



eCoach Options for Use

EDDA SYSTEMS AS, NORWAY

This document is produced to give insight into how eCoach can serve various customer needs and thus provide maximum value for investments made. An important aspect is that eCoach is very flexible, so one installation might serve a wide range of use. Such an installation can easily be expanded as needs evolve over time, giving absolute control over investments and minimum risk – there is no need to invest for “possible future needs”.



Figure 1: Simulated control tower as one part of a full-scale eCoach installation. Parallel runways are served with one ground and one tower controller each.

A full-scale eCoach installation can serve the whole range of Air Traffic Management from designing airspace and airports, add weather and traffic to the models, and then simulate ground control, tower control, approach control, and area control – all in the same system and at the same time in a joint session. It is even possible to run several towers and ATC sectors as part of the same session, located at different sites, just like in the operational situation.

Contents

Ground Control.....	4
Tower Control.....	5
3D Tower Presentation.....	6
Approach Control and Area Control.....	7
Traffic Operations.....	7
Simulator Piloting.....	8
Technological Basis.....	9
Software Functionality Basis	10
Daily Operations.....	10
Multi Purpose and Flexibility.....	11
Delivery Times	12
Financial Options.....	12
Quality and Support	12
About Edda Systems.....	14

Ground Control

Full ground control functionality is included in eCoach, with control of startup, pushback, taxi, holdings, de-icing, towing, runway line-up, take-off, airport lighting control, parking stands management, barriers, stop-bars, electronic flight strips, anti-collision functions, various list presentations, weather control, vehicles control for fuel, emergencies, bird scare, runway inspections, and so on. All user interfaces are designed for maximum situation awareness and sim pilot efficiency.



Figure 2: User interface for monitoring (controller) and controlling (sim pilot) ground operations.



Figure 3: Convoy for snow removal in winter operations.

Tower Control

Full tower control functionality is included in eCoach, with control of departure and arrival sequence, co-operation with ground and approach control, abort take-off, touch-and-go, stop-and-go, arrival and departure clearances, runway entry/exit selection, change of runway in use, monitoring and control of airport navigational aids, monitoring of wind, METAR, TAF, vehicles on runway, GA / VFR traffic including patterns for flight school simulations etc., helicopter operations, and more.



Figure 4: Tower control using projectors for out-of-window presentation.



Figure 5: Optional use of printed and/or electronic flight strips.

3D Tower Presentation

One or more eCoach Display Node computers will present a 3D model of the selected airport and add traffic and weather data to it for realistic presentations. The customer's hardware selections decide projector or monitor presentation, the horizontal coverage, image resolution, etc. The customer's building facilities might add constraints to the selections made.

Several simulated tower cabins can be added to the same simulator system, allowing simultaneous work. Even miniature tower cabins can be added, e.g. for individual training of ab initio students, airport operations scrutiny, or other purposes. The position can be operated without need for other personnel resources.



Figure 6: Single Student Training with 3D Tower Capabilities.

One or more 3D Tower cabins can be added to an eCoach installation at any time, even if the system was delivered without it initially. Thus, an ACC only simulator can easily be upgraded to include ground and tower simulation capabilities. All existing exercises can still be used without change.

Weather and light conditions, aircraft and vehicles, and the airport itself have realistic graphics for accurate training.

Approach Control and Area Control

Approach and area control can be automated if only tower control is simulated, or it can be included both with and without co-operating tower control, i.e. full flexibility is supported. All types of airspace can be simulated, including SIDs and STARs of all kinds such as RNAV, Point Merge System, and more. Flight strips, various flight plan lists, AFTN, advanced OLDI coordination, and much more are included as a COTS delivery.

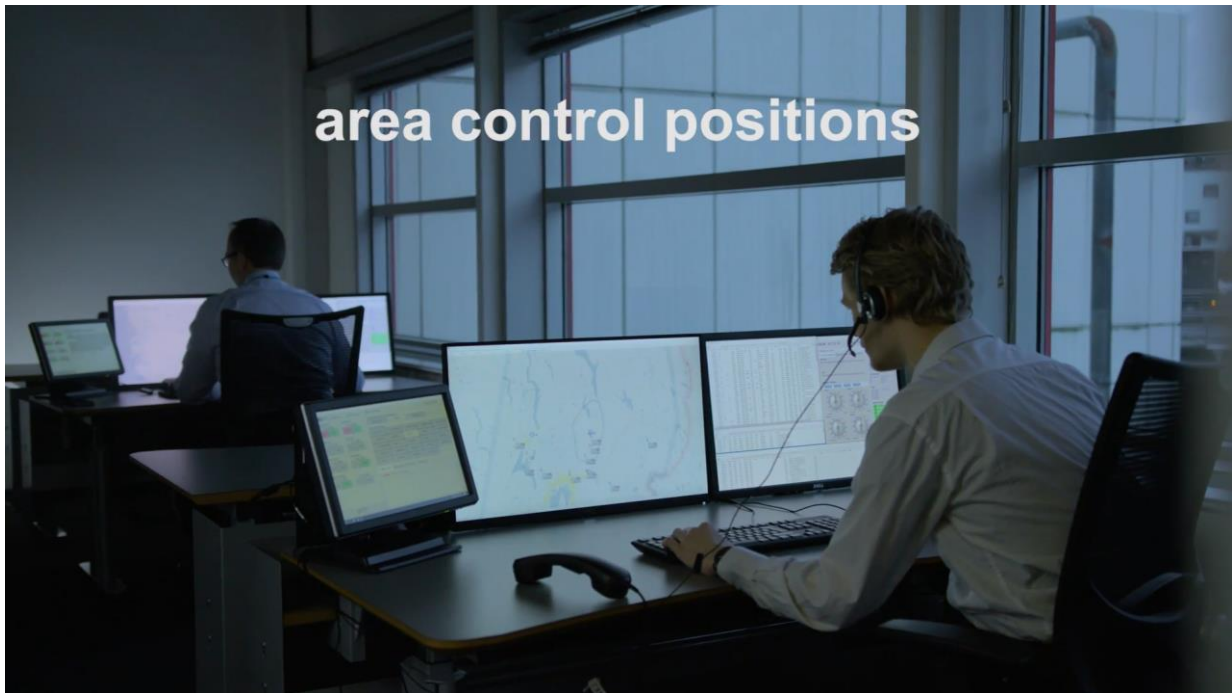


Figure 6: Area and/or approach control positions. Specific hardware is chosen by customer.

Traffic Operations

The eCoach simulator has been in use by several customers with different needs, from the smallest to the biggest airports, with great success. Examples are:

1. ATM education at university level, for students with no previous knowledge regarding ATM.
2. ANSP professional controller training regarding:
 - a. Helicopter operations for on-shore or off-shore activities, auto-rotation, land and take off from anywhere, etc.
 - b. Military operations with fighter formations, including military overhead patterns such as IP break and SFO (Simulated Flame Out), hot and cold side landings with optional touch-and-go for individual aircraft, and more.
 - c. GA and flight school VFR support with comprehensive, yet easy-to-use patterns for circling, and much more.
 - d. Obviously support for all kinds of fixed wing aircraft regarding simulation of commercial operations like business jets, cargo and passenger flights.

Simulator Piloting

For maximum realism regarding voice communication, simulator pilots should be located in a separate room. A common pool of simulator working positions can be used to serve multiple exercises, even multiple simulators, at the same time.



Figure 7: Simulator pilot working positions in separate room.

Exercises are automated regarding all aspects other than the focus of the specific training session. In addition, user interfaces are made for maximum efficiency: For example, only one input is needed to serve major parts of a flight. As a result, a minimum of personnel is needed to support an exercise, and thus cost are kept to a minimum. In addition, training of new simulator pilot personnel is efficient due to intuitive user interfaces – one week of training can be expected.

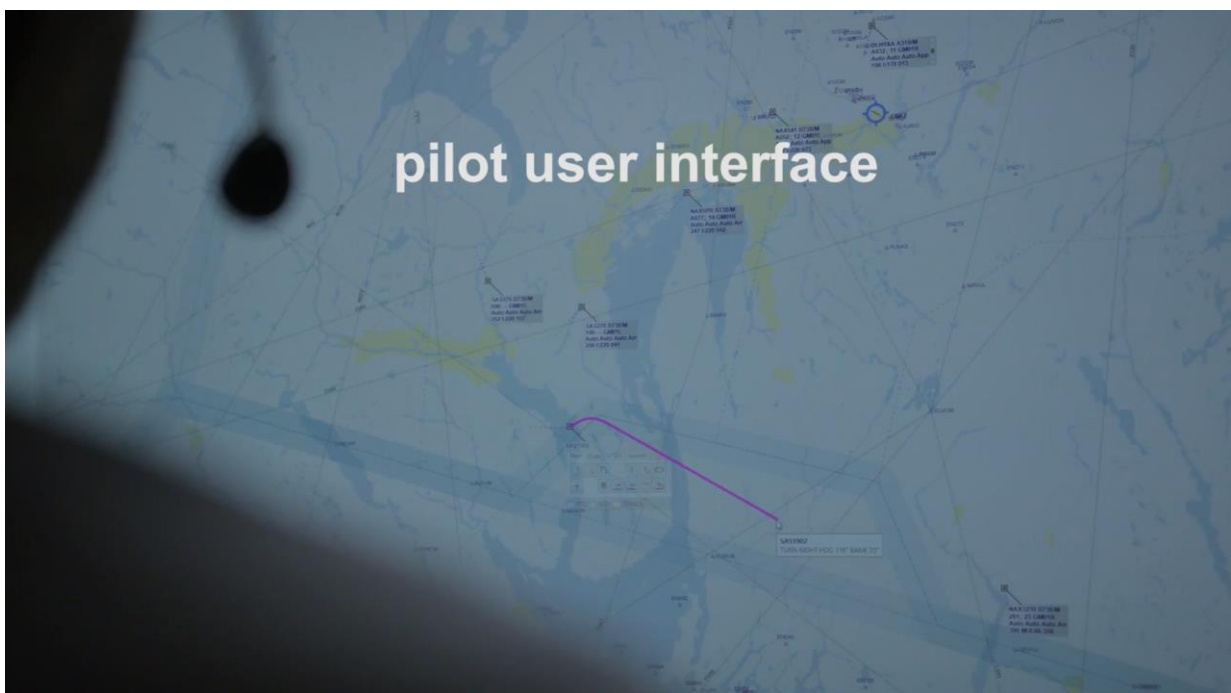


Figure 8: All user interfaces are carefully designed for maximum efficiency in operation.

Technological Basis

The eCoach simulator is based on Microsoft Windows 10 operating system. This gives a large set of benefits which result in low cost both in the short and long term:

- 100 % of hardware are COTS products, including computers, displays, and accessories like headsets for voice communication.
 - This enables the customer to select hardware models that are perfect for own needs and that are sure to be available in compatible models for the long-term future.
 - Prices, delivery times, etc. are very favourable due to strong competition among hardware suppliers. Spares can be kept to a minimum for immediate replacement only. Spares are also connected to the system and kept up-to-date.
 - Adding extra working positions or e.g. a tower cabin is just a matter of COTS hardware purchase and a minimum of installation work.
- No specialist personnel are required for system maintenance, and there are no periodic maintenance procedures.
- User interfaces are very easy to learn for a normal skilled PC user.
 - This gives short periods for full personnel training, typically a week or less.
- The software development environment for eCoach is very efficient, allowing short delivery times and low cost regarding any special needs the customer might have.

In summary, customer benefits are low cost, low personnel needs, high long-term availability regarding both system and spares, and great support for both the system as such and for the simulator software in particular.



Figure 9: Hardware can be selected among thousands of models based on customer needs.

Software Functionality Basis

The software architecture is based on international standards for ATM such as interface protocols and message formats defined by ICAO, EUROCONTROL, etc. This means that message flows in the simulator are similar to the operational, which provides many benefits:

- AIP documentation can be used to quickly model any airspace, existing or planned.
- Each flight is easily defined gate to gate by elements from a standard ICAO Flight Plan.
 - For efficient work, this can be done in Microsoft Excel.
- Detailed aircraft performance data, including even fuel consumption and noise, gives highly realistic aircraft behaviour and many options for e.g. airspace evaluation and other investigations.
- The above enables 100 % realistic simulation from gate to gate.
 - ATC can be included or not as the customer prefers. E.g. if tower control is not part of the simulation, this part is easily automated, allowing ATCC simulations only.

Daily Operations

As for all the rest of the eCoach simulator, the support for daily operations are designed for maximum cost efficient use. Examples are:

- Software initiated power on and off of the whole simulator system from one position.
- Short times regarding start-up and re-start/reconfigure for exercise runs.
- Easy management of exercises and airspace models for multiple airports.
- Detailed monitoring of system status.
- Synchronized playback of data and voice from any session.
 - A separate Player software is supported for office desk evaluations, if desired.
- Very quick and convenient update of all system software and/or airspace definitions (config).
- Remote support from supplier via the Internet, if needed.

No need for specialist personnel is required for simulator operations – regular computer skills are sufficient for all operations.

Multi-Purpose and Flexibility

To increase the cost/benefit ratio of the simulator investment, the cost are kept to a minimum, but also the possible benefit is in focus. For details about this, please see our web pages at www.eddasystems.no and in particular the eBook [eCoach as a Multi-Purpose Tool](#).

As an example, airspace or airport models can be designed at a regular office desk using the eCoach Designer which is delivered with the simulator. Traffic can be added for detailed scrutiny of the results:

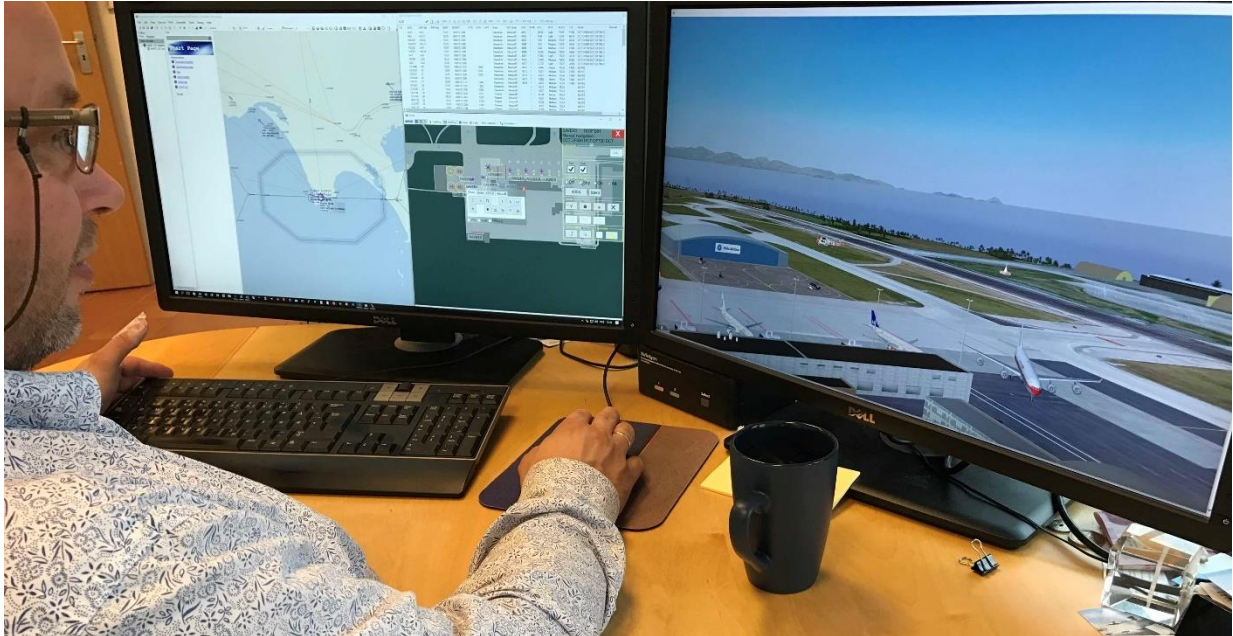


Figure 10: eCoach Designer with 3D Tower in a regular office workplace.

All simulator functionality is available for testing at the office desk. When a recommended model is ready, it can be discussed with experts in a meeting room:

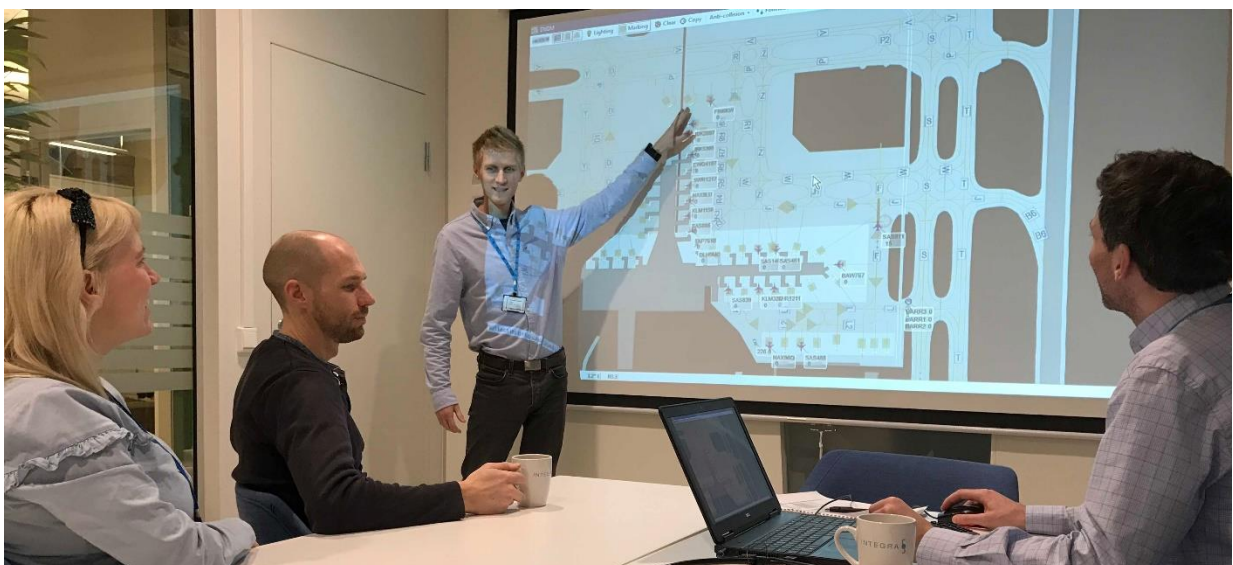


Figure 11: ATC Discussions Using eCoach

After conclusions, the results are brought directly to the simulator for full session run without change.

Delivery Times

Since the eCoach simulator is based on 100 % COTS hardware, delivery times are generally short. VCS accessories like microphones and headsets might take four to six weeks, but computers and screens are a lot quicker. Provided that the site premises are ready, the complete installation can be ready for use in a few months, typically three from contract signature, including training of personnel.

Financial Options

Various financial agreements can be made based on customer preferences. This applies to both hardware purchase and software licensing. The software can be purchased, or arrangements can be made for rental or leasing. Various warranty and support arrangements are available for both hardware and software.

Quality and Support

The eCoach ATC simulator system is a COTS product undergoing constant development based on customer feedback and strategic decisions. Every customer will have special wishes for the presentation and behaviour of the product, to fit their most important training aspects. The supplier Edda Systems is fully aware of this and is prepared to do its utmost to fulfil customer needs at all times. Over the latest years this strategy has proven to be a great success, based on customer feedbacks received. Customers appreciate the efforts Edda put into realizing customer wishes in the shortest delivery time possible, as reflected in customer reference letters. Also, the simulator is highly configurable in real time, allowing customization of user interfaces and functionality to the individual user. Such configuration setups can be stored and be available for use at any time.

The eCoach simulator is produced in a very efficient software development environment by experienced experts from professional air traffic control. This allows rapid development of new functionality when required by the market. Functionalities follow the latest ATC standards and are compatible with existing ATC equipment around the world. However, new standards emerge constantly, and in the case where a customer requires simulator functionality that is currently not available, this will be produced according to customer's detailed requirements in close communication with the supplier.

The eCoach supplier, Edda Systems, Norway, is based on ATC expertise from many years in ANSP before the company was established. It was founded in 2005 and thus the product, eCoach, is developed using the most modern development tools available. The software runs on the latest operating system platform at any time, so the optimal hardware platform is always chosen at the date of purchase for each new customer. New products on the market can be used from the moment they arrive, based on the use of standard hardware.

The combination of expertise and development efficiency has resulted in a product highly appreciated by customers regarding all aspects: Software functionality for realistic simulation and efficient use, airspace and airport definitions emulating real world to great detail, exercise preparation and management with configuration control of historic development. All aspects are developed with focus on ease of use and full control for the end user, resulting in minimum life cycle cost for the customers.

The above is documented through reference letters available on request. Customer feedback can also be viewed in the video found at <https://www.eddasystems.no/index.php/downloads/videos>.

Edda's Quality Management System is certified according to ISO 9001:2015, included on the next page.



CERTIFICATE

Nemko AS has issued an IQNet recognized certificate that the organization:

Edda Systems AS
Spikkestad, Norway

has implemented and maintains a
Quality Management System

for the following scope:

Design, development, and delivery of Air Traffic Control simulators for professional use – including ATCO training, airspace and airport prototyping and simulation, quality assurance, and related services

which fulfils the requirements of the following standard

ISO 9001:2015

Issued on: 2018-05-28

Validity date: 2021-05-28

This attestation is directly linked to the IQNet Partner's original certificate and shall not be used as a stand-alone document

Registration Number: NO-800974



Alex Stoichitoiu
President of IQNet

Pål Eddie
Nemko AS



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About Edda Systems

Edda Systems was established in Norway in 2005 by technical and ATC experts from many years in operational air traffic control. Our eCoach ATC Training Simulator and associated products are in daily use in small to large installations in several parts of the world.



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