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Absorbing and Developing Qualified Fighter Pilots

The Role of the Advanced Simulator

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Summary

One of the main responsibilities of an operational fighter unit is to turn inexperienced pilots entering the unit into experienced pilots who are able to carry out the unit's operational mission effectively. The process of turning inexperienced pilots into experienced pilots is called *absorption*. The Air Force must manage pilot absorption to achieve two goals. First, it must ensure that operational units have enough experienced pilots to perform the unit's mission and to sustain the development of pilots for supervisory flying positions in the unit. Second, it must ensure that pilots gain the experience they will need to perform duties in nonflying positions that require rated officers.

Managing the absorption and subsequent development process effectively requires measuring pilot experience. Since pilot experience is developed through training in the unit's aircraft, it is currently measured in terms of aircraft flying hours; pilots with more flying hours are presumed to be more experienced. The Air Force uses the flying-hour measure of experience in its Rated Distribution and Training Management (RDTM) system as a basis for maintaining an appropriate mix of experienced and inexperienced pilots in operational units. The fundamental RDTM criterion for being identified as "experienced" is that a fighter pilot have 500 hours in the primary mission aircraft. Although the 500-hour RDTM definition is clear and quantitative, it may not accurately reveal actual pilot experience in terms of skills or qualification levels. The evidence is compelling that the quality of 500-hour pilots has varied considerably over the more than 30 years that the definition has been in use. These variations in pilot skills have changed

the quality of the operational training environment. Still, the RDTM definition has served the Air Force well despite these variations because it has historically provided aircrew managers with a useful measure of unit health in terms of pilot qualifications—the unit’s *experience level* (the ratio of experienced primary mission pilots assigned divided by total primary pilots assigned). Embedded in the RDTM definition is the assumption that, if the unit’s experience level remains high enough, pilots can continue to develop the skills and qualifications required to perform duties as instructors, supervisors, and staff officers. This assumption was quite valid when the RDTM definition was adopted, but evidence is growing that the absorption and development processes may have become decoupled and may require independent monitoring by aircrew and assignment-process managers. The problems result from inefficiencies caused by increasing numbers of inexperienced pilots and decreasing numbers of operational units.

One indication of possible inefficiencies in the absorption process is the stress on operational units lacking sufficient training resources to produce enough experienced pilots (see Taylor, Moore, and Roll, 2000; Taylor et al., 2002; and Bigelow et al., 2003). This stress is imposed, to some extent, by the RDTM definition of an experienced pilot as one with at least 500 hours in the primary mission aircraft. A more-accurate accounting of pilot absorption and development opportunities is required.

The present research was designed to examine how well the RDTM flying-hour measure of experience corresponds to expert pilots’ notions of what constitutes an experienced pilot in terms of ability to perform additional tasks, such as staff or supervisory duties. To study what is meant by *experience*, it is necessary to be able to measure pilots’ actual capability levels, which cannot be observed directly. Ultimately, the degree to which a pilot reflects an experienced ability level can be known only through subjective judgments made by peers and commanding officers. To determine the basis of these judgments, we developed a survey to determine the factors that contribute to judgments of pilot experience and development. These surveys were conducted between October 2002 and October 2003. Fighter training experts (supervisors and instructor pilots) judged the experience level of pilots

with different backgrounds and training experiences in terms of aircraft proficiency and readiness for a staff assignment.

The results of an initial survey conducted at an F-16 base indicated that flying hours are only one of the factors that contribute to judgments of a pilot's experience (see p. 62). Other factors include a pilot's previous flying experience, upgrade level, and types of training sorties flown (see pp. 63–64). These results suggest that the current approach to measuring experience in terms of flying hours alone may not accurately estimate a pilot's actual level of experience because it ignores many of the external factors that influence the development of pilot experience.

The results of a second survey conducted at F-15C bases having advanced simulator systems with MTCs capable of linked distributed mission operations indicated that certain types of MTC training, such as large-force employment exercises (which involve interaction among a number of aircrews in a simulated combat environment), contribute significantly to pilot experience in terms of combat capability (see p. 49). The results of the F-15C survey also indicated that experience is not a yes-or-no variable and must be considered in context. Having the experience necessary not to require special in-flight supervision, for example, is quite distinct from having the experience required to assume staff or supervisory duties (see p. 42). Our survey results indicate that unit supervisors believe the latter type of experience requires nearly twice the flying hours as the 500-hour RDTM requirement for experience (see p. 44). These results strongly indicate that the absorption and developmental processes for pilots need to be monitored independently for the Air Force to ensure its pilots have the opportunity to continue to develop required operational skills after their initial operational assignment.

The F-15C survey also asked about the optimal mix of sortie types required to maintain aircraft proficiency in terms of combat readiness. The experts in the F-15C units agreed that the optimal number of live sorties per month was about 14 (see p. 50). These experts also agreed that the optimal number of MTC sorties per month was about five. So the experts agreed that a total of about 19 training profiles (including live sorties and simulator missions) per month was optimal and that about

26 percent of these sorties should be large force employment exercises flown in the MTC (see p. 53). Clearly, these advanced simulator systems, as they become available, can be regarded as essential components of the operational training environment that can also contribute significantly to the initial absorption and ongoing development of experienced pilots.

The survey results suggest that it is time for the Air Force to consider revising its yes-or-no view of pilot experience to manage the absorption and development processes separately for both operational training and career progression (see p. 57). An additional measure of pilot experience will be necessary to reflect the skills and qualifications acquired to prepare for more-senior supervisory or staff assignments. The absorption process must still be based on some measure of experience, but managing development and subsequent career progression will require an additional measure that accounts for development of these additional skills (see pp. 57–58).¹

With certain caveats, we also recommend modifying all experience definitions to include credit for appropriate training in advanced simulator systems with MTCs (see p. 57). This change would incorporate a very effective training opportunity in units in which it is available and could codify the training requirements and accomplishments necessary for a more-efficient mix of live and simulator training. Our caveats include the following:

1. Advanced systems should be available to all pilots working with given a mission design series.
2. Funding for fielding new systems, providing ongoing essential software updates for fielded systems, and continuing development of distributed links to other appropriate units needs to be adequate.
3. Training requirements need to emphasize and exploit an integrated and coordinated mix of live and simulator training.

¹ The Air Force has recently established officer development programs in all career fields to ensure senior-level review of officer development options and opportunities. We are concerned, however, that this review process may not begin early enough for rated officers to ensure that all (or even most) of them can continue to develop the required operational skills in subsequent assignments after their initial operational assignments.