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AN EXAMINATION OF AN ALL-SIMULATED AB-INITIO AIRCREW TRAINING PROGRAMME

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JCSP 45

Solo Flight

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SOLO FLIGHT

**AN EXAMINATION OF AN ALL-SIMULATED
AB-INITIO AIRCREW TRAINING PROGRAMME**

Major Jamie Brennan

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AN EXAMINATION OF AN ALL-SIMULATED AB-INITIO AIRCREW TRAINING PROGRAMME

INTRODUCTION

“Flight simulation has been a supplementary part of live flight training since Edwin Link delivered his first simulator in 1927.”¹ Today, simulation is incorporated into aircrew training at every level as technology advances at monumental rates. Simulators offer a mechanism of training so realistic that new F-35 pilots for example, “complete roughly half of [their] initial qualification flights in the Full Mission Simulator,”² not only for affordability and effectiveness, but also necessity, as the \$80 million³ aircraft only has one seat.

But what about the benefits offered by simulation for non-pilot aircrew such as Air Combat Systems Officers (ACSO) and Airborne Electronic Sensor Operators (AES Op), where employment is not a matter of hands and feet but one of system management and information interpretation? At a time when RCAF ab-initio ACSO and AES Op training programs are stalled by antiquated training systems and aging aircraft, would it not be more beneficial to provide initial “back-seat” aircrew training in a simulated environment in a much shorter, more cost effective manner, and in one that better reflects the tasks they will be expected to perform at the operational level down the road?

¹Robyn Bainbridge, “H19 FTD Level 5 Simulator Receives Certification,” Air Med & Rescue, last updated 03 July 2019, <https://www.airmedandrescue.com/latest/long-read/simulation-and-training-evolution-pilots>.

²Lockheed Martin, “F-35 Lightning II – Training, Support Equipment and Sustainment for Fifth Generation Aircraft,” last accessed 10 April 2020, <https://www.lockheedmartin.com/en-us/products/f-35-lightning-ii-training-systems.html>.

³Kyle Mizokami, “The F-35 is Cheap to Buy (But Not to Fly),” Popular Mechanics, last updated 30 October 2019, <https://www.popularmechanics.com/military/aviation/a29626363/f-35-cheap/>.

This paper will argue that ab-initio ACSO and AES Op training can be completed entirely via simulation versus actual flying. An analysis of the shortcomings of current training programs, the benefits of utilizing simulation over live flying in the training scheme, and the impact of planned future training initiatives on this overall strategy will formulate the basis for this argument.

A FAILING LEGACY

Ab-initio “ACSO and AES Op training [is] delivered by 402 Squadron at 17 Wing, in Winnipeg, Manitoba.”⁴ These “undergraduate training systems generate personnel to feed five [Operational Training Units] OTUs that convert the [new winged graduates] NWGs onto operational aircraft at tactical units.”⁵ Primary 402 training resources include: 1) the CT142 Gonzo, a modified Dash-8 100 aircraft; the Tactical Mission Trainer (TMT), a “Windows- based system”⁶ that “simulates all of the aircraft systems, atmospheric phenomena, and flight characteristics”⁷ of the CT142 that is utilized both on the aircraft in an emulated role⁸ as well as in a ground based desktop simulator; and 3) the Procedures Crew Trainer (PCT), a simulator based on the CP140 Block 3 “Aurora Incremental Modernization Project.”⁹ While the PCT is a recent acquisition, the TMT has been in use since 2001 and “is no longer capable of providing the core competencies needed to operate the modern complex sensor suites used on board RCAF

⁴Treasury Board of Canada Secretariat, *Business Case, Future Aircrew Training (FACt)*, Department of National Defence/Royal Canadian Air Force (Ottawa: President of the Treasury Board, 2018), 9.

⁵*Ibid.*, 21.

⁶Department of National Defence, C-12-142-0T0/MB-001, *CT142 Aircraft Navigation Training System Instructor's Manual* (Ottawa: DND Canada, 2011), 1-2.

⁷*Ibid.*

⁸*Ibid.* The Navigation Training Computer receives actual inputs from the aircraft Flight Management System and Air Data Computer and emulates this information within the TMT program into simulated systems that may be manipulated at each student training station without affecting the actual performance of the aircraft or related systems.

⁹402 Squadron, *Concept of Operation: 402 “City of Winnipeg” Squadron Procedures Crew Trainer* (Winnipeg: 402 Sqn, 2017), 1.

operational fleets. Additionally, CT142 ... fleet serviceability is problematic as the aircraft ages and nears the end of its [Estimated Life Expectancy] ELE.”¹⁰

ACSO training has shifted focus from older generation navigation to modern system and mission management, whereas AES Ops are taught electronic sensor operations. The current problem rests in the fact that the CT142 has neither an onboard sensors suite nor the modern tactical computer systems required to facilitate the training. As the TMT program is used both on the ground and in the air, ground simulator instruction fares no better. Both courses encompass a curriculum of ground school, simulator, and flying missions where specific mission profiles are first practiced on the ground and then repeated almost verbatim in the air. Flying hours on the ACSO and AES Op courses have been reduced over time as job specifications have changed, going from 120 to 80 on the ACSO course, and 24 to 12 on the AES Op course.¹¹ Unfortunately, “obsolescence of the current training system has accelerated while the health of ACSO and AES Op occupations”¹² trends downward. As a result of depreciating resources, in 2015, 402 Squadron ACSO and AES Op courses were deficient in meeting their Qualification Standard (QS) requirements “by at least 32% and 53% respectively.”¹³ Efforts to address these shortcomings were identified as early as 2010 through a Statement of Capability Deficiency (SOCD) report, which highlighted the need for a new Tactical Mission Training System to make sure QS requirements were being fulfilled and “to

¹⁰Treasury Board of Canada Secretariat, *Business Case, Future Aircrew Training (FACt)* ..., 9.

¹¹Department of National Defence, *RCAF Training Plan – Air Combat Systems Officer* (Ottawa: RCAF, 2019), Annex B; Department of National Defence, *RCAF Training Plan – Basic Airborne Electronic Sensor Operator* (Ottawa: RCAF, 2018), Annex C.

¹²BGen J.B. Ploughman, *Tactical Mission Training System (TMTS) – Analysis of Critical Issues* (2 Canadian Air Division: file 4520-1 (COS)), 28 October 2014.

¹³BGen J.B. Ploughman, *Training Needs Analysis (TNA) Report of the Tactical Mission Training System (TMTS) for ACSO and AES Op Basic Occupational Training* (2 Canadian Air Division: file 4520-1 (COS)), 28 April 2015.

ensure students [were] ready to be employed on modern RCAF platforms such as the CH148 Cyclone and the [upgraded] CP140 Aurora.”¹⁴ Unfortunately, both the CT142 and TMT systems remain in use with little advancement.

TRAINING REALIZATION – THE AES OP EVOLUTION

Prior to 2017, AES Op training consisted of simulator and flight training where the emphasis of instruction focused on aircrew duties, communications, and radar operations.¹⁵ The inability to provide practical electronic sensors training led many to question the value of the program in its current state, a point further verified through a validation study conducted using AES Op graduates between 2011 and 2017 and their respective OTU training staff, where the “overall quality of NWGs was assessed as low.”¹⁶ It was deemed that ab-initio AES Op training simply did not meet the needs of the operational communities and that a revision in training philosophy was required. Accordingly, numerous changes were undertaken. AES Op training was re-vamped into a sole QS with a heavier weight on sensors and radar employment. TMT simulator and CT142 flight training missions were reduced by over 50% to 3 and 4 respectively,¹⁷ and were primarily maintained in the curriculum just to introduce radar homing and emergency procedures.¹⁸ Students were sent to 404 Squadron in Greenwood to conduct sensors training on the Aurora PCT until such times as 402 Squadron acquired their own

¹⁴1 Canadian Forces Flying Training School, *Statement of Operational Requirement – 1 CFFTS Tactical Mission Training System (TMTS)* (Ottawa: DND Canada, 2011), 9.

¹⁵402 Squadron, *AAFT – Intermediate Airborne Electronic Sensor Operator Qualification Course Training Plan* (n.p. 2014), Annex C.

¹⁶Sgt Corey Hawes (402 Squadron AES Op Standards), email to author, 15 May 2020.

¹⁷Department of National Defence, A-P2-019-L5A/PC-D01, *Basic Airborne Electronic Sensor Operator (AES Op)* (Ottawa, DND Canada 2018), Annex C.

¹⁸Hawes, email to author ...

PCT system in 2017¹⁹ Additional training was conducted in house using table top computer trainers to teach subjects relating to acoustics and environmental theory.

The results from this shift to a simulator heavy program were quickly apparent. The PCT enabled 402 Squadron to train up to 97% of the AES Op QS²⁰ with a reduction in course training days. Further benefits were observed at the OTUs, where for example a reduction of approximately 15 training days has been seen over the last four CP140 Maritime Operational Aircrew Training (MOAT) courses.²¹ With respect to 404 Squadron specific PCT training, a reduction of roughly 22% in training hours²² was noted between students who have completed initial PCT training at 402 Squadron versus those who haven't (Figure 1).

PO	1702	1902
Radar	39 hrs	35 hrs
IFFI	8 hrs	4 hrs
Overland Radar	16 hrs	12 hrs
MAD	12 hrs	12 hrs
EO/IR	16 hrs	12 hrs
ESM	19 hrs	16 hrs
Sensor Review	16 hrs	8 hrs
Totals	126 hrs	99 hrs

Figure 1 – PCT Training Reduction in Hours between MOAT Serials 1702 and 1902

Source: CWO Fred Williams (2 CAD AES Op Trg), email to author, April 8, 2020.

Simply put, a reduction in flying in favour of simulator based training produced more qualified AES Op candidates in less time and at less cost; and made them available sooner for operational front line employment than previous ab-initio programs. Although

¹⁹402 Squadron, *Concept of Operation* ..., 1.

²⁰*Ibid.*

²¹CWO Fred Williams (2 CAD AES Op Trg), email to author, 08 April 2020.

²²*Ibid.*

the PCT is presently being introduced into ACSO training, there remains a significant live flying component on that course, the value of which is constantly contested in much the same way AES Op training was previously, especially since it doesn't meet all of the training requirements of the trade.

AN ALL-SIMULATED SOLUTION

In 2015 the RCAF “released its first long-term simulation strategy, paving the way for the spending of hundreds of millions of dollars on new training initiatives.”²³ The vision is, by 2025, to “have a simulation-focused training system which skillfully leverages live, virtual, and constructive (LVC) domains within a networked common synthetic environment.”²⁴ The benefits of this strategy are three fold: more effective training, more efficient training, and smarter training.²⁵ Although little was mentioned specifically about non-pilot aircrew, the application of such an approach would be highly advantageous along the three aforementioned domains which are henceforth examined.

More Effective Training

Present ab-initio training has already been identified as lacking in the ability to fulfill ACSO and AES Op QS requirements. Simulator training can offer a wide variety of benefits over actual flying towards achieving this goal. The fact that better performance has been attained through AES Op PCT instruction with reduced flying hours is testament to this. First and foremost, a simulator training environment is available wherever and “whenever it needs to be.”²⁶ Between FY 2016/17 and FY

²³David Pugliese, “Canadian AF Establishes Simulation Strategy,” Training & Sim, last updated 21 March 2015, <https://www.defensenews.com/training-sim/2015/03/21/canadian-af-establishes-simulation-strategy/>.

²⁴Department of National Defence, *RCAF Simulation Strategy* (Ottawa: Directorate of Air Simulation and Training, 2015), xiii.

²⁵*Ibid.*

²⁶*Ibid.*, 4.

2019/20, an average 20% of 402 Squadron flights were cancelled for either weather or aircraft unserviceabilities.²⁷ The unpredictability of securing a consistent VFR flying environment for training has led to substantial course delays, postponements which are further compounded by aircraft maintenance issues on a dated fleet. “At the same time that live training events have become more difficult to accomplish, significant technological advances have improved the productivity and realism in the modeling, simulation, and distributed training areas.”²⁸ Accordingly, simulation “can realistically represent training environments anywhere in the world ... which are inherently safer and more secure”²⁹ on any given day without interruption. A school “can run a simulator 16, 18, or more hours a day and turn it back to back.”³⁰ This is unattainable with a live flying program.

In addition to dealing with location and weather challenges, training effectiveness is only as good as the capabilities of the platform being used. If a simulator can offer more diversified training scenarios than an aircraft, particularly ones that portray real world threats, co-operating units, systems employment, and tactical situations more reflective of that expected during operational employment; wouldn't it hence be more beneficial to fly 20 different scenarios in a simulator than 10 repetitive airborne missions? Findings from the ACSO Focused Validation Study conducted by 2 Canadian Air Division (2 CAD) in 2018 noted that “ASCOs employed on six different legacy and new or modernized aircraft operating in five different operational communities do not benefit

²⁷402 Squadron Operations, Cancelled Missions Spreadsheet. Information obtained from the 402 Squadron Operations and Technical Support Flight Commander.

²⁸J. Schank *et al*, *Finding the Right Balance, Simulator and Live Training for Navy Units* (Santa Monica: RAND, 2002), iii.

²⁹Department of National Defence, *RCAF Simulation Strategy ...*, 1.

³⁰Eric Tegler, “Air Force Flight Simulators May Help Cut Training Costs,” last updated 11 November 2011, <https://www.defensemmedianetwork.com/stories/virtual-bargain/>.

equally from the ab-initio training provided at 402 Squadron.”³¹ An attempt to alleviate this concern through the introduction of the PCT into the ACSO program has been positively embraced, however current training platforms and practices simply cannot provide enough diversity towards creating a well-rounded candidate suitable for employment across a variety of operational aircraft in the time allocated. Despite incorporation of the PCT, upwards of 80 flying hours are still spent utilizing out-of-date systems in an attempt to *justify the need to fly*. “Virtual training devices, in contrast, are designed to support training.”³² Simulators “have become so incredibly sophisticated that they can accurately replicate ... the operation of systems down to the deep button presses and menu selections”³³ of any modern mission suite. Scenarios can be tailored to the needs and progression level of the student. They can be recorded and reviewed by the instructor. Ultimately, mundanely utilized flying hours could be replaced with simulator hours that create totally unique learning opportunities for students, and more of them, with far better feedback “that cannot readily be duplicated via live-fly training.”³⁴

More Efficient Training

“Training using simulation allows more concentrated training, reduces reliance on scarce resources, and supports more frequent execution of training events.”³⁵ ACSO and AES Op training courses have not finished on time in over a decade, with delays of six months being encountered in recent cases³⁶. Current wait times of 18 months³⁷ for new

³¹Col R.J. Walker, *Focused Validation Report Air Combat Systems Officer (AKGA)* (2 Canadian Air Division: file 4985-3 (AF Trg Val Coord)), 28 March 2018.

³²Department of National Defence, *RCAF Simulation Strategy* ..., 5.

³³Stephen Pope, “Simulating Reality,” last updated 11 July 2011, <https://www.flyingmag.com/training/recurrent-trainingsimulators/simulating-reality/>.

³⁴Department of National Defence, *RCAF Simulation Strategy* ..., 5.

³⁵*Ibid.*, 6.

³⁶Captain Yu Jin Lee (402 Sqn ACSO Course Director), in discussion with the author, 22 May 2020.

³⁷Captain Craig Isenor (2 CAD ACSO BTL Manager), in discussion with the author, November 2019.

ACSO candidates on the Basic Training List (BLT) prior to even commencing ab-initio training following recruit school, compounded by additional wait periods upwards of two years depending on platform for OTU training,³⁸ further justify the need for efficient delivery of courses in minimal time. Skill fade has been noted as problem amongst candidates as a result of this drawn out training flow.³⁹

From a cost perspective, 402 Squadron is allocated roughly \$8 million annually to operate 4 training aircraft, and flies 1800 hours per year in support of ACSO and AES Op training as well as pilot conversion and currency.⁴⁰ The CT142 has an operating cost of approximately \$4710 per hour without factoring in aspects of crewing, maintenance, and flight operations support.⁴¹ Comparatively, the “US DoD estimate[s] the cost of simulation at between 5-20% of the cost of the equivalent training on an aircraft,”⁴² where “relative costs of simulated versus actual flight hours are between 3.3% and 14%.”⁴³ In 402’s case, although the PCT is certainly not the be all and end all of simulation systems, given the increased training effectiveness this mere \$5 million procurement⁴⁴ has provided over live flying hours, arguably the purchase of one or multiple high fidelity simulator systems would be vastly cheaper than that of acquiring a new aircraft platform, and with much better training potential. Additionally, much of this technology is readily

³⁸*Ibid.*

³⁹Walker, *Focused Validation Report Air Combat Systems Officer ...*

⁴⁰Captain Rob Nicholson (402 Sqn Admin O), email to the author, 16 May 2018. 17 Wing FY2018/19 402 Squadron Final Business Plan Allocation.

⁴¹Department of National Defence, *Cost Factors Manual Air Chapter 2018-2019* (Ottawa: Director General Costing, Investment, Planning, and Approvals, 2019), Table 1-1.

⁴²Department of National Defence, *RCAF Simulation Strategy ...*, 6.

⁴³S. Yoon *et al*, “A Study on Transfer Effectiveness and Appropriate Training Hours in Airplanes Simulators” last accessed 07 April 2020, https://www.itec.co.uk/__media/libraries/human-factors-and-performance-in-a-connected-age/15---Sugjoon-Yoon-Slides.pdf.

⁴⁴LCol John Schwindt (1 CAD SSO ISR), in discussion with the author, 22 May 2020. Exact total is proprietary information and not directly releasable.

available through “Commercial Off-the-Shelf (COTS) hardware and software,”⁴⁵ thus enabling the possibility of quick implementation. As technology improves, upgrading simulators to reflect evolutions in avionics and weapons systems is much cheaper than aircraft refits. 402 Squadron’s PCT is presently about to undergo a minor capital expenditure software upgrade to make it compatible with the new Block IV Aurora.⁴⁶

Simulation also benefits personnel management and infrastructure. Unlike airplanes, an ACSO and AES Op simulator program doesn’t need pilots, technicians, or a large supply and maintenance system. Instructor training, which normally takes upwards of 6-8 months at 402 Squadron, can be accomplished in minimal time or may not even be required if the simulator in use reflects current operational equipment; likewise instructors who are grounded or otherwise unable to fly can still contribute. Reduce staffing requirements means that “personnel who would otherwise be training, supporting training or travelling to and from training can instead support an increase in operational tempo,”⁴⁷ thus further accomplishing overall RCAF goals.

Smarter Training

The use of simulation helps provide “second and third order effects”⁴⁸ such as “reducing ... the carbon footprint”⁴⁹ and environmental impacts associated with flying. Aircraft in general quickly become obsolete without extensive upgrades, hence an “increased reliance on virtual simulation-based training”⁵⁰ can free up money to be devoted towards maintaining more expensive operational platforms. Ultimately,

⁴⁵J. McHale, “Training in a Virtual World is Cost Effective,” last accessed 07 April 2020, <http://mil-embedded.com/articles/training-a-virtual-world-cost-effective/>.

⁴⁶Major Pierre-Luc Gauthier (DAR 3-3), in discussion with the author, 19 May 2020.

⁴⁷ Department of National Defence, *RCAF Simulation Strategy* ..., 6.

⁴⁸*Ibid.*, 7.

⁴⁹*Ibid.*, xiv.

⁵⁰*Ibid.*, 7.

simulation can facilitate effective ab-initio training faster, cheaper, in greater numbers, and with fewer resources than a live flying approach.

AIRBORNE EXPOSURE REQUIREMENT

Given the significant time and financial investment placed in training ACSO and AES Op candidates, debate continues over the necessity for flying exposure at the ab-initio level, particularly regarding concerns over airsickness and student ability to handle airborne stressors much later down the road at the OTU. While “there’s intrinsic value in just getting air under your wings and experiencing the stressors of actually being in the aircraft,”⁵¹ it has not proven to be a necessity at the ab-initio level. Although some students experience airsickness, there has been only one student removed from training for airsickness on ACSO and AES Op courses over the last 5 years.⁵² Before 2018, ACSO candidates completed 9 hours of Lead-In Air Navigator Training on the Grob aircraft at the Canada Wings Aviation Training Centre before moving on to the CT142. This training, aimed at providing an introduction to the airborne environment, was deemed ineffective and time consuming, with little bearing on student progression and was subsequently removed from the training scheme by the Commander of 2 CAD. This isn’t to suggest that early flight exposure isn’t beneficial, but it can easily be achieved elsewhere without formalizing it on entry level training courses.

Of particular note with respect to student attrition rates at 402 Squadron, eight ACSO course student failures over the same time frame were attributed to students not understanding the nature of the occupation they had entered in to, and in turn electing to

⁵¹Tegler, *Air Force Flight Simulators May Help Cut Training Costs ...*

⁵²Review of 402 Sqn Progress Review Board Cease Training Files.

pursue another career option within or beyond the Canadian Armed Forces.⁵³ Given the significant wait time to attend occupational training, introductory flying experience could be gained during periods of on the job training at a line Squadron prior to attending an ab-initio course. This provides candidates the opportunity to see their chosen occupation at work, hence increasing morale and the desire to move forward quickly with their training. This practice is currently not standardized, and while some students benefit greatly from a first-hand look at operational flying while they await training, others have minimal to no exposure to life in the Air Force and show up at 402 Squadron with little comprehension of what lies ahead. Ventures such as this cost nothing more than the TD and lodging associated with spending a few weeks at an operational Wing, and provide huge long term savings versus having students voluntarily withdraw from training at a later date because they don't like the job.

FUTURE AIRCREW TRAINING PROGRAM

The objective of the Future Aircrew Training Program (FAcT) is to deliver a contracted “comprehensive aircrew training program that provides aircraft, simulators, civilian instructors and classroom training systems, as well as other essential services”⁵⁴ for all RCAF ab-initio pilot, ACSO and AES Op courses. Primarily designed to replace currently contracted pilot training services in Moose Jaw and Portage la Prairie, responsibility for 402 Squadron training will also be assumed following a fleet transition period.

⁵³*Ibid.*

⁵⁴Public Services and Procurement Canada, “Future Aircrew Training Program,” last accessed 15 May 2020, <https://www.tpsgc-pwgsc.gc.ca/app-acq/amd-dp/air/snac-nfps/ffpn-fact-eng.html>.

FAcT is proposing an increase in flying hours compared to existing programs, notably upwards of 120 hours per student on the ACSO course over a projected course length of 200 days;⁵⁵ and 45 hours on the AES Op course over a course length of 120 days.⁵⁶ This marks a flying increase of 50% for the ACSO course and a fourfold increase for the AES Op course. Reasons for this increase have not been clearly articulated other than the mention of low performance at the OTU.⁵⁷ Given the graduated shift towards simulator training through the PCT and accompanying success, this vision is certainly not in-line with the RCAF Simulation Strategy. Additionally, despite anticipated improvements in maintenance with the introduction of a new training aircraft, weather remains a factor in completing courses on schedule, and added flying time will just compound this.

Furthermore, as part of the project contract conditions, with respect to mission, sensor, and weapons systems training; “there will be no mandatory requirement for live sensors on the aircraft,”⁵⁸ and simulated systems may be employed. If simulated technology is therefore deemed an acceptable training aid for this program, why go flying in the first place? Given the cost and time factors already noted with live flying training, again could this time not be better spent by increasing the variety and complexity of the missions the student is exposed to through ground based simulation?

⁵⁵RCAF, *Concept of Training – N.001553 Future Aircrew Training (FAcT) Draft* (Ottawa: Directorate of Air Simulation and Training, 2019), 27.

⁵⁶*Ibid.*, 28.

⁵⁷Col R.J. Walker, *Provisional Approval of Future Aircrew Training (FAcT) Air Combat Systems Officer (ACSO) Qualification Standard* (2 Canadian Air Division: file 4520-3 (SO NFTC)), 17 January 2019.

⁵⁸Maj J. Roulston, “FAcT Transition Update Brief,” (PowerPoint presentation, Carling Campus, Ottawa, ON, 04 December 2019).

Consideration has been given to ‘streaming’ students during ab-initio training to align them with the operational aircraft they will be selected to fly. An all-simulator centric course with multiple simulators based on these aircraft, even at an elementary level, will further hasten student progression at the OTU as they will already be familiar with these aircraft systems and can avoid repetitive training. While potentially costly depending on the level of simulation desired, this approach still outweighs the cost of implementing a new aircraft fleet. The United States Navy’s VT-4 Squadron currently “utilizes simulators for 100% of [their] training”⁵⁹ for Naval Flight Officers streamed to their E-2, E6, EP-3, and P-8 communities.

Lastly, as ACSO and AES Op production will continue during the FAcT transition phase as 402 Squadron integrates a new aircraft,⁶⁰ an all simulator solution would greatly ease facilitation of the new program without the challenges associated with maintenance, crewing, and infrastructure for multiple fleets simultaneously.

⁵⁹Bruce Cummins, “VT-4’s Multi-crew Simulator Impacting Naval Flight Officer Training,” DVIDS, last updated 07 July 2019, <https://www.dvidshub.net/news/330121/vt-4s-multi-crew-simulator-impacting-naval-flight-officer-training>.

⁶⁰Roulston, *FAcT Transition Update Brief* ...

CONCLUSION

The goal of this paper was to show that similar, if not better, results could be obtained by shifting ab-initio ACSO and AES Op training to an all simulator program. The aim of the Canadian Forces Individual Training and Education System (CFITES) is “to produce the right number of people, with the right qualifications, at the right time, and at minimum cost.”⁶¹ Where current training programs have failed in this regard, simulation can fulfill this aim and address current shortcomings. Simulation has already proved its worth in the AES Op program, providing training that has been lauded at the operational level. Although FAcT marks a long overdue effort to improve ab-initio ACSO and AES Op training, the proposal looks quite analogous to legacy programs and will undoubtedly incur similar problems with respect to time, training delays, and cost effectiveness. Ultimately, “games for training is not a replacement for live behavioral learning. There will always be a need to get one’s boots dirty.”⁶² The question remains as to when that should occur. Should the RCAF continue along the path of expensive, drawn out training practices or focus on a program that best prepares candidates for the moment when it comes time to put those boots on? Simulation has demonstrated the ability to facilitate that preparedness.

⁶¹Department of National Defence, A-PD-050-001/PF-001, *Flight Instructor’s Course Handbook* (Ottawa, DND Canada 2014), 20.

⁶²Bainbridge, *H19 FTD Level 5 Simulator Receives Certification ...*

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