating countries. Applied to the field of military aviation, the project could meet the criteria of a defense project as

defined in Article 296 of the EC Treaty so it would be exempted from the EU's internal market regulations. Moneys needed to finance the project would be drawn from the participating countries' defense budgets.

In option 2a, the participating countries sign a contract for common training operations using, if appropriate, pooled resources of their air forces (personnel, aircraft, installations, etc.). An example of this type of effort is common Franco-Belgian training at Cazaux (AJeTS), which uses aircraft released by the two participants for common training operations. This training option envisages no role for a private service provider, the entire operation being the responsibility of the French and Belgian air forces.

In option 2b, a service provider would occupy a central role in flying training operations. It could own elements of the flying training system and sell training capacity. Training aids and equipment along with their maintenance, as well as major portions of ground training, would be the service provider's responsibility. Training arrangements would be based on a long-term contract, while the service provider would come either from national or foreign industry.

The outsourcing of the Air Force's primary flying training, which is undertaken on the Vinka, may be regarded as a representative example of a solution in which training is provided by a private company. It is understood that some overlap may exist between options 2b and 1 in cases where the latter is established as a common effort of not eleven nations but a smaller number of countries.

Option 3: Bilateral or Multilateral Flying Training Cooperation Using Aircraft and System that Are under Defense Forces Control

This option would mean retention of the present flying training system in which the Air Force provides training with aircraft that are under its control, with the exception that surplus capacity, if it becomes available, is sold to foreign clients. This option, like the foregoing alternative, could meet the criteria of a defense project as defined in Article 296 of the EC Treaty.

This option makes necessary replacement of the Hawk and Vinka from around 2015 onward. The number of aircraft required is determined by the number of trainees, time needed to process them through training syllabi, and personnel available. An operational role could be assigned to the aircraft to boost both peace-time and war-time capabilities of the Defense Forces.

The number of flight hours that can be generated using modern jet trainers is twice the number of hours that the Air Force can produce with its current Hawks, or even more. The service life of aircraft to be purchased is typically in the 30-year class, which after maintenance of an aircraft fleet will not be feasible due to training-related and technical reasons. Considering the number of Air Force

students and resources needed for training it is unlikely that all flight hours that could be extracted from aircraft could be used.

Flight hours surplus to the Air Force's training requirements could be sold in two ways. The Defense Forces itself could sell surplus capacity (option 3a). The process could take the form of bilateral or multilateral cooperation using the same principles as were adopted when training was offered to Poland. This "case Poland"¹ can be regarded as a typical example of training that is provided using aircraft and system that are under Defense Forces control and could be available for sale without this significantly affecting the Air Force's own operations or end-use of aircraft. To avoid a situation where the Air Force would have to use its own personnel to generate capacity that is sold to a foreign buyer, the latter should also use its own personnel other than student pilots to support the operation.

In the second alternative the Air Force releases its aircraft and facilities of the Kauhava base to a private service provider, which in turn sells flight hours that can be generated by aircraft but are surplus to the Air Force's flying training requirements (option 3b). The Air Force will be responsible for arrangements required to support its own training. This alternative also permits cooperation with any aircraft manufacturer who could utilize the Kauhava base for training in connection with aircraft sales, for example. The Air Force could purchase from the service provider the same services that the latter also sells to a foreign client.

5. Costs of Flying Training System and Schedule for Operation and Replacement of Training Aircraft

During the evolution of the AEJPT program (figure 3) preliminary cost assessments and comparisons have been made of the effects of outsourcing of flying training and related functions on training costs. Models that were studied ranged from entirely government owned and operated systems to a system that is in its entirety owned and operated by a private service provider. There are no major differences

1 Poland asked in spring 2005 whether Finland would be in a position to train Polish Air Force pilots with its Hawks in Finland. The inquiry covered English language training and a flying training package of approximately 70 hours, to be administered to 24 pilots over a two-year period. A response to this inquiry was prepared under direction of the Ministry of Defense, with the Air Force investigating training possibilities and costs that would be incurred by training.

The Legal Department of the Ministry of Foreign Affairs stated that the PfP SOFA would have been applicable to training of Polish pilots. In addition to a statement of the applicability of the PfP SOFA, a possible contract between Finnish and Polish authorities would have contained a more detailed agreement on issues not regulated by the PfP SOFA along with other items that are prerogatives of an authority.

Finland's answer to Poland was dispatched in May 2005. Poland, however, announced in September 2005 of its decision to purchase pilot training to meet its requirements for 2006-2008 from the United States.

in the total costs of the models that were investigated. These calculations will be specified as more detailed information of costs becomes available.

The costs profiles of the outsourcing options that have been studied are different. A government owned system, on one hand, involves a spike in government expenditure due to purchase of training aircraft, while on the other hand this type of arrangement is generally the cheapest since a government normally needs to invest less than private companies for purchase of aircraft since a government can usually finance part of purchase from its revenues and is granted loans at lower interest rates. Manipulation of a major property on the company's balance sheet or protection of property using insurance or other equivalent means can also incur additional costs to a private firm.

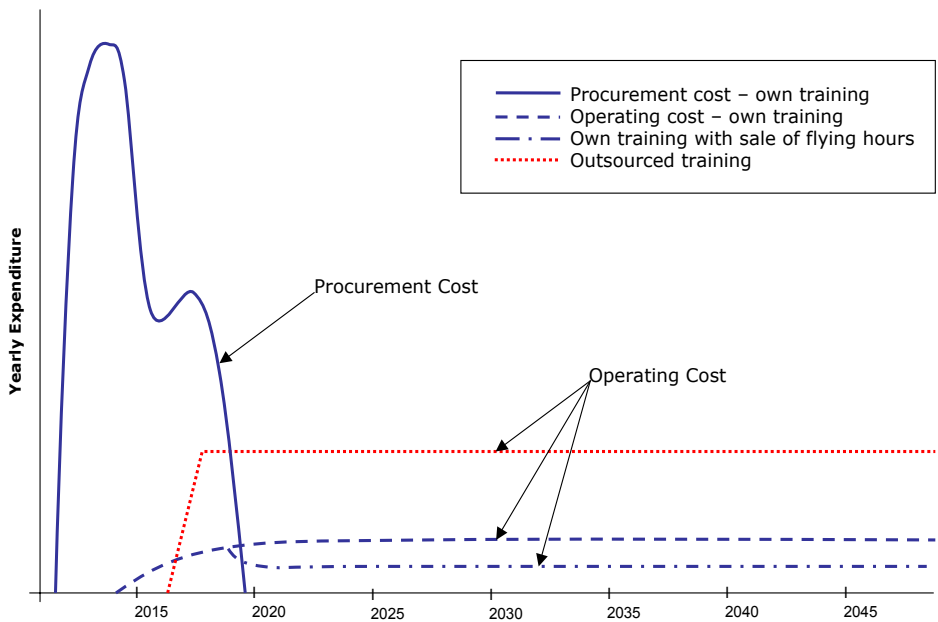


Figure 3 Distribution of costs over time in various flying training options
Source: Kauhava Working Group

Although purchase of government owned aircraft creates a costs spike, annual running costs, which are paid from moneys appropriated for operating costs, make up no more than approximately one third of operating costs that would have to be covered should training be purchased from a service provider. The number of flight hours that could be extracted from aircraft cannot, however, be utilized through the Air Force's training alone, which results in the spreading of the **purchase costs of the aircraft over a number of flight hours that falls short** of the aircraft's design life, which in turn leads to a situation where the total costs of government owned aircraft within their technically attainable life span could remain broadly at the same level as the total costs of training bought from a service provider if financial effects associated with aircraft purchase are not taken into consideration. If, however, some of these otherwise unutilized flight hours could be sold, even a small number of foreign trainees would be sufficient to partly cover the operating costs required for training of own pilots.

If flying training is purchased from a service provider a long-term (typically 20 to 30 years) binding contract must be signed, resulting costs being paid for from the operating costs of the Defense Forces. In addition to training payments that must be made to the service provider, additional costs that are created when students undergo a supplementary training phase in the Hornet -- which provides students with skills that they need to commence more challenging Hornet training -- must be paid for from operating costs, which would be further taxed by the use of Hornets for target representation and other supporting operations that can in the present system be carried out on cheaper training aircraft.

Figure 4 shows a possible schedule for purchase of successors of the Vinka and Hawk. The duration of the various phases of the project are derived from timelines of the Air Force's latest aircraft purchases and estimates of training aircraft manufacturers of delivery times and production runs, among other references. To enable the first cadet course to fly the Hawk's successor to commence training in the spring of 2017, a purchase project, which will include drafting of a request for quotation, should be given a go-ahead in early 2008. During preparation of the schedule shown in the diagram, the fact that a replacement of the Vinka (which here is assumed to be a turboprop) must be purchased before the Hawk's successor. Financing for purchase of successors of both the Vinka and Hawk must be available from 2012 onward.

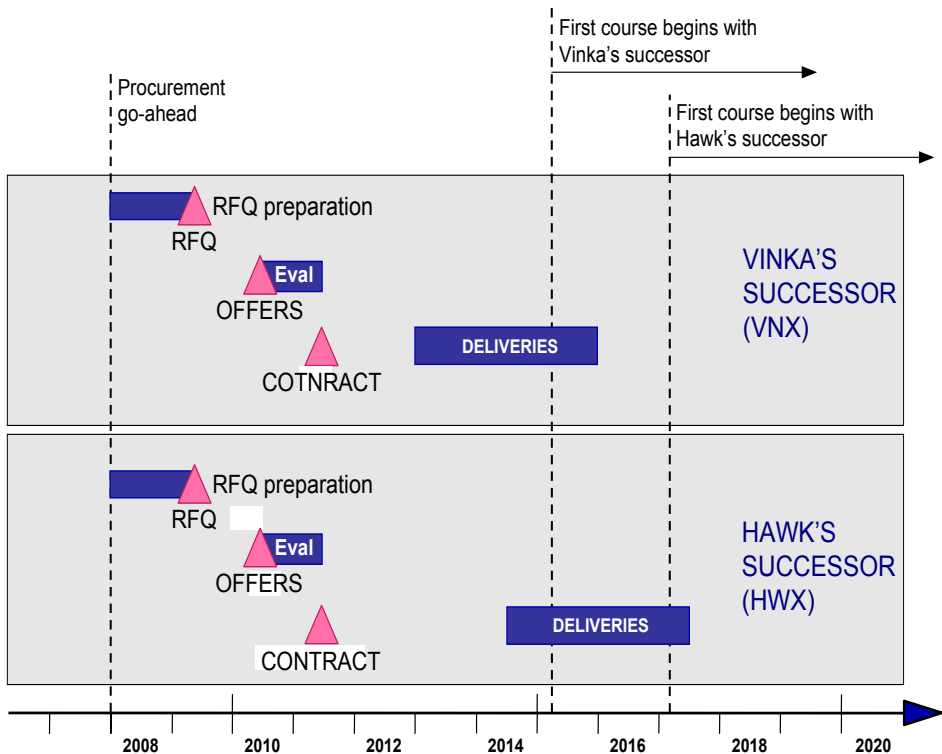


Figure 4 Non-conservative schedule for purchase of the Vinka's and Hawk's successors
 Source: Air Force
 RFQ = Request For Quotation
 Eval = evaluation of bids

If a decision to purchase own aircraft is made it is estimated on the basis of the Air Force's training requirements that approximately 25 aircraft should be acquired as replacement of the Hawk fleet (now 50 aircraft), while approximately fifteen turboprops would be required to succeed the Vinka (now 28 aircraft, of which 18 are used for VN1 and VN2 training).

The purchase of a jet trainer makes possible an arrangement in which the trainer aircraft is assigned war-time roles as part of the air defense system, which in turn releases fighters from supporting roles to their primary mission.

6. Summary: Assessment of Flying Training Options

Chapter 4 presented on basic level three options for the establishment of a common European flying training center at Kauhava or for finding other avenues towards undertaking multinational training there. The alternatives have a degree of intentional overlap.

- In option 1, the Kauhava base is part of an international flying training center.
- In option 2, training is provided as bilateral or multilateral cooperation using outsourced aircraft and system.
- In option 3, bilateral or multilateral flying training cooperation is exercised utilizing aircraft and system that are under Defense Forces control. This option may also involve cooperation with a partner company.

All these options are feasible. The key issue is whether Finland intends to purchase aircraft of her own. Option 3 can be realized through internal actions within the defense administration provided that purchase of own aircraft is seen as a viable solution. There are also different ways of exercising option 2 in case of own aircraft being purchased. Having aircraft under Defense Forces control, regardless of their ownership, would allow for subsequent agreements to be made on the arrangements required for the alternatives described in paragraph 2, along with settlement of necessary partnership details.

Option 1 becomes realistic in the event of Finland not purchasing own aircraft; in this case, Finland should contribute in all means available to the progress of the AEJPT program and strive to have an international training center established at Kauhava. The realization of the AEJPT program in its planned extent is, however, deemed uncertain due to reasons beyond Finland's control so this option must not be seen as the sole remaining alternative. Another solution in this case would be to participate in other training abroad, provided that training that meets the Air Force's requirements is available in another foreign flying training system.

A major difference between the options lies with the possible operational uses of aircraft. Option 3 best enables generation of an operational capability in conjunction with training. Option 2 also permits generation of an operational capability provided that Finland's own share (number of pilots and technicians) in a program is determined in a manner consistent with the desired operational capability. In option 1, use of the aircraft for the needs of national defense is unlikely due to ownership arrangements.

Option 1 meets interoperability requirements best. If option 2 or 3 were considered, particular attention should be paid on meeting interoperability

requirements. In all options, international cooperation, commitment, and networking boost the credibility of Finland's defense and enhance possibilities of providing and receiving military support during crises.

The 2004 Government report on Finnish security and defense policy states that application for Nato membership remains an option in Finland's security and defense policy. All foregoing options would permit Nato membership as training procedures are compatible with those utilized in Western European countries. Nato has no pilot training system of its own, each member nation training military pilots to meet its requirements in a manner it has chosen.

Officer's military and academic education must be arranged on national basis regardless of which option is considered, and the same applies if it is decided to purchase training from abroad as international cooperation is limited exclusively to pilot training. In option 1, officer's education and flying training would most likely be successive training phases, which would lengthen the total time of training. If flying training were separated from the requirements for an officer's degree and would not be given until after graduation, significant delays in flying training would be experienced.

The possibilities of influencing contents of training are smaller in option 1 than in options 2 and 3 as it is difficult to introduce changes to multilaterally approved training syllabi. Changes could affect operational use and, consequently, service life of aircraft, which in turn might necessitate revision of contracts signed by participating countries. According to the working group's analysis, option 1 would bring no particular training related benefits compared with the other alternatives. In option 1, and possibly in option 2, the Air Force would have to complement international training with additional Hornet flying training.

Analysis of the options from the point of view of foreign policy, legislation, airspace management, socio-economic and environmental effects, and commercial, economic and personnel related issues showed that each one of the three alternatives is realistic, yet they all would require actions and, in some cases, additional investigations.

The PfP SOFA², when combined with bilateral contracts with possible partner countries, would make possible both training of foreign fighter pilots in Finland and foreign instructors' participation in this training. If aircraft that are not Finnish Defense Forces property were based in the Finnish territory (option 1 and, possibly, option 2), a critical assessment of the applicability of the PfP SOFA would be required and it should be assumed that the issue would be best settled utilizing other contractual arrangements.

2 See footnote 1.

All options could involve contractual arrangements between various countries. Should a contract include directives that are within the prerogatives of legislation the contract must be approved by the Parliament.

Assignment of a public service function to another body than a designated authority would require that the issue be regulated in sufficient detail in a law.

A contract on flying training could also determine tasks and responsibilities for the Defense Forces. It would perhaps be appropriate to revise the law on the Defense Forces to include more specific clauses on the Defence Forces' participation in the type of operations that is under study.

The legislation related aspects of the different options should be looked into during further preparation of the matter.

Options 1, 2b and 3b would involve release of Government property, with the first two possibly including sale of property. Where an issue involves release of control of property, matters related to compensations, damage liabilities, actions in exceptional circumstances and other conditions of release must be settled.

Options 2 and 3 do meet the criteria of defense projects as laid down in Article 296 of the EC Treaty and are therefore exempted from the EU's internal market regulations. Option 1 is purely commercial, and financial support for it may under certain conditions be sought in form of Government support as laid down in Article 87 of the EC Treaty. Provided that certain conditions prevail, Finland's existing system concerning, industrial participation (offset) could be activated when setting up a training center and when starting training cooperation, for obtaining various flight equipment and training systems, involving transfer of know how and technology.

The working group identified no air navigation services or training airspace related issues that would preclude the realization of the flying training options described in this paper at Kauhava. The Finnish Civil Aviation Administration and Air Force have cooperated in planning of the management of Finland's airspace with the result that the demands of the two parties, one involved in military and the other in civil aviation, for airspace management have consistently been met to a satisfactory degree. Increased Hawk training at Kauhava has made necessary the enlargement of training airspace with associated changes in airspace management, air navigation services, air traffic control systems, and personnel availability being planned, and to the largest possible extent implemented, to ensure adequate conditions for training operations. The different options presented here would have no marked effect on civil aviation as in conjunction with the consolidation of the Hawk fleet at Kauhava arrangements were made to allow such an increase in training volume that would be sufficient to permit the materialization of any one of the options presented.

Neither do the options described here, in the working group's judgement, markedly differ in their socio-economic and environmental impact. Sufficient consideration must be given to environmental issues right from the beginning of a project to avoid the appearance of later, and most likely costly, problems. A separate study shall be made of detailed requirements for the region's infrastructure, the exact objectives of this study being determined by the extent and type of training cooperation, while in conjunction with this the need for an environmental permit, which is required by the Environment Act, must be determined. It is essential that any arrangement involves an established and responsible operator whose resources are also sufficient for investment in structures that are needed for operations and who can assume responsibilities for environmental matters. Should the operator come from outside the Defense Forces, amendments to applicable laws may be required.

Looking at the initial assessment of cost effects of the options, it seems apparent that the cumulative effects are practically the same throughout the life span of new aircraft if financial effects associated with aircraft purchase are not taken into consideration, the question being a choice between permanently elevated operational costs and a one-time investment for aircraft purchase. In all options the buyer of the services, that is, the Air Force, must pay for the purchase of aircraft irrespective of how their possession is arranged. In a case where aircraft are property of a private service provider the Air Force must also pay for the service provider's financing costs and profits. In options where aircraft are not Air Force property (1 and 2b), a long-term contract for approximately 20 years would need to be signed for purchase of services. Due to long delivery times (approximately 3 years) of aircraft, provisions shall also be included in these options to ensure availability of aircraft for training under any exceptional circumstances such as a partner company's liquidation. Option 3 enables sale of surplus flight hours, even sale of training of 4 pilots resulting in significant savings in life cycle costs.

A comprehensive assessment of the economy related effects of the options shall be carried out during further preparation of the matter. The Ministry of Finances maintains that further preparation should be based on the aim of finding appropriate solutions within the current framework of government appropriations. Possibilities of redirecting resources shall be investigated. Matters related to financing requirements and financial commitment will be discussed, and associated decisions will be made, in conjunction with discussions about budgets and budget frameworks.

In option 1, decisions related to personnel policy and peace-time organization would need to be made, these having an effect on the future of current Kauhava based organizations and use of personnel. No changes in the personnel structure

of the Kauhava base would result from option 2a, while option 2b would cut down the number of Defense Forces personnel as a result of personnel becoming employees of a possible service provider. Options 2a and 2b would increase the number of personnel at Kauhava due to increased volume of operations. In option 3, the number of Defense Forces personnel would be determined by whether the Defense Forces or a service provider generates capacity that is for sale. Both option 3a and 3b would increase the total volume of operations so an increase in the total number of personnel at Kauhava would result.

All options for flying training at Kauhava would involve purchase of aircraft, which could then remain under Defense Forces control, be used to support a training program set up with a partner, or be released to a service provider. This fact highlights the need to initiate a decision making process and preparations for a possible purchase to enable a new training system be operational when the Hawks are retired from service around 2017.

7. The Working Group's Recommendations

The working group was tasked to carry out a feasibility study of the setting up of a common European flying training center at Kauhava. As the study progressed it, however, became apparent that the working group's assigned task could not be accomplished without expanding the study to involve issues pertaining to the purchase, ownership and operation of jet trainers so the working group's recommendations also include aspects that are outside the scope of the original assignment. This was deemed necessary, otherwise the report would not provide a sufficient basis for future decisions.

An underlying idea on which the working group's recommendations are based was the objective of ensuring availability of high-quality cost-effective flying training that would meet the Finnish Air Force's long-term needs and would also be compatible with Finnish officer's general training requirements. Another underlying idea was the retention of pilot training in Finland so the working group did not embark into detailed assessment of possibilities for training abroad.

The working group holds the view that setting up an international flight training program in Kauhava would be of importance for the development of the Finnish defence, aviation and space industry and increase the visibility of our country within the field of common European military and air defence cooperation. It would also boost the region's economy and increase demand for new local community and other services.

The working group considers, as a result of its study, all three options described in this paper for setting up of a training unit providing flying training on multinational basis at Kauhava feasible on basic level.

The working group learned that the common European flying training program (Advanced European Jet Pilot Training, AEJPT), born in a meeting of the European air commanders, includes major risks that may result in dropping out of some of the countries currently involved and lead to the effort lagging behind the schedule that Finland sees prerequisite for her own flying training arrangements. Yet the working group recommends that Finland continue to be an active participant in the process with a long-term objective of having an element of a common European flying training program, which may materialize in the long run, or of a training system involving a smaller number of countries, in Kauhava, Finland. The working group also recommends that when decisions of future flying training arrangements for Finland are made any option selected will enable common European flying training or operations as part of a training program in Finland. The working group further recommends that Finland support the possible role of the European Defense Agency in promoting common European flying training programs.

The working group regards the third option, in which bilateral or multilateral flying training cooperation is exercised utilizing aircraft and system that are under Defense Forces control, as the most advantageous alternative from the Air Force's standpoint. In practice, this option means continuation of the current arrangement but involves sale of flying training to at least one government in order to lower costs and utilize surplus capacity that exists during the present period of transition. This option does not preclude bilateral arrangements described under option 2, in which training is provided as bilateral or multilateral cooperation using outsourced aircraft and system. A solution could, in practice, also be a combination of these two options, depending on the emergence of prospective buyers for our flying training and on solutions pertaining to the selection of partners.

The working group recommends that future Air Force flying training be arranged on the basis of the two foregoing options. This would make purchase of new aircraft necessary. Outsourcing of primary flying training to Patria Training is an example of functioning cooperation with a partner company; consequently, partner arrangements with Finnish aviation industries should be studied as an alternative during a decision making process. The proposed flying training arrangement ensures that Finland will have, also in the long run, an influential position in negotiations where the establishment of a possible common European flying training system is discussed, while definitively possessing a training system that meets the Finnish Air Force's requirements. Cost-effectiveness can be achieved through optimization of number of aircraft to be purchased, sale of flying training to foreign governments, bilateral and multilateral cooperation, and outsourcing of parts of flying training.

Air Force specialists heard by the working group stated that the Vinka and Hawk will be retired from service at a rate that precludes the availability of a sufficient number of aircraft for training from around 2017 onwards. The Hawk's service life cannot be further extended without incurring major costs and technical risks. Should it be decided to retain a national training capability, the recommended options make purchase of new aircraft necessary. The working group emphasizes that the number of new aircraft that will possibly be purchased be optimized, with training requirements being the determining factor. Aircraft to be purchased shall be specified essentially for training; as a result, their equipment standards for war-time operations should be kept at a minimum in order to maintain costs at a low level. The number of aircraft to be purchased shall be determined solely by training needs, not by war-time operational requirements.

The working group recommends that training arrangements and possible aircraft purchases be conducted in a manner that involves, in addition to purchase of aircraft, concurrent preparations with the aim of identifying suitable partner countries and companies. Attempts shall already be made to find cooperative partner countries during the time that training is provided with the current aircraft fleet; these efforts, should they yield desired results, would lead to cooperation programs also in conjunction with possible purchase of a new aircraft and training provided with the new platform. Consideration shall be given during this process to the utilization of the capacities of partner companies.

The exact purchase costs of a new jet and propeller trainer fleet will essentially depend on the number of aircraft purchased and on the materialization of partnership arrangements. The working group learned that costs incurred to the national economy during an aircraft type's life cycle by purchase of training are broadly in the same class as those incurred by the purchase of new aircraft, which means that the Defense Forces' operating costs would remain permanently at an elevated level as opposed to a one-time investment.

The working group maintains that marketing efforts for common training at Kauhava must be well planned and coordinated with the Ministry of Defense assuming a central role. The current situation, in which resources are somewhat dispersed, will not provide sufficient possibilities of finding partner countries. The working group recommends that a clear-cut political decision of marketing of training be made, combined with a plan that includes the invitation of all participating authorities along with industrial organizations and companies to take part in the the marketing efforts of the project. In a partnership arrangement, the partner could assume responsibility for marketing.

This is a significant issue from the viewpoint of defense administration and national economy, and it has major effects on the Development Program of the Defense Forces. The issue of replacement of training aircraft should be put in

a wider context of total development of national defence. The matter also has connections with larger defense and security policy related questions.

The working group, therefore, recommends that the issue be outlined in the next Government report on Finnish security and defense policy. Due to the aging of the current trainer fleets and the undertaking of other projects that form parts of the Development Program of the Defense Forces it is important that a decision of a future flying training system is made during 2008. The working group also recommends that the Defense Staff take the selected option into consideration during the drafting of the Development Program of the Defense Forces for 2009-2020.

With the objective of supporting preparations for a Government report on Finnish security and defense policy the working group recommends that it be allowed to continue its work in the capacity of an advisory committee and expert body during the preparation of the report.



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