WHITE PAPER ON
FEE FOR SERVICES ACQUISITION STRATEGY
FOR AIR FORCE RESERVE COMMAND
AIRCREW TRAINING

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EXECUTIVE SUMMARY

Fee-For-Services (FFS) is a new acquisition strategy being advocated by several Air Force acquisition and MAJCOM offices to buy training services instead of training devices from Industry. Industry is responsible for funding, developing, and operating their own training assets. The Government buys training services in those assets. Industry is also responsible for simulator concurrency to aircraft modifications and the insertion of new technology into their training assets.

This white paper analyzes the merits and risks of the FFS acquisition strategy as applied to aircrew training. Recommendations to help mitigate risks are presented.

There are many assumed benefits to FFS, and there are many assumed risks as well. The FFS acquisition strategy is continuing to evolve and to be tailored as risks become better known and better understood, but it remains largely unproven.

If AFRC chooses to adopt the FFS acquisition strategy, previous versions of FFS must be further tailored to reduce **currently unacceptable risk** to the Government.

A second white paper (to follow) will analyze the merits and risks of Distributed Mission Training (DMT) as a particular application of flight simulation technology and training requirements. DMT and FFS are analyzed separately, since they are two separate and distinct issues

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WHITE PAPER SCOPE

This is the first of two white papers dealing with critical issues associated with the potential infusion of modern simulation technologies into Air Force Reserve Command (AFRC) simulation and training assets using innovative business strategies. These issues, technologies, and strategies are driven by recent, parallel guidance and directives from Secretary of Defense and Air Staff offices to decrease DOD acquisition overhead and to increase the use of simulation as a cost-effective tool to enhance and maintain USAF mission capability and readiness. These white papers are intended to be used by AFRC staff and senior managers to better understand the critical issues and best manage AFRC resources and assets.

This first white paper explores the apparent merits and risks associated with Fee-For-Services (FFS) as a particular acquisition strategy. The second white paper will assess the apparent merits and risks associated with Distributed Mission Training (DMT) as a particular simulation application and include a stand-alone discussion on various methods of funding DMT operation.

These critical issues are treated in separate white papers because **FFS and DMT are independent of each other**. FFS can be applied to programs with no connection to DMT and using many funding methods. DMT can be implemented using any acquisition strategy and funding method. Novel funding methods can be used irrespective of the acquisition strategy and any connection to DMT. Recent USAF flight simulation acquisition initiatives have involved all of these issues and, at times, **the issues have been perceived as being merged**. **They are not**. The issues should be considered separately to best plan, manage, and execute flight simulation programs tailored to the unique needs of AFRC well into the next century.

TRAINING SYSTEM ACQUISITION STRATEGY BACKGROUND

The acquisition strategies used to procure, test, and support USAF flight simulator and aircrew training systems have evolved considerably over the last twenty years. Evolving strategies do not necessarily replace their predecessors, but add to the alternative strategies available in a program manager's toolkit.

Organic Support Strategy

Early digital flight simulation systems (pre-1980) often included detailed design requirements specified by the Government, were often tested by the same Government organizations that test aircraft, and were intended to be supported by organic (blue suit)

maintenance, logistics, and simulator instructor/operator personnel. Extensive MIL-SPEC and MIL-STD documentation were specified for fabrication, operation, and maintenance. These devices were intended to be handed off to trained Government technicians and instructors as a "turn-key" system, with varying degrees of field service support provided by the simulator supplier.

The technology base that serviced these early systems was principally driven by DOD flight simulation requirements and fueled by DOD RDT&E funds.

Contractor Logistics Support Strategy

With the elimination of USAF flight simulator technicians in the mid-80s, both fielded and new aircrew training system programs converted to a Contractor Logistics Support (CLS) strategy. CLS requires the contractor to build and/or maintain the devices to achieve a guaranteed availability level, perform "minor" modifications for concurrency to the aircraft, and to maintain a spares and documentation package sufficient to support recompetition after five or more years of one year options. CLS provides a guaranteed simulator availability, with training conducted by the Government, and all assets owned by the Government to support recompetition. In the event of non-performance, a new contractor can be competitively selected to perform CLS on the Government owned assets with a minimal break in training.

The CLS acquisition strategy places more reliance on the contractor and less on the Government to perform training system support and (to a degree) operation than the earlier, organically supported acquisition strategy.

Aircrew Training System Strategy

In the mid-to-late 80s, some USAF aircrew training programs adopted an Aircrew Training System (ATS) acquisition strategy, where the contractor is not only responsible for CLS, but also provides full courseware, instructors, and student scheduling. The ATS contractor is required to train "guaranteed" students who can successfully pass an Air Force administered evaluation or receive retraining at no cost to the Government. This strategy makes it possible to decrease detailed design requirements (how to build a simulator) and focus more on operational training requirements (what training tasks and proficiency levels the simulator should support) and has been used as rationale to decrease Government engineering insight and acquisition overhead during the development process.

ATS contractual scope typically includes a broader range of concurrency modifications than CLS and its period of performance often approaches ten years of one-year options before recompetition occurs. ATS provides a guaranteed total training service with all assets owned by the Government to support recompetition. In the event of non-performance at any time during the contract, a new contractor can be competitively selected to perform ATS functions on the Government owned assets with a minimal break in training.

Over time, ATS programs have found that use of the "guaranteed" student as a sole criterion for success provides insufficient information during initial development and testing of ATS components. Most ATS programs currently specify commercial (FAA) standards for flight simulator fidelity, tailored to the unique mission requirements of USAF. These are used as

design criteria to provide the Government with a known performance baseline and to provide the contractor with more clearly understood performance requirements and less risk during design, development, and test.

The ATS acquisition strategy places the contractor in a key role for all aspects of system support and operation, with the Government retaining limited technical oversight and a binding, operational performance evaluation role to ensure contractual compliance. The operation of some ATS programs has been at least partially funded through the reallocation of aircraft training flying hour funds.

USAF Simulator Certification Program

With the increasing complexity and capability of flight simulators in this same timeframe, USAF instituted a Simulator Certification (SIMCERT) program across the MAJCOMs to conduct initial and recurring tests and certifications of flight simulator fidelity. Each USAF SIMCERT organization is "owned" by a parent MAJCOM. The USAF SIMCERT program has been implemented quite differently across the MAJCOMs.

Although the USAF SIMCERT program is not an acquisition strategy, the degree of its integration into an acquisition strategy appears to be a discriminator of program risk.

Each MAJCOM's SIMCERT personnel are experienced in the highly specialized needs of flight simulator testing, often serve to operationally verify the CLS or ATS contractor's performance, and often participate in the source selections of competed concurrency modifications or a new CLS or ATS contractor during recompetition. MAJCOM SIMCERT organizations may include personnel with acquisition experience, experienced simulator and courseware technicians, as well as current, rated crewmembers to serve as technically knowledgeable subject matter experts.

ATS programs make considerable use of their MAJCOM SIMCERT personnel during all phases of requirements definition, acquisition, test, operation, and modification, to include initial and recurring certification. Although ATS programs may use FAA flight simulation certification criteria as a rough starting point for simulator acceptability, only USAF SIMCERT organizations conduct the certification of USAF flight simulators.

The integration of experienced USAF SIMCERT personnel into simulation acquisition strategies is becoming more important as simulation technologies begin to play a more crucial role in maintaining USAF mission capability, while the experience and insight of USAF acquisition personnel have eroded due to Government acquisition force downsizing.

AFRC does not possess a SIMCERT function, but relies upon the applicable active duty MAJCOM SIMCERT organization to perform the desired support in accordance with the particular MAJCOM SIMCERT mission and support philosophy.

Application of Acquisition Strategies

Both the CLS and ATS acquisition strategies have been tailored to suit individual programs and are being used to differing degrees, mostly as a function of the MAJCOM mission and

training philosophy, level of training device fidelity, and the ability of flight simulation technology to support unique mission training tasks. Both strategies may require the planning, programming, and budgeting of up-front Government funds to build and own the devices and training system. Both strategies have found difficulty in maintaining simulator concurrency with aircraft modifications caused by a variety of factors to be discussed later. Both strategies disallow use of proprietary designs and components that could prevent recompetition or make recompetition fiscally unfeasible. Both strategies have been proven to support recompetition with realized cost savings, but also with some mixed performance results caused by a subjective definition of what constitutes the "Best Value" to the Government and the slow erosion of Government insight and engineering experience available to objectively discriminate "Best Value" during source selection.

Some of the technology base that services today's DOD flight simulation CLS and ATS programs may result from commercial aviation and the entertainment/home computer segments of our industrial sector. There is decreasing dependence on DOD flight simulation requirements and DOD RDT&E funds to drive the technology to achieve some of the required performance at an affordable cost; however, serious technology shortfalls still exist to limit the breadth of training that can be credibly and confidently accomplished in flight simulators. This is especially true in the tactical, air-to-air, and air-to-ground mission arenas with requirements for visual displays with a field of view equal to the aircraft and resolution equal to the human eye.

AFRC has generally adopted the training philosophy and acquisition strategy of the active duty MAJCOM that "owns" the aircraft type with some tailoring to suit AFRC's unique needs and methods of securing funds.

DESCRIPTION AND ANALYSIS OF FEE-FOR-SERVICE (FFS) ACQUISITION STRATEGY

The genesis of FFS resides in recent DOD reform initiatives that more closely integrate the military and industrial sectors and shift Government resources from overhead support functions to modernization of forces and military action. These initiatives focus on the use of commercial business practices, long term Government/contractor relationships, and contracts based on performance rather than design compliance. These initiatives also focus on the purchase of services instead of products, outsource of non-core functions, streamlined acquisition processes, and smaller Government program offices. FFS evolved to support those initiatives.

FFS has only recently been used in several USAF flight training programs, each of which exhibit some significant differences, and the tailoring limits of an FFS acquisition strategy are not yet well defined. When applied to flight training programs, the FFS strategy is often referred to as "Commercial Training Simulator Services," or several other variants that all result in the same acronym…CTSS. For the purposes of this white paper, the term FFS is interchangeable with the term CTSS. The following data summarizes the best known, key characteristics of a "typical" FFS acquisition strategy that appear to differentiate it from other strategies. These key characteristics (in *Italics*) are then each analyzed for their merits and risks and recommendations are made as appropriate.

Key Characteristics of a "Typical" FFS Acquisition Strategy and Their Analyses:

***KEY CHARACTERISTIC 1*: The FFS contractor invests its own capital funds for the up-front development, testing, fielding, and operation of all flight training assets, with the possible exception of the building(s) it is housed in. The FFS contractor owns all other assets in perpetua. The Government may provide a limited amount of investment funds to enlarge the effective competitive base during initial source selection, with proportional reductions in cost of services or shortened period of amortization, but the Government does not retain any form of ownership or right to title upon contract termination or closure.**

ANALYSIS: It is assumed that this key characteristic applies only for new-start programs, and does not apply to existing training systems and devices already owned by the Government or with acquisition funds already programmed and budgeted. The transfer of existing Government owned training assets to a FFS contractor inherits many of the FFS risks with few of the intended FFS advantages, and for this reason is not analyzed in this white paper.

Using existing, Government owned, aircrew training systems as a cost model, the corporate investment funds required of a FFS contractor could range from as low as $30 million dollars to as high as $1.2 billion dollars, with an average in the $200-$300 million dollar range. A potential proposal offeror would have to secure access to this range of investment funds to qualify for a FFS source selection. An effective competitive base with a sufficient number of qualified offerors is essential for successful source selection.

Funds management and program execution require an experienced Government infrastructure to mitigate risk during conventional acquisition.

MERIT: This characteristic vastly simplifies Government funding and procurement, since the responsibility for procurement transfers from the Government to the FFS contractor. The use of a limited amount of Government investment funds to supplant the FFS contractor's investment can enlarge the competitive base during source selection and provide a more favorable prenegotiated cost to the Government.

RISK: The large investment required for many training system programs exceeds the fiscal resources available to many otherwise qualified potential offerors. Supplanting their investment with Government funds reduces the potential advantage of FFS to lower Government acquisition overhead, since Government investment requires oversight and oversight requires overhead infrastructure. See ***KEY CHARACTERISTIC 9*** for further analysis and risk assessment caused by FFS contractor ownership of training assets.

One of the greatest risks associated with this characteristic is that it may cause unrealistic expectations and decrease necessary management attention to the continuing challenge of applying Government RDT&E investment in technology sectors to better meet current and anticipated flight training requirements. Although this characteristic simplifies O&M funding, the flight simulation technology base is still deficient in numerous areas. For instance, significant technology shortfalls exist in out-the-window visual displays, rapid visual and sensor data base generation, Night Vision Goggle training, threat modeling, and sufficiently correlated networked simulation. Continuing RDT&E investment is required.

Risks associated with the Government not retaining ownership or right to title of training assets following completion of the period of amortization are discussed under ***KEY CHARACTERISTICS 3 and 9.***

RECOMMENDATION: If AFRC pursues a FFS acquisition strategy, it should be limited to those programs requiring a level of contractor investment that allows a sufficient number of qualified offerors to compete during source selection. Supplanting contractor investment with a limited amount of Government funds should be minimized, since it limits one of the key potential advantages of FFS, depending on the degree of Government investment. AFRC should maintain support for continued Government RDT&E investment in flight simulation technologies.

KEY CHARACTERISTIC 2: The Government buys training services from the FFS contractor at prenegotiated rates determined upon initial contract award. This could be a rate per training hour, or a rate per training event, or a rate per trained student. The minimum amount of purchased services is also determined upon contract award, with the FFS contractor guaranteed being paid for system availability to conduct training services even if no crews are present to be trained.

ANALYSIS: The prenegotiated rates determined upon initial contract award are determined through competition. The rate metric used (time, event, students, etc.) is determined based upon the training needs and type required by the Government for each specific program. The prenegotiated minimum amount of purchased services (for example, a guarantee that the Government will purchase no less than 2,600 hours of training services per year per simulator) is a necessary precondition for the FFS contractor and their credit source to be assured of amortization and payback.

MERIT: The initial FFS training service rates, determined through competition, should be favorable to the Government. The entire cost of FFS training can be funded through a single line item at annually forecasted rates. This simplifies and stabilizes funding and can reduce Government acquisition overhead. The ability of each program to determine the rate metric used allows the Government the flexibility to tailor the FFS strategy to more closely support the unique operational performance requirements of each program. See ***KEY CHARACTERISTIC 8.*** A guaranteed minimum amount of purchased services can extend the competitive base during initial source selection to include companies that would otherwise not be able to secure the necessary investment capital.

RISK: If the FFS contractor and the Government reenter negotiations for any reason (See ***KEY CHARACTERISTICS 10 & 11***), the lack of Government insight into the FFS contractor's business practices (See ***KEY CHARACTERISTIC 6***) and Government dependencies on continued FFS contractor services (See ***KEY CHARACTERISTIC*** 9**), the Government will be negotiating from a position of weakness**. Renegotiated price of services or the period of amortization will increase with no recourse available to the Government. The guaranteed minimum amount of purchased services adds risk to the Government that they may be forced to pay for something they did not receive. If the FFS contractor's performance is unsatisfactory, or if the available technology does not meet customer expectations, or if aircraft

and crews are deployed for a military contingency, crews may not be sent to the FFS contractor to receive training services that the Government is contractually required to pay for.

RECOMMENDATION: If AFRC pursues an FFS acquisition strategy, the rate metric used to describe the service being purchased should be tied to the operational performance requirements of each program. The purpose of training services is not to have a simulator occupied by a crewmember. **The purpose is training, proficiency, and mission skills**. This is what should be bought. AFRC should tailor the FFS strategy to include increased insight into the contractor's business practices and should plan for an increase in the initial FFS price rate with time. The Government must assume the risks of paying for something not received, since a guaranteed training service purchase amount appears to be a necessary condition for a viable FFS source selection. Methods of ameliorating this risk are discussed at ***KEY CHARACTERISTIC 12***, Recommendation.

KEY CHARACTERISTIC 3: The initial cost to the Government for training services includes amortization of the FFS contractor's initial investment plus prenegotiated interest and profit until the initial investment is recouped. The period of amortization is determined upon contract award. If the Government contributed to the initial investment, the period of amortization reflects only the FFS contractor's investment. Once the period of amortization is complete, the cost to the Government is reduced to a prenegotiated service price (operating cost plus profit).

ANALYSIS: It is a common business practice for a company that assumes the risk of initial investment to retain ownership following amortization of their investment including interest. With a sufficient customer base dependent on their services, the company will most often not decrease the price of their services following amortization and realize a significant profit. With the presence of effective competition the company may reduce the price of their services even prior to completion of amortization to retain cash flow from their retained customer base.

MERIT: The reduction of service price to the Government following the period of amortization is favorable to the Government, since there is no effective competition for the FFS contractor's services.

RISK: The prenegotiated period of amortization may be incrementally extended due to a number of factors. See ***KEY CHARACTERISTICS 10 & 11.*** A reduction in service cost may not occur when planned, if at all. Although it may appear that the FFS contractor assumes the risks of initial investment, the lack of effective competition and probable reliance on the FFS service for mission readiness after contract award places the true risk solely on the Government.

RECOMMENDATION: If AFRC adopts the FFS acquisition strategy, methods should be found to minimize risk to the Government caused by an inability to go elsewhere for services or control extensions to the period of amortization. A partial solution is to have the Government retain right to title following the amortization period, and to disallow the use of proprietary designs that prevent recompetition. Methods of controlling the risk associated with an escalating period of amortization are to ensure that system requirements are precisely and objectively defined prior to contract award, that concurrency modifications should be very selectively applied, and that

technology insertion should be conducted only to increase operating efficiency, not merely increase performance.

<u>KEY CHARACTERISTIC 4</u>: The FFS contractor may be allowed to sell excess training services availability to other parties (other Commands, Services, allies, commercial aviation, etc.) as a profit incentive.

ANALYSIS: Commercial flight training services companies have been very successful in selling their services to smaller airlines and corporations with their own aircraft at affordable prices and profitable costs by extending amortization of their investment across numerous customers and using the devices at very high annual rates. At times, the requirement to be able to reconfigure the simulators between different types of the same aircraft was known prior to the selection of system design architectures, thus making reconfigurable cockpits achievable with acceptable cost and fidelity. Some customers are willing to accept minor differences between their aircraft and the commercial flight simulator because no other affordable flight simulator training options are available and the differences in operation can be trained in their aircraft. Some types of aircraft flown by the United States military are also flown in different configurations by other organizations, both foreign military and commercial. The advantages of flight simulator training are well known throughout the international flying community. A market exists for commercial flight simulator training.

MERIT: The Government may be able to achieve a proportionately reduced service cost if the rate reduction caused by other party use is prenegotiated, or assuming the Government is allowed and willing to re-enter negotiations for this purpose after contract award.

RISK: Unless the requirement for reconfigurable cockpits is known at the front end, system architectures cannot easily support affordable reconfiguration with sufficient fidelity. System design for reconfigurable cockpits will add to development cost and may decrease fidelity. The requirement to track, manage, and fund simulator concurrency modifications for a number of different aircraft configurations adds technical complexity and management risk to FFS operation. Many types of United States military aircraft are configured with classified subsystems and capabilities not accessible to foreign military. A requirement for reconfiguration between classified and unclassified operations requires changes to hardware, software, and facility design, as well as software support and operational management strategies. With other party use of FFS training assets, the Government may not have the same assurances of service availability.

RECOMMENDATION: If AFRC adopts a FFS acquisition strategy, other party use of training service assets should be encouraged, as limited by conditions inherent to each specific program. Other party use is not an option for some aircraft types because no one else flies it. Security concerns may make other party use unacceptable for some aircraft types. Major differences in aircraft configuration may make either the additional cost of reconfigurable cockpits or a tradeoff in system fidelity unacceptable. Each specific program should be analyzed closely to determine if other party use is executable and advantageous to the Government. If so, favorable conditions for sharing fiscal advantages with the FFS contractor and maintaining Government priority of service should be agreed to prior to contract award.

<u>KEY CHARACTERISTIC 5</u>: The FFS contractor is provided with broad design flexibility and may use proprietary designs and components throughout the system, upon their discretion. Design, fabrication, operation, and maintenance documentation as well as configuration management functions are per their discretion and entirely owned by them.

ANALYSIS: Current Government acquisition policy is to specify requirements in broad, operational terms. Offerors have the job of interpreting the operational requirements, converting them into technical specifications, and proposing a design intended to best support them. The use of proprietary designs and components is often allowed if the proprietary data provides improved cost, schedule, or performance sufficient to overcome the risk of becoming reliant on the offeror, or if no effective competitive base exists. **The cost to the Government of buying proprietary data rights is often prohibitive.**

MERIT: If the Government dictates design, the success or failure of that design becomes the Government's responsibility and the contractor is not culpable for poor performance. Dictating performance absolves the Government from responsibility over insufficient design, unless the performance is insufficiently described.

RISK: If the Government dictates requirements in very broad, operational terms rather than specific terms the resulting design may be operationally unsatisfactory, depending on the FFS contractor's skills and luck at interpretation. For example, the following statement is a broad, operational requirement that is difficult to design to with confidence…"The system shall provide air-to-air interdiction training." A more specific operational requirement with less risk of misinterpretation and unsatisfactory performance would be…" The visual display system shall support training to distinguish realistically scaled and colored models of a Blackhawk helicopter from a HIND helicopter while in trail during day VFR conditions at a minimum range of 12,000 feet." Specific operational requirements are more difficult to write, but they are less difficult to interpret and they reduce risk for both the contractor and the Government.

The use of proprietary data may prevent the Government from having access to these data to perform validation and accreditation of simulation fidelity. In the event of unsatisfactory performance, the existence of critical, proprietary components can prohibit the option of buying system assets from the FFS contractor for recompetition purposes. In the event of modifications for concurrency or technology insertion, the FFS contractor is inclined to use proprietary components for business reasons, rather than for reasons of cost, schedule, and performance advantage to the Government. With a lack of Government insight into the FFS contractor's business practices (See ***KEY CHARACTERISTIC 6***), it may be difficult for the Government to ascertain the FFS contractor's motives for selection of a proprietary design approach over other alternatives. Technology insertion may be limited to the FFS contractor's proprietary technology only, with little recourse available to the Government to insert other available technologies.

RECOMMENDATION: If AFRC adopts a FFS acquisition strategy, use of proprietary data should be allowed only if it is proven to provide sufficient cost, schedule, and performance advantages to the Government that are worth the risk of being unable to recompete for training services. All proprietary data must be identified to the Government prior to contract award. The inclusion of new, proprietary data into system design during modifications must be identified to

the Government beforehand, and the Government shall retain approval rights for the modification.

<u>KEY CHARACTERISTIC 6</u>: The Government has limited insight into the FFS contractor's activities during the development phase or into their commercial business practices during operation. Government test involvement may be limited to simple inspection and monitoring of contractor tests.

ANALYSIS: Historically, the degree of Government insight into contracted acquisition activities has been defined by the type of contract awarded which, in turn, is usually determined by the degree of development risk associated with the contracted task. Cost-plus (CP) contracts with higher risks have required considerable insight and firm-fixed-price (FFP) contracts with lower risks have required little insight. CP contracts usually have fewer, less specific and objective requirements than FFP contracts. Service contracts can run the gamut. Existing FFS programs use firm-fixed-price, Indefinite Delivery Indefinite Quantity (IDIQ) service contracts with annual priced options as award term. Government insight into the contractor's activities adds to the contractor's schedule and increases their cost. The amount of Government insight should be carefully determined as a function of degree of risk assumed by the Government in the event of unsatisfactory performance.

In the event of clearly expressed, specific, objective performance requirements being available, a system can be designed and tested with high confidence that the requirements can be met by system performance. If those objective requirements are lacking, the contractor's system design may be based on their best-guess interpretation of performance requirements, and their tests may be based on the performance of their system design, not the Government's interpretation of performance requirements. Contractor tests of flight simulators are frequently expressed as technical proofs of performance, using engineering metrics and criteria. Operational proof of performance must be conducted using operational metrics and criteria. If a device is designed to satisfy an operational training requirement, a true test of the device is to measure if and how well it trains. This often requires Government involvement, and is a major reason for the establishment of Air Force SIMCERT organizations across the MAJCOMs.

The DOD flight simulation and training community has historically had a very difficult time trying to absolutely define the required degree of fidelity to achieve satisfactory training. Major disagreements exist between expert opinions in the military, with the differences often defined according to different aircraft missions and the capability of available technology to support differing missions' training requirements. Notable differences exist regarding the importance of force motion cueing and some forms of visual display systems to achieve quality training. The commercial flight simulation community has had few disagreement regarding fidelity, since they share a common air transport mission, and the FAA has developed widely adopted fidelity standards to satisfy different degrees and types of air transport training. Military air transport training requirements often cite these FAA fidelity standards, tailored to suit military airlift, as a basis when specifying and testing flight simulators. This considerably simplifies and decreases risk to both industry and Government when designing and developing flight simulators for military airlift and larger aircraft. The fast mover, fighter community does not share in this advantage. For those systems, the Government must assume the risk of the FFS contractor misinterpreting fidelity requirements unless they are specifically and objectively defined.

MERIT: Limited Government insight and test involvement allows the FFS contractor to conduct normal business practices at less cost and schedule. This will provide the Government with a lower price and shorter schedule for the initiation of training services.

RISK: The Government assumes all risk in the event of unsatisfactory performance. See ***KEY CHARACTERISTIC 9.*** With limited Government insight, the Government is unable to monitor or control design and operation factors that may affect performance. Also, there are strong forces to require reentry into the initial negotiated rates and amortization period (See ***KEY CHARACTERISTICS 10 &11***) and the Government would be at risk of having to conduct renegotiations without sufficient data to negotiate from a position of strength. Without sufficient Government insight, the Government assumes the risk of the FFS contractor misinterpreting the degree of fidelity required to achieve operational training requirements during the design phase.

RECOMMENDATION: If AFRC adopts a FFS acquisition strategy, all possible means should be used to increase Government insight into the contractor's activities and business practices (including cost accounting) during development and operation of training services. Initial and recurring system testing (both annual and following significant modifications) should be closely monitored by the Government and conducted by the applicable SIMCERT organization. Initial testing should be extended to include transfer of training studies conducted by the Government, if the training service is required to support new forms of training requirements or novel approaches are employed to satisfy them. Tailored FAA flight simulator fidelity standards should be specified for airlift and (possibly) bomber training systems to reduce the Government's risk of misinterpreted requirements.

KEY CHARACTERISTIC 7: The Government, through a second party contractor, or the FFS contractor may provide courseware, instructional materials, and instructors.

ANALYSIS: The quality of training services is affected by both the capabilities of the training devices and the methods used to deliver training to crews. A satisfactory flight simulator will result in satisfactory training only if it is used properly. In this sense, training devices and training delivery are interrelated. Their design, operation, and modifications for currency to the aircraft should be closely coordinated and centrally managed to ensure overall operational success and optimization of resources and schedules.

MERIT: There is no merit to this characteristic unless the FFS contractor is selected to provide courseware, instructional materials, and instructors.

RISK: If another organization, other than the FFS contractor, is responsible for training delivery there is a high risk that training device hardware design and function will not be coordinated with how it is used during training delivery. With multiple prime contractors, culpability for unsatisfactory performance or reward for superior performance may be difficult to ascertain.

RECOMMENDATION: If AFRC pursues an FFS acquisition strategy, the FFS contractor should also be responsible for courseware development, instructional materials, instructors, and courseware modifications to reflect aircraft configuration or mission changes.

KEY CHARACTERISTIC 8: The FFS contractor's criteria for satisfactory operational performance can range from the highly simplistic and subjective criteria of "Happy Pilots" to

the more complex and objective criteria of trained crewmembers passing an Air Force administered proficiency evaluation.

ANALYSIS: Meaningful operational performance criteria are required to reduce risk for any acquisition strategy, including FFS. Operational performance criteria for training services should focus on the quality, availability, and (if possible) cost of training. Specific criteria should reflect the type of training service (initial qualification, continuation, upgrade, etc.), level of training (cognitive, behavioral), and the required training tasks (part task, emergency procedures, multi-ship, full mission, mission rehearsal, etc.) unique to each program. Criteria should support both initial testing and continuing operations throughout the contract life cycle. The Air Force SIMCERT process exists to help validate the operational performance of ground based aircrew training.

MERIT: A measurable and objective definition of what the customer expects from the training services will help the FFS contractor ensure that their design meets customer expectations and to help justify their large initial expense with a reasonable return on investment. These criteria can also be used as performance metrics if the FFS contract includes a variable incentive award fee.

RISK: If the Government does not provide the FFS contractor with measurable and objective operational criteria for success, the FFS contractor must interpret whatever subjective criteria is available during design and development. Simplistic and subjective criteria can add high risk that the performance will be operationally unsatisfactory, and serve as reasonable justification for claims by the FFS contractor if any form of fiscal penalty was to be invoked by the Government.

RECOMMENDATION: If AFRC pursues the use of FFS as an acquisition strategy, criteria for operational success must be clear, measurable, and objective. Criteria should be developed to support the full system life cycle and tailored to the specific needs of each program. The applicable MAJCOM SIMCERT organization should be integrated into the FFS training service requirement validation process.

<u>KEY CHARACTERISTIC 9</u>: In the event of unsatisfactory performance by the FFS contractor, the FFS contractor may be penalized by the Government through a reduced profit/fee, or by the Government not buying as much training service as planned prior to the end of the prenegotiated period of amortization, or by the Government simply "walking away" and leaving the FFS contractor with a non-amortized investment loss.

ANALYSIS: The precedence for reduced profit/fee in the event of unsatisfactory performance has been set in many incentive-fee-type contracts. Some programs have successfully used a positive, increased profit/fee as further contractor incentive for superior performance. A variable incentive fee can require the Government to use complex performance data collection, synthesis, and reporting methods. There has been a central tendency for the Government's incentive fee award determination authority to focus on broad business issues, and award incentive fees at a different rate than reported performance on that one particular program dictated. The initial FFS contract could include penalty provisions that would limit the amount of FFS contractor investment amortized by the Government due to unsatisfactory performance. This type of penalty would require explicit, clear, objective, and highly stable system performance

requirements upon contract award to eliminate the risk of contractor claims to the contrary. FFS programs require a very large investment by the FFS contractor at the front end and strong pressures will be placed on recoupment of that investment.

MERIT: If AFRC adopts FFS, the inclusion of an incentive-fee-type contract provision, to include both fee reductions and fee increases as a function of performance, could positively incentivize the contractor and reduce cost, schedule, and performance risk.

RISK: Incentive fee data collection, synthesis, and reporting methods can add to Government overhead. AFRC may not have a representative voice in the amount of incentive fee to be awarded. A large reduction or total elimination of the amount of FFS investment to be amortized by the Government as a penalty for unsatisfactory performance is not practical or tenable. The FFS contractor is under strong pressures to recoup a very large corporate investment **and will use any reasonable, prudent, and legal recourse to do so**. Their motivation to attain the highest award fee possible is of lesser importance, and will be sacrificed if need be to get paid for their investment. Recent USAF acquisition guidelines and the core nature of flight simulation and training system requirements cannot support sufficiently explicit, clear, objective, and stable requirements during the design and development phases to eliminate the certainty of contractor claims if amortization were withheld.

The greatest risk associated with this characteristic has to do with the need for mission readiness and the risk of no recourse available to the Government in the event of poor performance. If the Government were to "walk away" from the FFS contractor who performs poorly, or if available technology cannot support customer expectations, and if the nature of training services was critical to mission readiness (as it should be), mission readiness would be compromised for three or four years, until another FFS contractor could be selected to invest their own corporate funds in an improved version of the previous system. This is unthinkable, and will cause the Government to remain dependent on the initial FFS contractor. Also, it would be difficult for the Government to present a credible case for potentially lost mission readiness justifying realized lost investment amortization.

If the FFS contractor's system showed a reasonable degree of promise, but their execution is unsatisfactory, the Government could "buy-out" the FSS contractor at a cost equal to at least the initial investment, plus anticipated profit/fee over the duration of the contract, plus the value of proprietary property and documentation data. It would then take considerable time to transfer these very expensive items to a second contractor. This makes a "buy-out" untenable. The Government will be held hostage to the FFS contractor even in the event of poor performance or the service not meeting customer expectations.

Although it may appear that the FFS contractor assumes the risk of their initial investment, the true risk is solely retained by the Government.

RECOMMENDATION: An incentive fee award determination process should be made as streamlined as practicable, with AFRC input and operational performance criteria retaining greater weight than other organizations or factors. AFRC should retain veto rights when the amount of fee is determined by the incentive fee award determination authority. AFRC should only apply FFS to programs with highly stable, explicit, and objective requirements and ensure

that these requirements are included in the solicitation within the limits imposed by current acquisition guidance. AFRC must ensure that only a well-established contractor with a broad business base throughout DOD and a vested interest in maintaining a strong reputation is selected as a FFS contractor. The contractor's need to preserve their good name and reputation may serve as the only real business incentive for satisfactory FFS performance.

Even with these recommendations in place, AFRC must manage FFS programs very carefully and monitor them closely to help mitigate the high risks associated with this characteristic. The additional overheads associated with this are mandatory.

***KEY CHARACTERISTIC 10*: The FFS contractor is fully responsible for funding and modifying the training assets to achieve "guaranteed" concurrency with aircraft modifications. The estimated costs of future, planned concurrency modifications can be made a condition of initial contract award.**

ANALYSIS: A contract can guarantee contractor performance only for those aspects of performance that the contractor controls. Planned aircraft modifications can result in a rough estimate of cost and schedule for concurrent simulator modifications, but the actual cost and schedule may vary widely for reasons outside of the FFS contractor's control. Historically, the lack of flight simulator concurrency with aircraft modifications has been caused by numerous factors that the contractor did not control, including unstable programming of Government funds sufficient for the simulator modification. Other factors outside the contractor's control include the instability of Government funding for the aircraft modification, last minute requirement changes, unanticipated design changes and performance tradeoffs during the aircraft test phase, access to a stable performance baseline, access to proprietary design data, and errors in aircraft modification design and performance documentation. Also, some planned aircraft modifications fall out of favor and may not be implemented, or may be grouped together with previously unknown modifications that affect the same subsystem(s).

Simulator modifications for concurrency to the aircraft may inadvertently affect the fidelity of simulator functions not intended to be modified. Tests of simulator concurrency modifications should include overall system tests to ensure that previous fidelity has not been degraded as well as specific tests of the modified subsystem(s).

The Government infrequently specifies commercial aviation standards that require aircraft software and flightworthy OFPs to include simulator-unique functions such as freeze, reset, slew, malfunction insertion/deletion, etc. This reduces the risk of commercial flight simulators being non-concurrent to the aircraft by "stimulating" the actual aircraft OFP in the simulator rather than "simulating" complex OFP software. The non-recurring engineering effort and schedule required to "simulate" software intensive modifications after the aircraft design becomes known are considerable.

MERIT: This characteristic of FFS can decrease the risk of unstable simulator modification funding detracting from concurrency to the aircraft, since the FFS contractor is responsible for funding of the simulator modification. This characteristic can decrease the risk of gaining timely access to proprietary design data if the FFS contractor is the same contractor accomplishing the aircraft modification and intra-corporate separation and competition between cost centers can be

resolved, or if the FFS contractor is not viewed as being competitive by the aircraft modification contractor and cooperative non-disclosure agreements can be reached between them. This characteristic can reduce the time required to implement a concurrency modification, since the FFS contractor is not required to prepare and submit a formal ECP (in response to a formal Government RFP) through Government channels for review, revision, negotiation, and contractual incorporation.

RISK: This characteristic does not eliminate the risk of simulators being non-concurrent to the aircraft and cannot guarantee simulator concurrency caused by factors outside of the FSS contractor's control. There are many. It is doubtful if the FFS contractor can be contractually bound to cost and schedule estimates for concurrency modifications derived from assumed schedules and performance characteristics best known upon contract award, but then modified by the Government for reasons totally outside of the FFS contractor's control. Simulator concurrency modifications will require re-entry into negotiations.

Another key FFS characteristic is that the Government is provided with little insight into the FFS contractor's design or business practices. This leaves the Government in a very weak position any time new price rates are negotiated or previous rates or amortization period are renegotiated. The prices of simulator modifications agreed to upon FFS contract award are determined during competition. If the price is reopened for negotiation because of factors outside the FFS contractor's control, or if previously unplanned aircraft modifications occur, the renegotiated or newly negotiated prices will be determined in a sole source business environment. The differences in fiscal constraint and proposed resources required to mitigate risk between competitive and sole source cost proposals are considerable. The cost to the Government for simulator concurrency modifications (through higher service price or extended period of amortization) will be much higher than anticipated upon FFS contract award.

This characteristic decreases schedule risk since it eliminates the need for a formal RFP and ECP for concurrency changes; however, the FFS contractor will still prepare their internal equivalent to an ECP as a part of their normal business practice. The Government should still require some form of insight, review, and approval of concurrency modifications since the modifications may require Government furnished data, equipment, or operational expertise, may be considered critical to mission accomplishment and demand insight, may alter other training services, and may limit negotiated training service availability to the Government while the simulators are being modified. The FFS contractor will retain dependencies on the Government during concurrency modifications that will limit any guarantee of simulator concurrency.

Perhaps the greatest risk associated with this characteristic is that it may cause **unrealistic customer expectations caused by overstated benefits** and decrease necessary management attention to the continuing challenge of attaining simulator concurrency.

RECOMMENDATION: If AFRC adopts FFS, some factors affecting simulator concurrency may be reduced; however, management resources and attention must continue to focus on resolving simulator concurrency issues since many factors remain unchanged and the problem will remain. AFRC should secure access to sufficient cost and design data from the FFS contractor to ensure that the Government can negotiate the price of concurrency modifications from a position of strength, not from a position of weakness. AFRC review and approval of

concurrency modifications should be required, but should also be as streamlined as far as practicable and not use formal RFP/ECP processes as a model. The applicable MAJCOM SIMCERT organization should participate in concurrency modification design, development, and testing. AFRC should consider specifying tailored commercial airline standards (AR-610A) in aircraft modification contracts that add simulator-unique software functions into aircraft flightworthy software, and specifying "stimulation" (rather than "simulation") design approaches for software intensive flight simulator avionics in FFS contracts.

<u>KEY CHARACTERISTIC 11</u>: The FFS contractor is fully responsible for funding and inserting new technology into the training service assets to replace obsoleted technology that is more expensive to maintain and operate, or add new technology to improve system fidelity. The FFS contractor may propose an annual technology investment schedule as incentive during initial, competitive source selection.

ANALYSIS: The replacement of obsoleted technology in fielded systems for reason of operating efficiency has often been difficult to fund. Congressional and DOD imposed segregation of Government funding accounts often prevents acquisition fund managers to show a cost savings within the account they are responsible for. Funds to replace obsoleted technology can be more easily secured if the technology is also unsupportable, and required system availability is at risk. The Government instituted the Value Engineering Change Proposal (VECP) process in the mid-80s that allows a contractor to propose a system configuration change to save the Government money, and get paid a negotiated portion of the proposed cost savings to cover the cost of modification plus profit. VECPs have been rarely executed because of complicated, time consuming, and expensive review processes, conditions, and restrictions imposed by the Government.

Government funding for the insertion of new technology to improve the fidelity of fielded systems can occur only if a critical training shortfall is identified; and the technology must be principally off-the-shelf, since Government RDT&E funds for simulation technology are rarely accessible to funds managers responsible for fielded systems. The FFS contractor's cost of inserting more capable technology can be corporately absorbed through the largesse of altruistic corporate management, or compensated by the Government through a negotiated increase in training service price or an extension to the period of amortization. Corporate RDT&E funding exists to expand the corporate business base, with all developed technology being proprietary and with all intellectual property rights ascribed to them. Enhanced mission capability of the United States Air Force is incidental.

The insertion of new technology into existing FFS assets may inadvertently affect the fidelity of simulator functions not intended to be modified. Tests of these modifications should include overall system tests to ensure that previous fidelity has not been degraded as well as specific tests of the modified subsystem(s).

MERIT: This characteristic incentivizes the FFS contractor with profit beyond the negotiated value by improving operating efficiency, and can incidentally increase the availability of training services to the Government by replacing obsoleted technology having high failure rates. This characteristic can provide the Government with increased fidelity and improved training value through the insertion of more capable technology, and not require scarce Government RDT&E

funds, further reducing Government overhead. Since the FFS contractor works closely with operational customers, they can better understand operational requirements and prioritize RDT&E activities to enhance their return on investment through greater market share.

RISK: The greatest risk associated with this characteristic is that it may be interpreted as a functional substitute for DOD RDT&E investment. It is not. Significant technology shortfalls exist to limit the full satisfaction of mission training requirements in flight simulators, per risk assessment at ***KEY CHARACTERISTIC 1.*** Technology insertion conducted solely to enhance fidelity and training will most often result in an increased cost to the Government, unless the technology can also be used to expand the FFS contractor's business base or increase profit. For example, if the contractor were to modify their FFS training devices with helmet mounted display systems for simulated Night Vision Goggle training, their cost of operation would go up and the modification would require a considerable amount of Non-Recurring-Engineering effort for the integration of the display system on a device not originally designed for it. These contractor costs will demand recoupment. Even if the Government pays for technology insertion through an increased cost of services or an extension of the amortization period, the technology will still be owned by the FFS contractor and its use will be restricted by conditions determined solely by the FFS contractor to enhance their competitive position for future programs.

A corporate technology investment plan proposed during initial competition may be fleeting and unrealized. A cost overrun during acquisition or operation can be used to justify a redirection of proposed R&D funds, especially if the overrun can be construed to be caused by the Government. This is easy to do in an acquisition environment that forces programs to be driven by broad operational requirements and with few objective measures of performance. Redirection of proposed corporate R&D funds to cover an overrun would be among the first alternatives considered. If the use of proposed corporate R&D funds are not sufficient to cover the overrun, other methods, including reentry into prenegotiated rates, adjustment to the amortization period, or a more formal Request for Equitable Adjustment are likely, but that is another story regarding different characteristics of FFS.

RECOMMENDATION: If AFRC adopts FFS, this characteristic should be included, but with provisos. If the FFS contractor proposes a corporate R&D fund schedule, the Government should be provided insight, review, and comment of potential R&D efforts prior to their initiation by the FFS contractor. The Government should not plan or manage programs based on the assumption of FFS R&D success or technology availability. **The Government should continue its pursuit of DOD RDT&E funds** and maintain the overheads necessary to insert new, more capable technologies into planned and existing training systems. Difficult and challenging technology shortfalls exist. AFRC should continue to support Government RDT&E funds for the advancement of flight simulation technologies based on the unique requirements of the military and not limited to the needs of the public sector. The applicable MAJCOM SIMCERT organization should participate in simulator modifications for technology insertion during design, development, and testing.

<u>KEY CHARACTERISTIC 12</u>: The prenegotiated guaranteed amount of training services purchased by the Government in existing FFS programs averages around ten hours per day, five days a week, and fifty two weeks per year; or about 2,600 hours per year per flight training slot. A surge capability in excess of this value can be built into the FFS contract.

ANALYSIS: This compares reasonably to the availability requirements of some programs using CLS, but is considerably less than most ATS programs which require 5,000 or more hours per year per flight simulator, not including surge. With the presence of sufficient on-site support, modern flight simulation technology has shown itself capable of providing in excess of 6,300 hours per year per flight simulator without significant degradation in readiness or fidelity. Specified availability requirements and training services buy rates appear affected not only by the need for the FFS contractor to have assurances of amortization, but also by the amount of simulator training each MAJCOM and aircraft type is accustomed to, the relative priority of flight simulator training in the overall training and readiness continuum, and the degree of centralized versus decentralized training anticipated. The lower the guaranteed buy rate, the higher the price per unit of training service purchased or the longer the period of amortization. The Government can pay slow or pay fast, but it will still pay the full cost of amortization. See ***KEY CHARACTERISTIC 2*** for further analysis of this issue.

MERIT: A low guaranteed buy rate and extended period of amortization reduces the risk of funds required to be paid to the FFS contractor, even if crews are not receiving the service. It also can free up hours that could be sold to other MAJCOM, Service, allied, or commercial aviation customers, thereby increasing FFS contractor profit or decreasing Government cost if a price share agreement can be prenegotiated. See ***KEY CHARACTERISTIC 4*** for further discussion on this subject.

RISK: An artificially low guaranteed minimum buy rate can influence the contractor to invest in fewer devices than are actually required. Although this reduces their investment and the amount or period of amortization, it may not provide a sufficient amount of training services.

RECOMMENDATION: If AFRC is to pursue FFS, guaranteed minimum buy rates should be as low as possible and the period of amortization should be as long as possible to reduce the risk of paying for services not rendered. The cost of buying services in excess of the minimum guaranteed purchase should be negotiated prior to contract award to a price equal to operating cost plus profit with no amortization cost added. Actual buy rates should be as high as training value, crew availability, and technology can support to help decrease the average price of training services, unless sales of service to other customers are assured and a price share agreement is reached with the FFS contractor. The number of training devices and training service assets should be specified by the Government to be sufficient to support training of the minimum anticipated crew throughput. Additional devices and training service assets can be developed by the FFS contractor via priced options as the Government becomes more confident in actual throughput numbers.

PRECEDENCE FOR FFS

The FFS acquisition strategy is not entirely new, and can be loosely compared to several precedents set in the flight simulation community over the last fifteen or more years. Insights and lessons learned gained from these precedents can be useful when assessing FFS as an acquisition strategy.

In the mid-80s a large American corporation invested capital funds to set up an F-5 flight simulation facility using a form of FFS. Their intended customer base was USAF and Foreign Military Sales (FMS). At that time, funding offices within the (then) USAF MAJCOM (TAC) were hesitant to spend funds on flight simulation for an aircraft type that was competitive with their chosen F-16 airframe and FMS nations flying the F-5 were hesitant to further alienate TAC and spend funds on a training solution that USAF did not support. The contractor eventually sold their assets to an allied nation, wrote off their loss, and left the business.

In the late 80s another large American corporation sold a limited amount of training time in their own F-15A/C simulators to the (then) USAF MAJCOM (TAC) using a form of FFS. The contractor built the simulators principally as engineering research tools that could serve an incidental function as training devices. TAC found the multi-ship, networked simulation capability to provide very effective training not realizable with their own F-15 flight simulators. TAC paid for the direct operating cost per hour and did not pay amortization expenses associated with the initial contractor investment, except through the previous cost to the Government of aircraft development. This positive TAC experience undoubtedly served as a foundation for ACC's recent F-15C Mission Training Center program, which uses FFS.

Over the last several decades, several commercial flight training companies have successfully used a form of FFS to sell flight simulation and training time to commercial aviation companies. Although their initial commercial aviation customers were not willing to pay the full burden of amortization, enough customers were eventually found to share the initial investment expense and make the business affordable and profitable. Approximately 37% of the 490 high fidelity commercial flight simulators managed by the FAA's National Simulator Program are owned and operated by commercial flight training companies. Their customers are primarily private corporations and smaller shuttle airlines with relatively few crews flying a limited number of aircraft. **The larger commercial airlines with greater numbers of aircraft and crews own and operate their own flight simulators** (the remaining 63%) **for reasons of cost, schedule, and performance advantages.** Their cost of operation is less, they can guarantee training priority for their own crews, and the simulators can be more easily maintained in a configuration concurrent with the particular airlines' aircraft. The airlines also find it easier and cheaper to enhance simulation fidelity and insert technology improvements if they own and are responsible for their own flight simulators.

AFRC, NGB, and AMC have purchased training services via a form of FFS for their C-130H2 and H3 aircrews from a contractor that owns all assets, courseware, and instructors. The price of training services was determined on "what the traffic will bear" criteria, since the cost of the flight simulator was previously amortized and no other simulator was available to reasonably match C-130H2 and H3 configuration. Although the contractor's reconfigurable C-130H2/H3 flight simulator did not possess sufficient fidelity to satisfy ATS criteria, the courses were very professionally taught and bridged a training gap, until AFRC fielded its own C-130H2 ATS at Dobbins ARB, GA late last year and plans for the addition of a C-130H3 WST to Dobbins this summer.

The Air Force has recently awarded FFS programs to provide training services for the F-15C, F-16, and AWACS. These programs use firm-fixed-price, IDIQ contracts with an award term

(annual priced options) for the purchase of training services. The first program was for the F-15C, which was placed on contract in fall of 1997, with a Ready For Training date scheduled in spring of 1999; however**, it appears that its ability to support tactical training may be delayed for up to a year.** It is unknown how this affects the contractor's anticipated schedule for amortization of investment. A significant suite upgrade to the F-15C aircraft configuration was planned as an option in the initial contract, but its complexity appears to have increased considerably from what was assumed at the time of award. It is unknown if this will result in reopened negotiations to adjust price rate or amortization period. Meaningful data on the status of the program is hard to come by. The F-16 and AWACS FFS programs were just awarded in early 1999 and meaningful data is not yet available from them. Time will tell.

The United Kingdom's Royal Air Force (RAF) has recently awarded three training service contracts using a tailored acquisition strategy somewhat similar to both FFS and ATS, although their term for the strategy is called Private Funding Initiative (PFI), or sometimes Public/Private Partnership (PPP). PFI/PPP includes the contractor being responsible for up-front acquisition and development funding of training assets. The contractor also is responsible for training delivery, with the trained **students guaranteed to possess required skills** after the training service is performed. The contracts are very long term (up to twenty years), and the **Government retains right to title** following the period of amortization. Concurrency modifications are included in the initial contracts only for modifications having known and stable requirements and design. Future, less well known modifications may be competed. Technology insertion for efficiency will be funded and implemented by the PFI/PPP contractor. If the PFI/PPP contractor inserts new technology for enhanced training, reentry into prenegotiated rates may be required. The PFI/PPP contractor may sell excess training time to another party to increase their profit. The RAF's first PFI/PPP program is for the Medium Support Helicopter (MSH) training program and expects its first MSH device to be fielded later this summer. Other RAF PFI/PPP programs include the RAF Hawk (T-45) and the Tornado GR4 training systems. Delivery of the first Hawk trainer is expected later this year, and the first Tornado trainer is scheduled for delivery within a year or two. The RAF does not possess SIMCERT organizations similar to USAF, but uses aircrew training experts from each aircraft type (having variable expertise with flight simulation issues) during operational testing. RAF flight simulation experts have less insight into the PFI/PPP contractors' design and development phases than a conventional acquisition strategy would provide and have expressed some concern over the initial fidelity of fielded systems. Time will tell.

SUMMARY

The FFS acquisition strategy, as applied to USAF flight training programs, is a bold and innovative approach that appears to show much promise. The strategy is being strongly advocated by influential USAF acquisition offices. One of the clear reasons for the development of FFS as an acquisition strategy is to reduce the Government infrastructure and overhead cost of acquisition. Once this potential overhead reduction is proven to result in equal or superior performance at equal or less cost and schedule, FFS will have succeeded and can be emulated

throughout the Government flight simulation and training community with known and manageable risks.

One of the greatest obstacles to innovation is the presence of inertia. Old ideas die hard. Strong advocacy is required to make innovation work. One of the greatest risks of strong advocacy is the lack of balance between advantages and disadvantages when the innovation is promoted and sold. This white paper is intended to help achieve that balance through analyses not encumbered by too many old ideas.

The FFS acquisition strategy includes several key characteristics that are new, the strategy is in a state of flux, and it remains unproven. The initial applications of FFS to flight training programs indicate that lessons learned are being used by tailoring previous versions of FFS strategies to address newly discovered or better understood risks. Some unacceptable risks appear to remain. **FFS is not a panacea for acquisition ills**. Improperly implemented, with little regard to its characteristics and risks, it could cause more problems than it was intended to fix.

Flight simulation technologies have long been considered essential for ensuring safety-of-flight and decreasing the risk of loss of life, and are being called upon to serve an increasingly crucial role in achieving and maintaining DOD and USAF mission capability. The potential value of networked, team training and mission preview/rehearsal to mission readiness appear strong. Flight simulation should not be viewed as a support function, but as an integrated and required component of a weapon system**. Flight simulation is well worth Government investment and management attention.**

Until the FFS acquisition strategy becomes better defined and has been proven to work well past the initial development cycle, it requires careful, tailored application to not risk the mission capability of the Air Force Reserve Command. This white paper is submitted as a tool for AFRC managers to better understand those risks and to develop sound training system acquisition strategies that best serve our nation well into the next century.

Update 22 Jul 02. The FFS business model is no longer specified in the various, draft DMT roadmaps as the only business model, which will support achieving ACC's DMT requirements. Therefore, the legacy trainers owned by the Air Force can be migrated into the synthetic battlespace if a command decided that migration of a legacy trainer supported their DMT requirements. Bottom line, the DMT roadmap supports both types of Air Force trainers, leased or owned. Thereby, allowing the commands to evaluate on a case by case basis, which, business model best supports the implementation of future training requirements.

Also, additional costs have been levied onto both the F-16 MTC and F-15 ACES contracts. Both of the areas of additional cost can be attributed to the FFS business model. Although exact figures for these increases are sometimes hard to pin down at the acquisition agencies, it is safe to assume that these costs have exceeded a $10M threshhold.

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