THALES

INDUSTRY CONSULTATION

ATC SIMULATION
In Flight Crew Training

Produced by:

Thales Training and Simulation
for the RAeS Flight Simulation Group

A Royal Aeronautical Society & Halldale Media Group
Supported Initiative

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Table of Content

1. Foreword

The ATC simulation requirement introduced first in ICAO Document 9868 PANS-TRG, JAR-FCL 1 Amendment 7 for MPL and now in ICAO Document 9625 Edition 3 has triggered a passionate debate over this modern approach to practical radiotelephony training.

However, the ATC simulation requirement in ICAO Document 9625 Edition 3 has also raised several questions amongst the training community, requiring a consensus to be reached on the expected level of ATC simulation used for pilot training.

In order to better understand the training community's views on ATC simulation, an Industry Consultation was launched in July 2009.

The objective behind the questionnaire was to conduct a thorough analysis of industry's position on the subject, based on a systematic approach: the collection of training professionals' feedback on the perceived relevance of ATC simulation in Flight Crew Training and expected achievements of such simulation capability.

Intermediate results were presented at the **2009 Annual International Flight Crew Training Conference** held by the **Royal Aeronautical Society** in London (UK) on the 24th of September 2009.

The final results of the ATC Simulation Industry Consultation were statistically analysed and released in this document at the RAeS **2009 Autumn Flight Simulation Group Conference** on the 18th of November 2009.

2. Methodology

The industry consultation relied on the feedback of Flight Crew Training professionals who were invited to send their views on ATC Simulation in Flight Crew Training by filling forms circulated by the Royal Aeronautical Society, Halldale Media Group and Thales Training & Simulation.

The questionnaire, built in 2 parts:

Industry Consultation - Part 1:

- *Question 1:* Background related to Flight Crew Training (filter question)
- *Question 2:* Have you ever conducted or received training in a Flight Simulator Training Device (FSTD) fitted with ATC simulation? – YES /NO answer
- *Question 3:* Do you agree with the following statement: 'ATC Simulation is the missing link in Pilot Training'? – YES /NO answer
- *Question 4:* Do you think that the ATC controller role-played by the instructor is an efficient 'acceptable means of compliance' (AMC) for the new regulations in place?– YES /NO answer
- *Question 5:* Do you think that ATC simulation is relevant outside the scope of Multi-Crew Pilot Licence (MPL) training? – YES /NO answer
- *Question 6:* If your answer was 'Yes' to the previous question (#5), which other training do you think should benefit from an ATC simulation capability? – MCC/TR/RE multiple choice

Industry Consultation - Part 2:

- *Question 7*: Evaluation of statements from the least important (1) to the most important (5)

    A. Develop situational awareness in a realistic (busy) airport environment (with traffic)
    B. Develop situational awareness by introducing into ATC messages navigation data correlated with the flight profile used in the training session
    C. Develop situational awareness by introducing a realistic en-route ATC communication environment
    D. Include Pilot ATC communication workload in the simulation training sessions (real-time interaction with virtual controller)
    E. Develop ATC procedural skills
    F. Enhance English language skills to meet ICAO Level 4
    G. Reinforce the use of a strict ICAO 4444 phraseology
    H. Develop Threat and Error Management Skills through scenario-based training using ATC simulation
    I. Reduce instructor workload

*Both parts of the questionnaire allowed for additional comments to be entered.

The responses to Part 1 and Part 2 have been assessed statistically to reflect the frequency of response to each question.

The anonymous comments related to ATC simulation are relayed in this document, as communicated by the respondents, without further analysis, to avoid misinterpretation.

3. ATC Simulation Industry Consultation Participants

This industry consultation would not have been possible without the contribution of training professionals. Thanks are due to all respondents who have participated in this survey and to the Royal Aeronautical Society and Halldale Media Group for supporting the initiative and forwarding the form to all their members and contacts.

The identities of the participants are undisclosed and will remain confidential.

Information reflecting the level of participation:

- Worldwide participation from small and large organisations
- 50 identified Airlines, Training providers, Aircraft OEM, Regulators and Pilot Union organisations have participated, in addition to other unidentified organisations
- 86 responses (Part 1) from Airline Pilots (14) and Professional Airline Instructors (72 including Head of Training, Flight Crew Training Managers, Operations Directors...etc)
- 78 responses (Part 2)
- 13 responses from Regulators
- 12 responses from Military Instructors
- 1 response from a Cabin Crew Training provider
- 2 responses from Universities

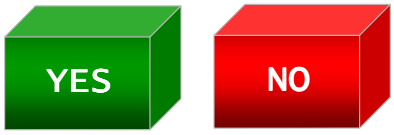
4. ATC Simulation Industry Consultation Results

4.1 Results: Industry Consultation part 1

4.1.1 Section 1 – Flight Crew Training Professionals

4.1.1.1 Statistics

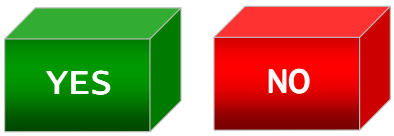
Industry Consultation - Part 1/Question 2



34% **66%**

The majority of the respondents have never conducted or received training in a FSTD fitted with ATC simulation

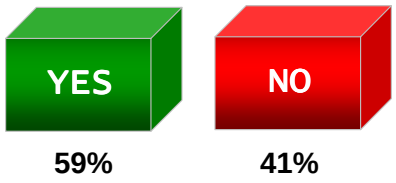
Industry Consultation - Part 1/Question 3



62% **38%**

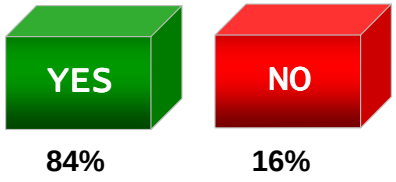
62% of the respondents have agreed that ATC simulation is the missing link in Pilot Training

Industry Consultation - Part 1/Question 4



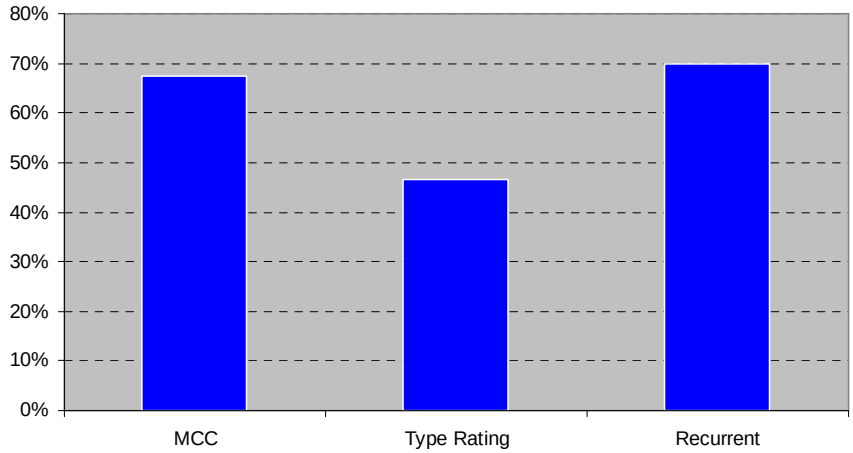
59% of the respondents have agreed that role-playing is an efficient AMC

Industry Consultation - Part 1/Question 5



The majority of the respondents have agreed that ATC simulation is relevant outside the scope of MPL

Industry Consultation - Part 1/Question 6



The majority of the respondents have answered that ATC simulation is relevant mostly to MCC and RE

4.1.1.2 Comments

1- "ATC Simulation should also be part of CRM training."

2- "We should not focus on developing new training technology to accommodate World War II era pilot-controller voice communications protocols but should be heavily promoting completely automated ATC interfaces in all phases of flight and lobby for bringing ATC

into the 21st century. Realistic visual simulation of busy airport environments in terms of other aircraft and negotiating complex taxi routes is more important than any voice simulations. “

3- “I think this is an important means to recreate the real environment, which entails ATC. This is a very real threat and will prepare pilots better for the real line training.”

4- “We have gotten so far a field with the LOE LOFT training and scenario based training that we do not get to have pilots do the things that THEY DO NOT DO ON THE LINE. Crosswinds to max limits, high energy approaches, etc. these are the things that are causing problems and damaging hardware. Not how do they talk to ATC. For MPL training, yes, but for trained crews, especially long haul augmented crew pilots, it is basic flying skills that need to be trained and retained, not talking.”

5- “During Type-Rating-Training ATC-Simulation plays only a minor role and may even hinder the training process by increasing the workload of instructors and students.”

6- “Add on facilities, such as collision avoidance, turbulence etc. to a simulator are generally not used; or if used it is usually a one of demonstration, but they have little instructional value.”

7- “ATC would increase fidelity and straight & level / CRM issues. Requires advanced solutions. Cost / Use benefit.”

8- “AMC instructor role-play can be a substitute. As part of the devotement team for our new MPL course, I had the opportunity to make several experiences with projects in the ATC simulation environment. So far, no product I've seen could fulfil the requirement of practical training needs, as e.g. automatic recognition of changed lesson process like a go around initiated by the trainees without instructor interference or requests by the trainees for radar vectors, longer approach, or other training contents not included in the lesson program.”

9- “Q3- if you had asked "Do you think there is value in adding this capability?" then I would have answered "YES". Q6- ATC simulation would certainly be of value for LOFT and certain SPOT sessions that could be included in Type Rating and Recurrent Training programs, but would not be universally useful or relevant in either of them. ATC simulation would be a useful distracter and additive workload factor in LOFT scenarios, and would add significant training value for SPOT training in TCAS, as well as possibly CFIT and LO VIS OPS”

10- “ATC simulation is a benefit ONLY if it is simple and unobtrusive. It should be an option, NOT a requirement.”

11- “If it is an initial type rating i.e. cadet pilot/second officer training than I think it ATC simulation might have relevance but not experienced pilots switching type.”

12- “I have worked with a company during the development of an ATC / voice recognition system for use in aircraft simulators. To date, these systems do not come close to meeting the needs of pilot training. The SFI has the strength to change and act on the fly to react to a very fluid situation and still meet the training objectives. I have yet to see a simulated ATC system that enhances simulator training, quite the contrary; they restrict the true objective of the training.”

13- “All crew performance centred training will benefit from ATC simulation: more procedure or tech centred training, like type rating, airport qualification, zero flight time base flight is better focused on airplane than on environment.”

14- “Waste of valuable simulator time outside MPL training. Instructor can otherwise complete the ATC task.”

15- “Plus most importantly, ELT to ICAO requirements for pilot trainees with English as a second language.”

16- “Reference to Q 4: The Instructor should have a pre-prepared script for all ATC frequencies and be able to improvise ATC outside the script where necessary, using correct ICAO phraseology, during CRM/TEM exercises, vectoring & unexpected missed approach etc. (Multi-Crew Training) ” see annex for additional comments.

17- “ATC Simulation technology is not currently capable of supporting a major part 121 airline's training needs. Simulation is not flexible enough and doesn't provide for the detailed and complex scenarios that we currently employ. ATC controller role playing by the I/E is vastly superior to current simulation technologies with adequate I/E training and/or scripted scenarios. Requiring ATC simulation would lesson the quality and realism of our current training/evaluation programs.”

18- “During ab-initio training we often feel that it would help, to give the student a more realistic training environment as far as ATC is concerned.”

19- “ATC is not the missing link.”

20- “The absence of proper solutions should not be an obstacle for the implementation of MPL, for an interim period of time other solutions like "instructor ATC" will do. The main objective is to get the ATC communication considered in the strategic behaviour of the crew.”

21- “ATC Simulation is an essential part of MPL and other training, as agreed in the IWG, that worked on the ICAO doc 9625 as well as the ICAO FCLTP.”

22- “On a task analysis basis, the real benefit of ATC simulation is in the MPL and ab-initio pilot training to allow these pilots to obtain the necessary skills in the ATC environment in conjunction with their overall piloting skills. On this basis, I believe ATC simulation should be introduced first in the MPL / ab-initio pilot training phase, and as the capability of this new feature is validated, it should then be introduced to LOFT/LOE type training (real scenario based training) and then other components of pilot training. Replicating the ATC environment is extremely difficult, and until the system is validated, it should not be employed in the training of experienced pilots.”

23- “For initial type rating only.”

24- “ATC is very essential and very important to Air crew training.”

25- “Few would argue against ATC Simulation for all types of Ab-Initio
Training including MPL and MCC. Conversely, it is hard to see the same need experienced pilots who are subjected to ATC on every flight (recurrent training). If the simulation was perfect or close there is the potential for added realism and the very long term possibility of standardizing communication phraseology. We believe it would be a very useful tool for non English speaking pilots to be introduced to high traffic airports and for all pilots being introduced to "Special Airports" that currently require familiarization training; this may in some cases mean several sorties. ATC familiarization could make such training more efficient and, when combined with enhanced simulation currently available, even eliminate or reduce the need for actual flights.

There are several factors that must be considered for the introduction of ATC simulation: It must not be intrusive to the training session by delaying ownship movement or actions. It must be realistic and relevant to the airport or region being flown; this includes background chatter. It must not add to the Instructor workload. It must be easy to implement and modify. Also, not be dependant on supplier maintenance; sufficient source code must be provided to the operator to permit modification.
Cost to purchase and maintain must be realistic. Design target must also be realistic. It is not technically feasible at this point to introduce any ATC program that encompasses all

ground, terminal, en route requirements.
For Ab-Initio training, an integrated system with visual to use on a laptop or PC would enable students to practice privately. Such a design could have embedded lesson plans or even limited free play.

We believe that fully synthetic simulation is not the only solution. It is potentially extremely expensive, as difficult and costly as visual databases to maintain and prone to errors. Much like a printer, the initial cost may be relatively cheap but the cartridge cost is enormous!
We believe other solutions are available that could reduce the cost and be equally effective."

26- "ATC simulation is required to force a realistic plus to the training"

27- "Initial IR training on FSTD is already loaded with new skills to be acquired. Adding ATC would be too much. Better adjusted to the student level by the IRI and much easier to handle than computer generated / FSTD generated communication. The total package includes basic ATC voice training and certification (as practiced in Seitherland at this time), exposure to real ATC context in the flight training phase."

28- "Any simulated ATC must be completely realistic for the particular airport and its environment; otherwise it will be rejected by crews, especially if they are familiar with the area. The ATC simulation I have used to date has not been realistic and thus it has been better to remain with the instructor covering the ATC transmissions as well as the interactions with other persons in the operation such as the ground mechanic and the cabin crew members. In addition to being 100% realistic any ATC simulation must not increase the Instructors workload otherwise it will not be used by instructors."

29- "Whilst there may be a small value in background ATC in some simulator training scenarios i.e. such issues as distraction, I believe this initiative purely generates unnecessary complexity with the potential to constrain scenarios to the extent that instructors are not able to generate learning points that may have more value for the crew. The point is to improve simulation through ATC environment; I would anticipate low fidelity training equipment would be more cost effective for this purpose."

30- "ATC true environment should be a real additional value for "LOFT" training during MCC and Type rating."

31- "In our environment it would be hard to have ATC simulation computer driven. Each crew is different in their action plan decisions. They may elect to land in a non-standard emergency field. I think our instructors would be able to roll with the decisions of the crew much better than a simulation of ATC."

32- "It is a very good idea to have it in the type rating for new pilots (second officers) in order to improve their communication skills which will help them in their line training. As well as for MCC."

33- "My answers to questions 5 and 6 reflect what should happen in an ideal world. Unfortunately the practical difficulty of simulating ATC comms in an interactive way make me doubt that it can ever be achieved by machine. My opinion of using a background tape is that there is little point - it only teaches you that you should listen out before transmitting."

34- "At ……we had 2 ……devices (circa 1987/89) which were specified with digital ATC. This consisted of "stored" ATC messages, some of which were highly automated (to respond to trigger phrases, such as "request airways clearance", and others which were scripted, stored and able to be "sent" by the instructor. It worked quite well, but could no doubt be improved upon given today's technology."

35- “I do not consider that an artificial ATC environment will enhance the quality of our training substantially. The efforts taken are in no relation to the benefits (if any). Normal ATC operation, as it is highly variable and inconsistent, can be experienced in the Observer and Line Training phase. For the abnormal situations an improvement to the current situation can be considered by giving instructors an in depth briefing (at the best by an ATC controller) on how controllers are supposed to react in case of an emergency.”

36- “I believe you need to train as you fly. If the cost is initially prohibited I would back off on Recurrent Training above only. This was all agreed to in the RAeS IWG on ICAO document 9625.”

37- “An effective ATC simulation would enhance all aspects of flying training through realistic simulation of ATC pressures while allowing the simulator instructor to concentrate on students’ reactions to the "complete" training experience.”

38- “ATC simulation is rather complex. If not simulated properly we see the danger of getting into negative training. We also see no means of a realistic ATC simulation since there is no such ATC in the real world. There are so many different ATC centres and standards in Europe that it will be almost impossible to make anything right. If trained with any ATC simulation will never put any pilot in a situation to cope with all European ATC standards. Experience and line training will be necessary for the next years. Presently we don’t see any benefit in getting any funds to upgrade our simulators. A simulator is designed and built to train flying techniques and procedures. Teaching ATC related items are presently not on the top list to be accomplished in a simulator.”

39- “Will be a good aim to reach the scope to have a conjunction training from pilot to ATC controller.”

40- “As a former ATC controller; (…….) would benefit greatly background chatter which could be interrupted by the instructor/evaluator as necessary.”

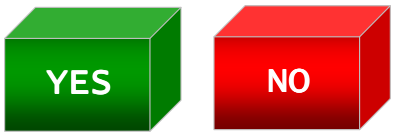
41- “This subject has been extensively debated in the IWG meetings and at other venues, and the vast majority of the industry agree with the requirement for better ATC simulation, i.e. it is the missing link in providing as realistic an environment as is possible during training in an FSTD.”

42- “The deeper the realism we can inject into the simulator model - the better and more meaningful the student experience.”

4.1.2. Section 2 – Regulators

4.1.2.1 Statistics

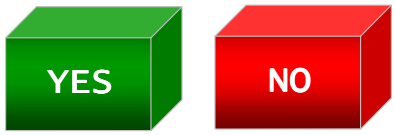
Industry Consultation - Part 1/Question 2



30% **70%**

The majority of the respondents have never conducted or received training in a FSTD fitted with ATC simulation

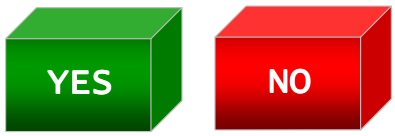
Industry Consultation - Part 1/Question 3



77% **23%**

77% of the respondents have agreed that ATC simulation is the missing link in Pilot Training

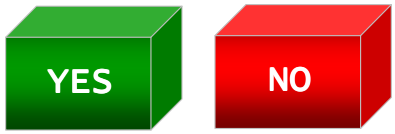
Industry Consultation - Part 1/Question 4



38% **62%**

62% of the respondents have disagreed about instructor role-play being an efficient AMC

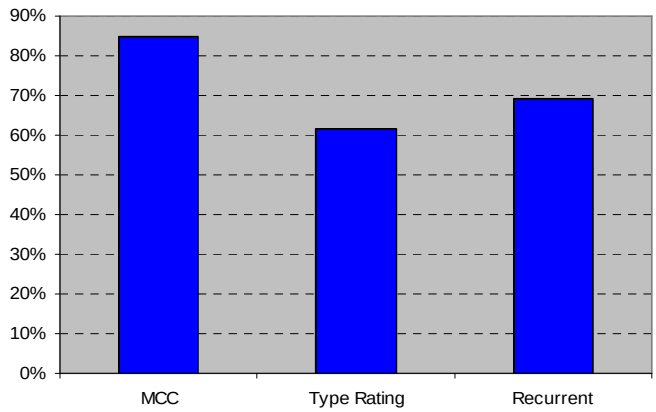
Industry Consultation - Part 1/Question 5



77% **23%**

The majority of the respondents have agreed that ATC simulation is relevant outside the scope of MPL

Industry Consultation - Part 1/Question 6



The majority of the respondents have answered that ATC simulation is relevant to MCC, TR and RE

4.1.2.2 Comments

1- “As a former 20K + hr pilot (heavy int'l Capt. & airline instructor), I have frequently tried (in simulator training) to play the part of “ATC" and know its limitations. Background chatter is important to keep the situational awareness of the pilot and I think it is of utmost value in all simulator airline training.”

2- “I am an …..Regulator, however, I worked with a training provider who developed speech recognition for ATC simulation and presented the potential for applying that technology to pilot training. That technology would standardize instructing, eliminate role-playing, save time in the simulator, provide better training, and permit a wider range of scenarios in line-oriented evaluations, line-oriented flight training, near-miss, traffic or runway incursion training, take-off, approach and go-around training, and clearance recognition/reporting in both domestic and international training. The technology has been used in military and ….ATC instructor/student training for several years and I believe it is the new frontier for pilot training.”

3- “ATC Simulation is not THE missing link in pilot training … but it is A missing link in pilot training.”

4- “ATC simulation is beneficial for every kind of simulated training, but has the highest training value for inexperienced pilots (training up to and including first TR) It has an additional training value for safety when students and/or instructors are marginal in the English language.”

5- “ATC simulation for pilot training is important, especially it could help trainee to set up a good conception and communication. This technology has a big developing space.”

6- “I believe many training centres are interesting in ATC simulation for pilot training. ATC simulation can help pilot to train the communication skill with ATC controller.”

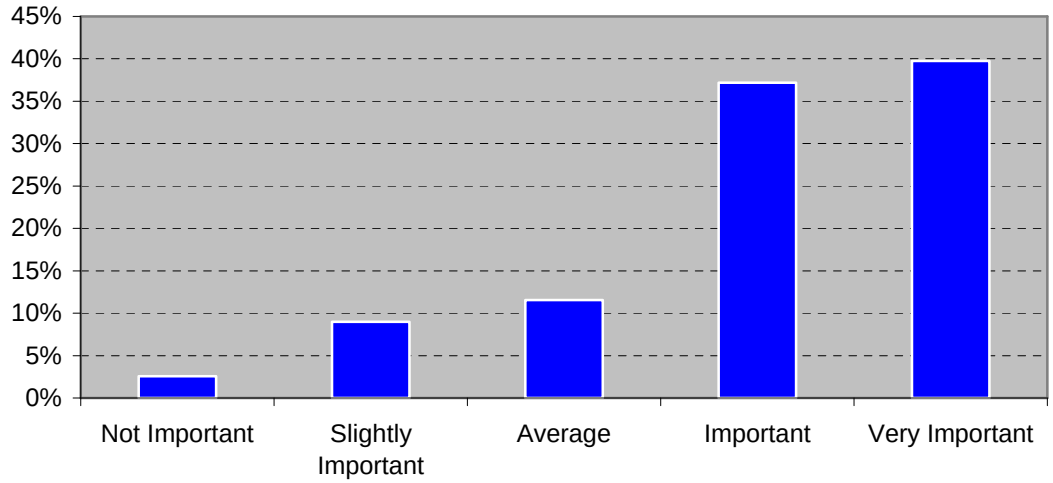
7- “ATC simulation, when realistically done, would increase the reality of training and provide for a operational workload allowing better scenarios, increased use of aviation English and of proper phraseology, and better instructor focus on training. An additional future development would facilitate the operator's training for unfamiliar complex airports where the flight crew can be prepared for local flight procedures, accent, navigational environment, etc.”

4.2 Results: Industry Consultation part 2

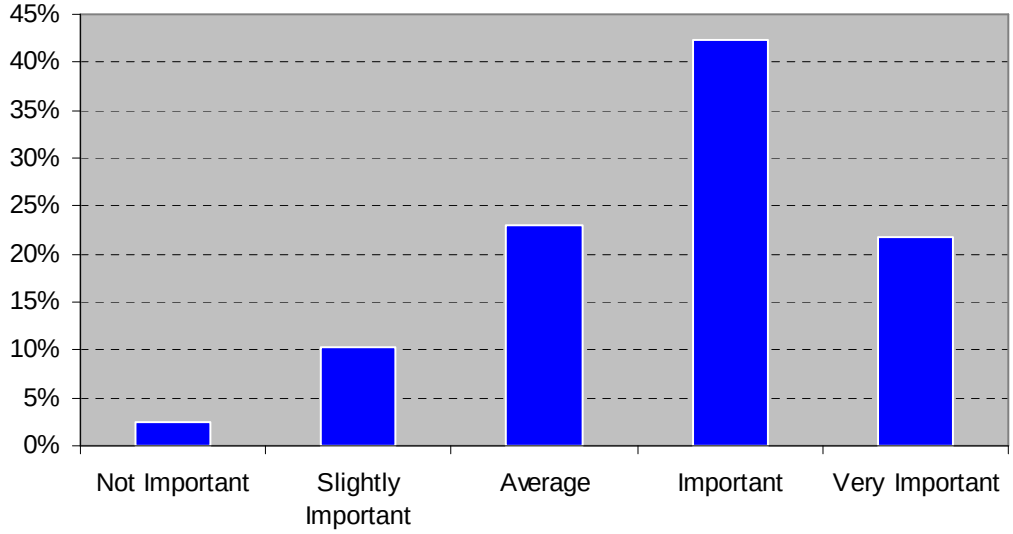
4.2.1 Section 1 – Flight Crew Training Professionals

4.2.1.1 Statistics

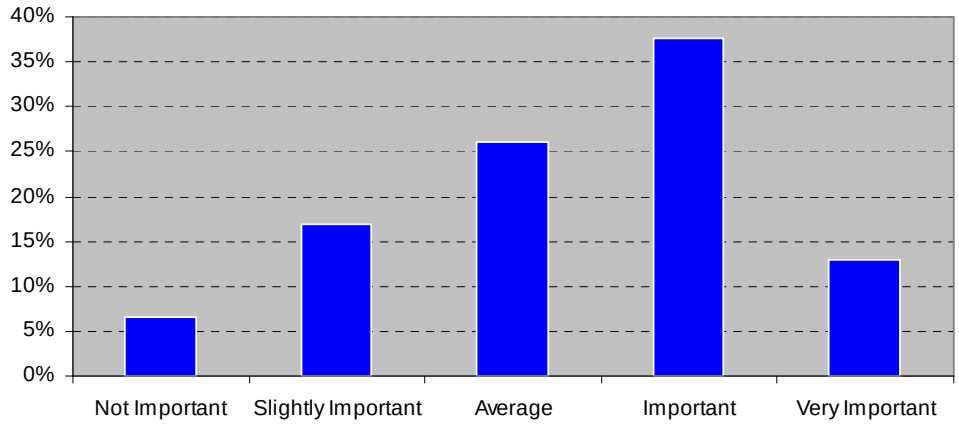
QA: Develop situational awareness in a realistic (busy) airport environment (with traffic)



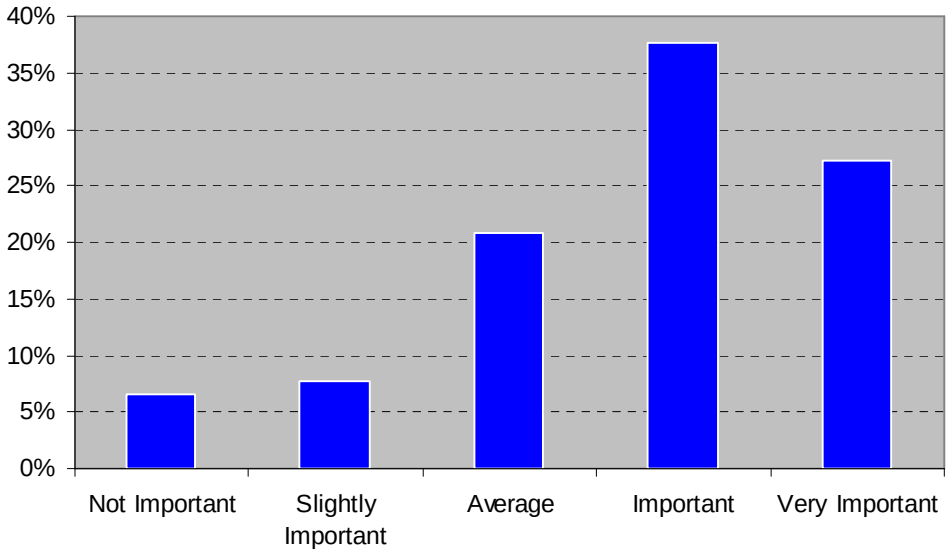
QB: Develop situational awareness by introducing into ATC messages navigation data correlated with the flight profile used in the training session



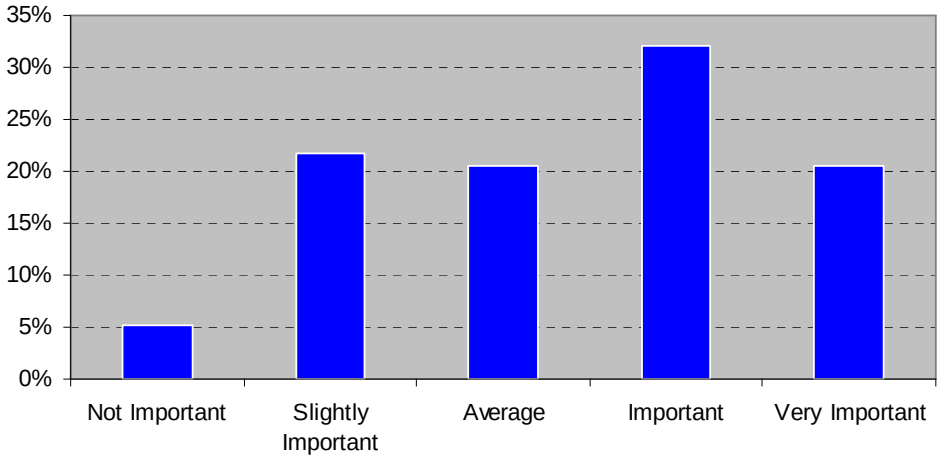
QC: Develop situational awareness by introducing a realistic en-route ATC communication environment



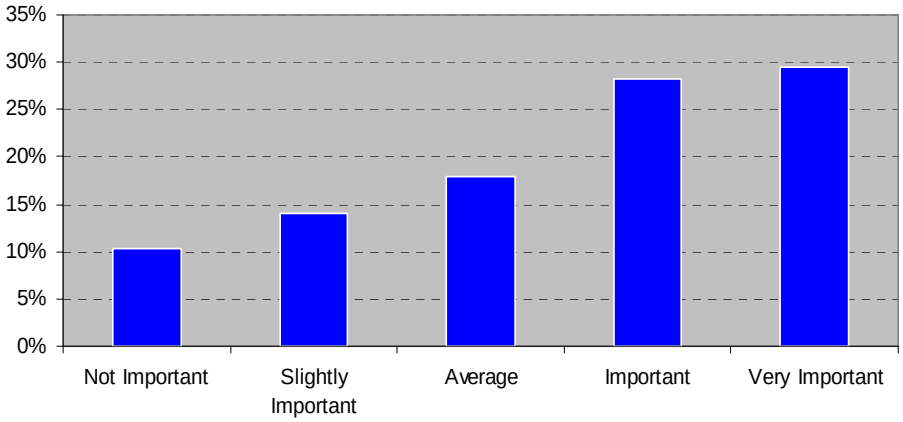
QD: Include Pilot ATC communication workload in the simulation training sessions (real-time interaction with virtual controller)



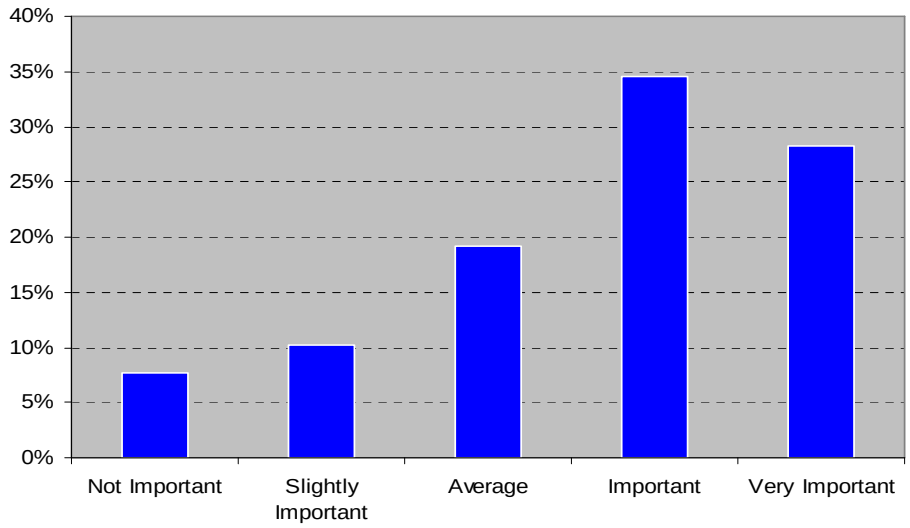
QE: Develop ATC procedural skills



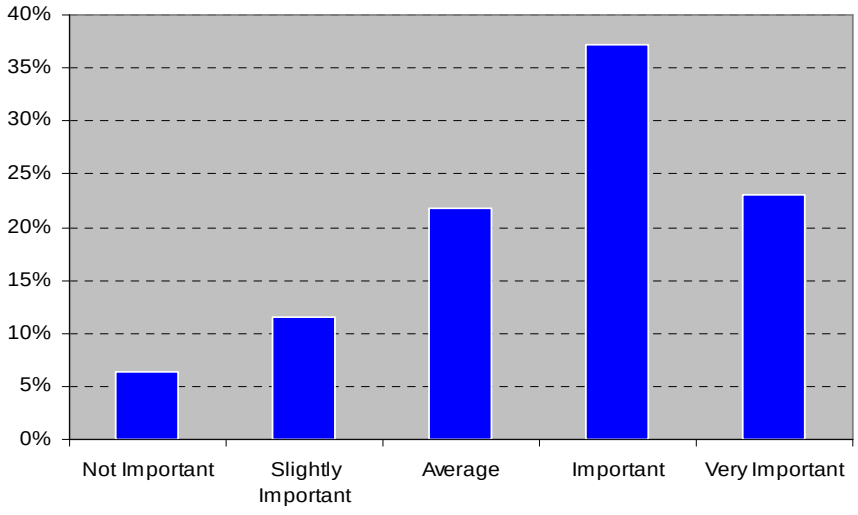
QF: Enhance English language skills to meet ICAO Level 4



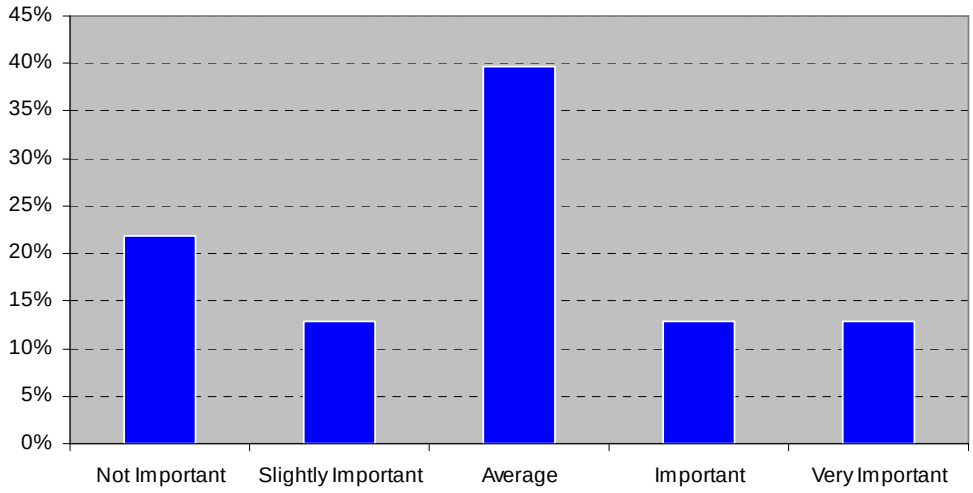
QG: Reinforce the use of a strict ICAO 4444 phraseology



QH: Develop Threat and Error Management Skills through scenario-based training using ATC simulation



QI: Reduce instructor workload



4.2.1.2 Comments

What is considered very important:

- Improve the overall "environment simulation"
- Move towards evidence based training rather than a ticking the box exercise
- Change scenarios in order to teach crews to adapt quickly to changes (Specific value to LOFT and LOS scenario training)
- Comprehend English spoken by ATC of different dialects
- Enhance the division of attention between flying skills and situational awareness
- Reinforce the use of emergency standard phraseology
- Runway incursion training
- Permit flexibility to depart from a set script
- Realistically simulate phraseology, call signs and patterns of speech pertinent to the area or airport in use

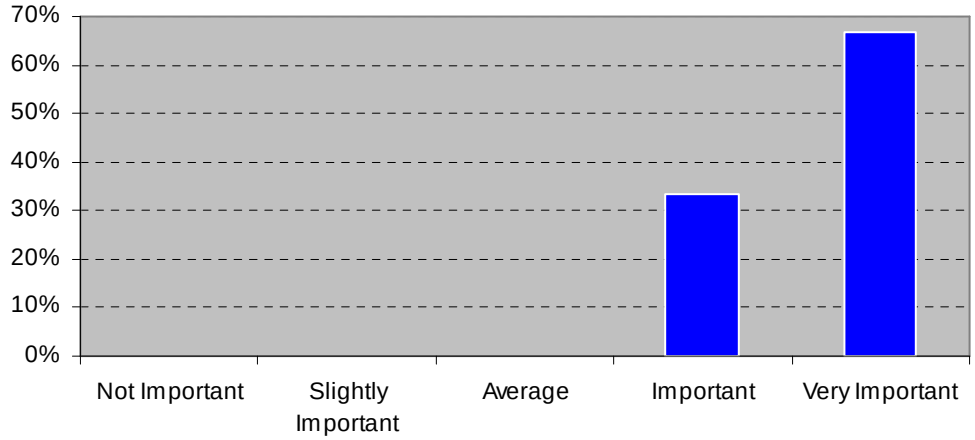
What is considered important:

- Annual ATC Controller exposure to flight deck experience (in simulator) for awareness

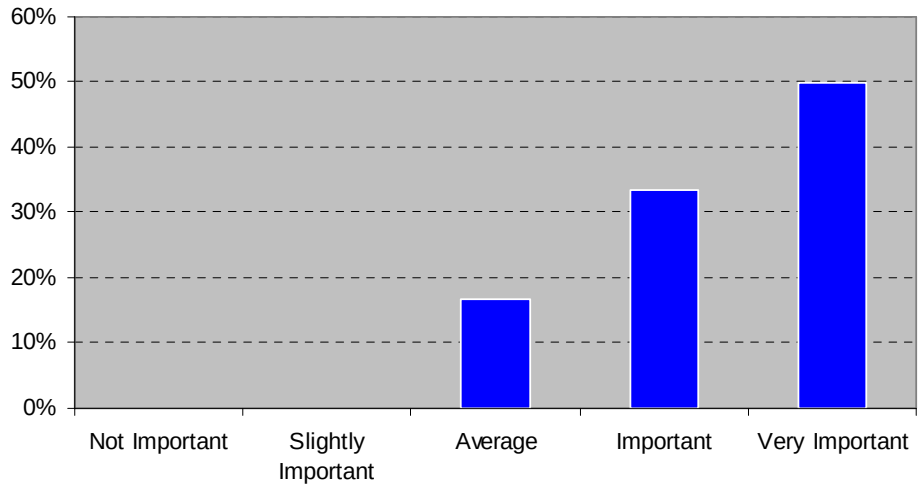
4.2.2. Section 2 – Regulators

4.2.2.1 Statistics

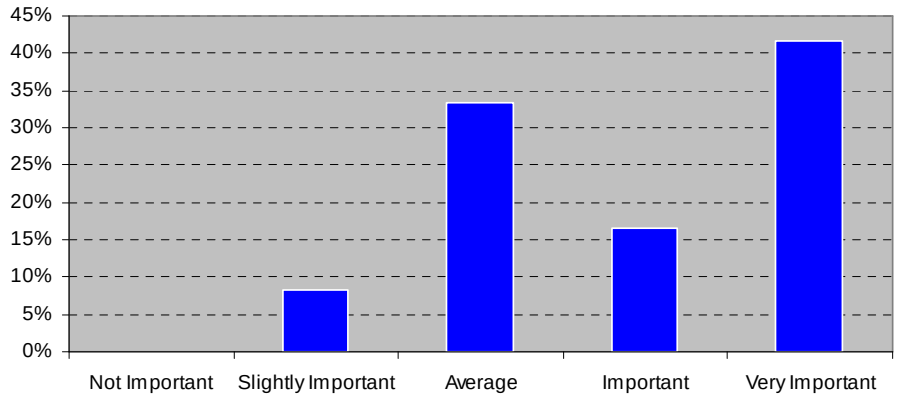
QA: Develop situational awareness in a realistic (busy) airport environment (with traffic)



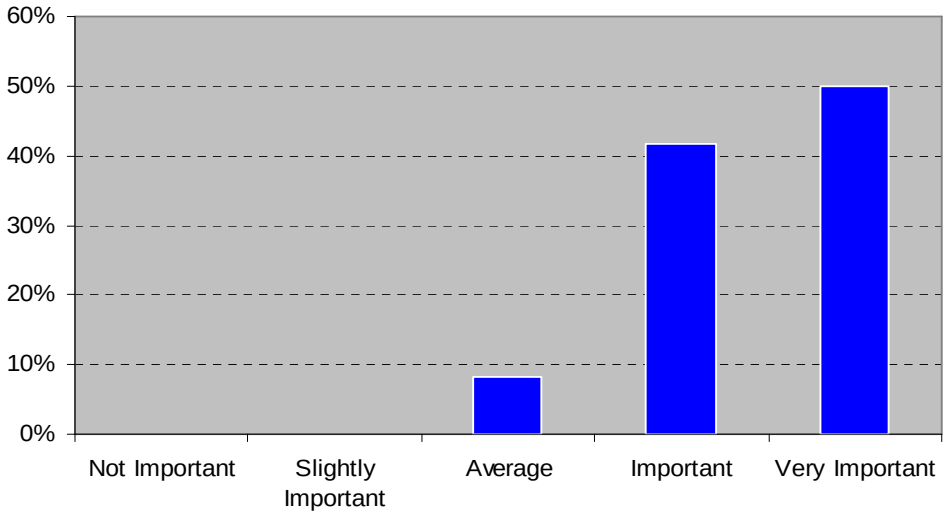
QB: Develop situational awareness by introducing into ATC messages navigation data correlated with the flight profile used in the training session



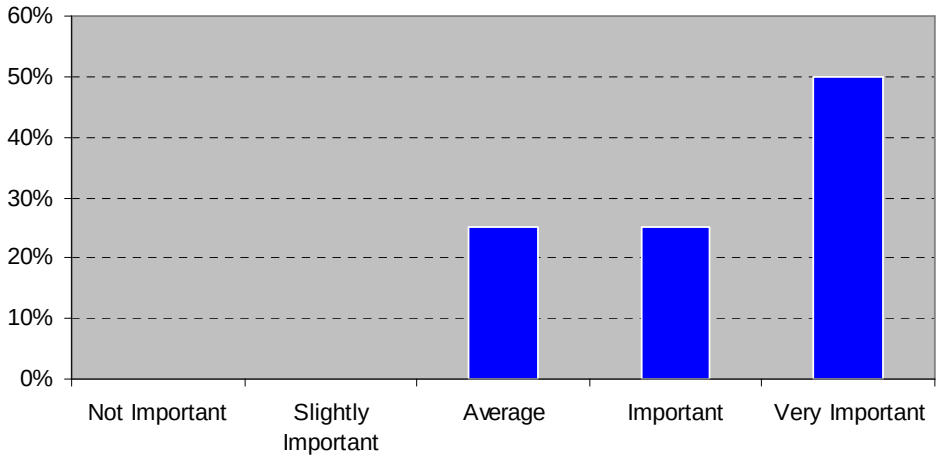
QC: Develop situational awareness by introducing a realistic en-route ATC communication environment



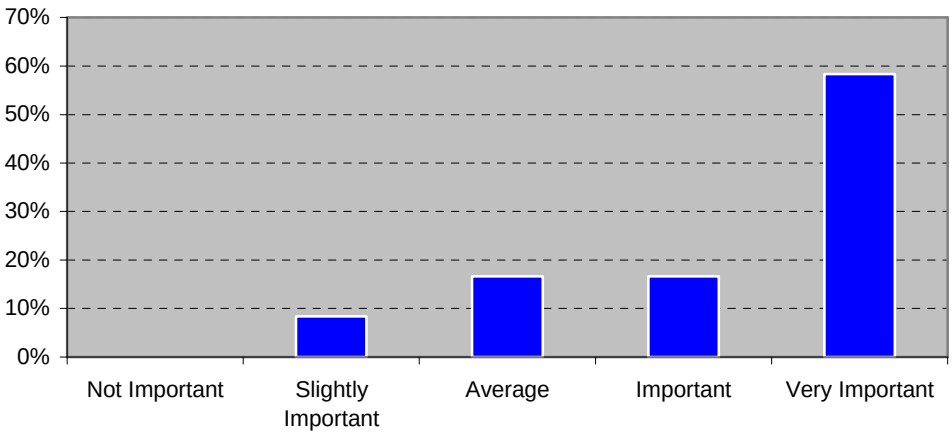
QD: Include Pilot ATC communication workload in the simulation training sessions (real-time interaction with virtual controller)



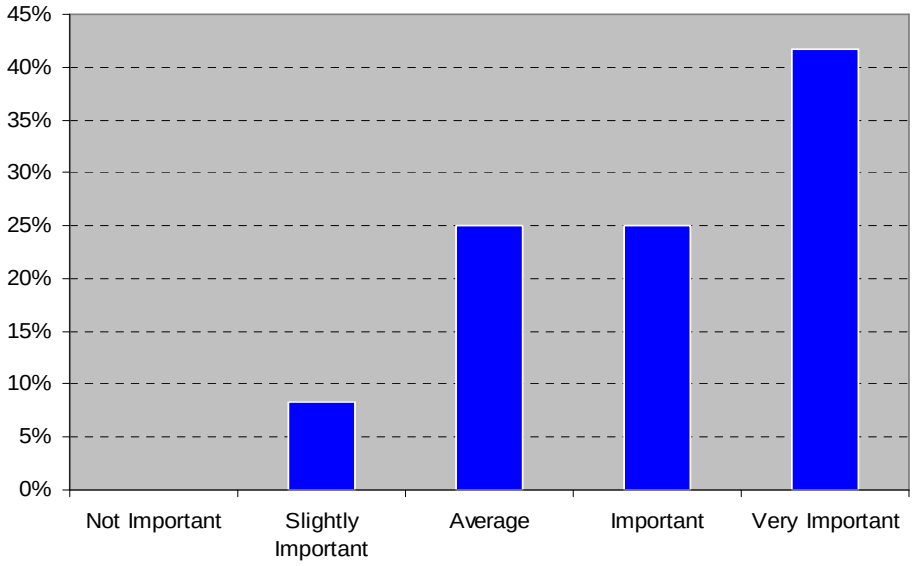
QE: Develop ATC procedural skills



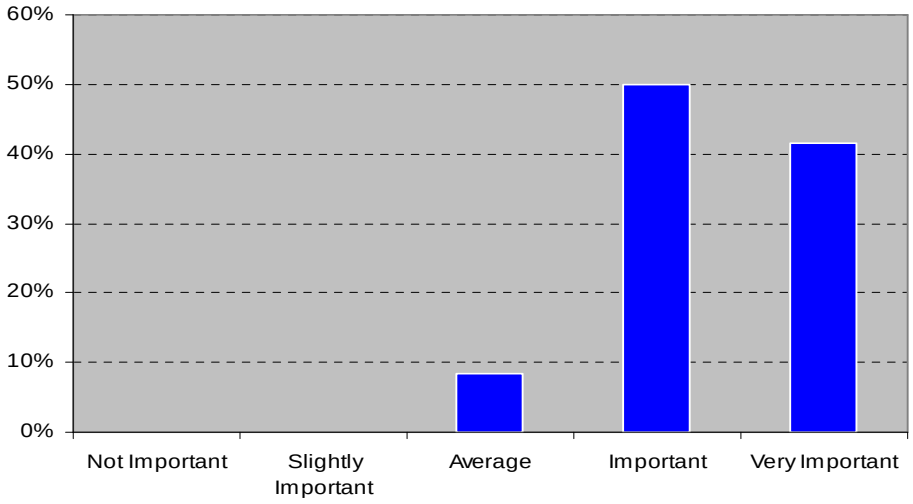
QF: Enhance English language skills to meet ICAO Level 4



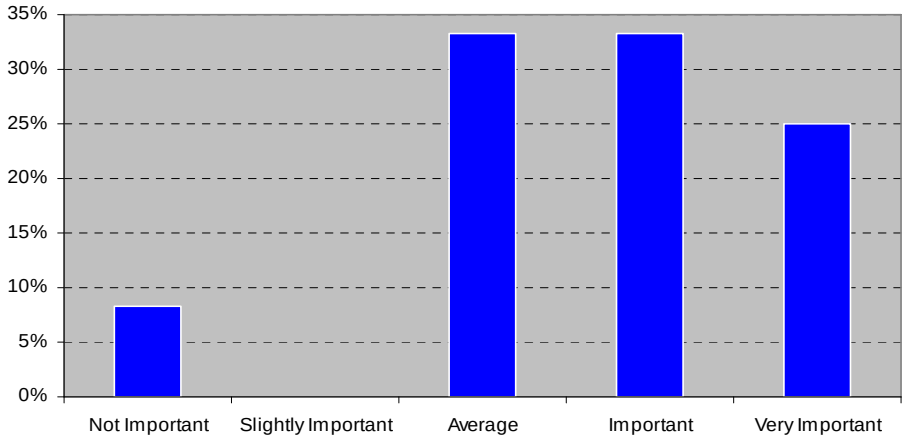
QG: Reinforce the use of a strict ICAO 4444 phraseology



QH: Develop Threat and Error Management Skills through scenario-based training using ATC simulation



QI: Reduce instructor workload



4.2.2.2 Comments

What is considered very important:

- Country ATC differences training for international pilots
- Runway incursion training
- International procedures for NAT Tracks, Pacific Crossings, Polar Ops
- Develop skill in establishing alternative actions in the cockpit
- Develop skill in prioritising actions in the cockpit
- Handling emergency situations
- Hijacking simulations
- Standard Radio phraseology

What is considered important:

- Increasing the fidelity of the simulated environment
- Provide destination/alternate airport familiarisation, including procedures, ATC content/accent

What is considered average:

- Improve realism of LOFT scenarios
- Provide specific ATC communication training for special routes (e.g. transatlantic flight)

5. Other Comments

Cabin Crew professional feedback : “It is essential that all parties in the aircraft not only Pilots understand the role of the ATC in Aviation, in an emergencies e.g. Pilot Incapacitation when Cabin Crew are requested to assist the remaining Flight Crew the understanding and communication should be comprehensible to the Cabin Crew as to not interfere with Flight deck duties. At our Academy we do a day of field training taking students to ATC's at Airports for practical observation as to what the ATC function and communication with Aircrafts and Flight Crew are prior to departure and during flight, we have found that this gives the Cabin Crew member more insight to what is happening in the Flight Deck during flight and with the "Sterile Flight Deck" phase of flight when communication with ATC is taking place.”

Ground Instruction professional feedback l: “ATC adds to the workload especially interaction and awareness. Active intervention from the instructor must also be allowed.”

6. Conclusion

The results of the Industry Consultation depict the importance of ATC simulation to the training community, primarily for MPL training, but also the challenges that are perceived by the Flight Crew Training professionals which appear to be still looking for an effective solution to achieve the following objectives:

- Develop situational awareness in a realistic and busy environment with traffic using ATC simulation
- Develop situational awareness by providing ATC messages depicting the correct location by providing appropriate navigation data
- Include ATC communication workload and interaction with a virtual controller
- Use of a strict ICAO phraseology
- Develop Threat and Error Management Skills through scenario-based training using ATC simulation

Enhancement of English language skills seems key to Training Providers based in Non-English Speaking Countries.

Nevertheless, other issues are still to be resolved:

1- Commercial issues

They cannot be ignored in the current economic climate where we are all under immense pressure to deliver more, for less…

How far should we go?

- Tailoring the system to cope with airports standard operating procedures, and then keep up-to-date: significant consideration for maintenance and through life cost.
- How tailored do Operators expect the scenarios to be? : This implies a level of involvement in product development.
- Different End-users expectations: Is the wish list achievable and cost effective?

2- Regulatory requirements for ATC simulation

Testing and Certification/Accreditation issues: Quantitative or Qualitative tests?

- Subjective Performance assessment (SPA) or Functional Tests
- Repeatability and consistency of the results?

In order to overcome the challenges, the simulation industry needs to continue its work with the airline training community to attain a level of ATC simulation that contributes as much as possible to providing a realistic and positive learning experience which does not conflict with the prime flying training objective.

Ongoing product development should continue to address the training requirements and all stakeholders' needs.

Finally, the industry has to engage with the regulators to establish a certification framework which will shape the future ATC simulation requirements.

7. Annex

REQUIRED DOCUMENTS TO ENSURE MULTI CREW TRAINING COMPETENCY STANDARDS

1. Pre-Course, the trainee should be issued with a company FCOM (formatted to the Simulator aircraft type).
   The FCOM should include limitations, fuel policy, crew areas of responsibilities and Normal Procedures etc.

2. Also, briefing notes for each exercise should be issued to the trainee before the course commences.

3. The briefing notes for all Multi Crew training sessions, should also include;
   a. Flight plan - for the route (in company format) & Fuel requirements
   b. Weather forecasts - Departure, Destination & Alternate airports
   c. NOTAMs (for the above airports) for possible CRM exercises
      These documents must be taken by the crew to each pre-flight briefing and used in flight i.e. disposable.
   d. Route map (Jeppesen or other)
   e. Applicable current Charts for all planned and alternate airports
   f. Extracts from QRH applicable exercises (Full QRH in the Simulator)

4. The Instructor should be issued with the same data as the trainee **and** an ATC script, which includes;
   a. ATIS (for simulator environment set-up)
      (including T/storms in vicinity - for TEM & Windshear exercises)
   b. Positions of storms (if required for the exercise - en route & local)
   c. Airways Clearance (Correct format / PDC where possible)
   d. All (correct) SMC, TWR, Departure, Route and Arrival frequencies.
   e. Winds, at various levels
   f. TCAS events, Changes of Tracks, Diversions, STARS, Approaches,
      Missed App. scenarios, taxi instructions etc.
   g. The ATC script must comply with ICAO R/T phraseology and
      include LOCAL procedures where applicable.
   h. Script should include all the scenarios for CRM and TEM exercises
   i. Scripts to include Company calls, Ground engineer, Dispatch & Cabin crew
   j. Final Load Sheet (disposable)

   Note: 'Company' means the Sponsoring Airline (or a high quality generic airline, if required, for pure Multi Crew training as distinct from MPL training)

8. Glossary

- ATC: Air Traffic Control
- CFIT: Controlled Flight Into Terrain
- CRM: Crew Resource Management
- ELT: Entry Level Training
- FAA: Federal Aviation Administration
- FCLTP: Flight Crew License and Training Panel
- ICAO: International Civil Aviation Organization
- IWG: Industry Working Group
- MCC: Multi-Crew Cooperation
- MPL: Multi-Crew Pilot Licence
- NAT Tracks: North Atlantic Tracks
- LOE: Line Operational Evaluation
- LOFT: Line Oriented Flight Training
- LO VIS OPS: Low visibility operations
- LOS: Line Operational Simulation
- RE: Recurrent Training
- SPOT: Special Purpose Operational Training
- TEM: Threat and Error Management
- TR: Type Rating