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## Advanced Precision Kill Weapon System (APKWS) Acceptable Risk: Experimental Pilots and Aircraft in Operational Testing

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### Approved for public release, distribution unlimited

**See also ADM201946, Military Operations Research Society Symposium (73rd) Held in West Point, NY on 21-23 June 2005.** The original document contains color images.
Advanced Precision Kill Weapon System (APKWS)

Acceptable Risk:

Experimental Pilots and Aircraft in Operational Testing

73rd MORS Symposium 22 JUN 05
Tried and True Hydra-70
APKWS

Hydra-70, 2.75-inch rocket system comprised of launchers, system management electronics (weapon control unit), upgraded fire control software, a MK66 rocket motor, laser detection and guidance section, and warhead.

BAE Systems Concept

Operational Test Command
Traditional Test Path

- Test Schedule and Review Committee (TSARC) coordinates with US FORCES COMMAND (FORSCOM) upon review of requested operational unit test player composition and targeted test dates.

- FORSCOM reviews potential units for availability of requested test unit composition and then availability of unit during requested testing dates.

- Test location determined.

- Training conducted

- Test executed.
Why Did Different Choices have to be Considered?

- Army Aircraft Usage.
- FORSCOM aviation unit operations tempo (OPTEMPO).
- Flexibility of unit to adapt to emerging development test results and test schedule changes (acceleration/slippage).
- Desire to have development test and a limited user test (operational test) back to back with only three working days between tests.
Army Aircraft Usage is UP

- Number of available aircraft for test has diminished over the last three years due to active theaters:
  - Korea
  - Afghanistan
  - Iraq
- Non-deployed aviation assets committed:
  - Training
  - Flying proficiency flights
  - Homeland security flights
  - VIP transport flights
  - Aircraft maintenance flights
- Aircraft out of circulation:
  - Aircraft upgrades
  - Aircraft Re-builds (forecasted and battle damage)
  - Transition of aircraft between elements for modularity
Army Rotary-Wing Aircraft OPTEMPO

- Train-up For Deployment
- Deployment
- Re-set / Re-fit After Deployment
- Training
- Experimental
- Re-build

Army Rotary-Wing Aircraft Pool

Operational Test Command
What is Considered Experimental Aircraft

- For the Aviation Technical Test Center, an experimental aircraft is an aerial vehicle used for developmental flight testing and airworthiness qualification testing.

- Developmental flight testing of aircraft systems, subsystems, aircraft allied equipment and aviation life support equipment to influence the material acquisition decision making process.

- Airworthiness qualification testing focuses on assessing the handling qualities of the aerial vehicle and its performance (e.g., flight, hover, autorotation, etc) and flight in icing conditions.
Experimental Aircraft

- **PROs:**
  - Configured with on-board instrumentation.
  - Latest upgrades completed.
  - Robust maintenance data due to on-going reliability, availability, and maintenance (RAM) data collection.

- **CONs:**
  - No longer in an operationally fielded configuration.
  - Flight may be characteristics changed due to upgrades.
Who are Experimental Pilots?

- Graduates of the United States Naval Test Pilot School
  - 48 week course.
  - Conducted twice a year.

- Fixed-wing, rotary-wing, and airborne systems curriculums provide instruction in academics, flight test preparation, flight test conduct, data collection, data reduction, and test report preparation.
Golden Crew

- For an AH-64D a golden crew is two experimental pilots.

- PROs of a golden crew:
  - Are the “best of the best”.
  - Highly adaptive to schedule change.
  - Disciplined in creating and maintaining conditions for data collection.
  - Keen sense of situational awareness.

- CONs of a golden crew:
  - In quest of data collection, create highly structure scenarios not reflecting the operational environment.
  - Absence of mistakes made by new pilots
Type III Error

Solving the wrong problem precisely is a type III error.

- A type III can easily occur using experimental aircraft and pilots if two conditions are not managed:
  - The first condition is not using the same aircraft configuration as operational units.
  - Golden crews’ skill and experience can prevent conditions from surfacing (key operational aspect) that new or lesser experienced pilots could encounter.

- Mitigation of these condition can be done by:
  - Returning experimental aircraft to operational configuration.
  - Mixed crews (experimental pilot and FORSCOM pilot).
Conclusions

• Experimental aircraft can be used once the aircraft are returned to a normally fielded configuration along with a certifying statement reflecting the configuration and noting any impact from leaving instrumentation in place.

• A mixed crew consisting of a FORSCOM pilot and an experimental pilot:
  – Capitalizes on data collection discipline.
  – Maintains newer (younger) pilot perspective.
  – Captures the broad spectrum of skills from new pilot to seasoned pilot.

• It is an acceptable risk to use experimental aircraft and pilots for a limited users operational test.