Osborn

## Harrier Hassle

A fleet replacement squadron instructor pilot (IP) and a pilot in training (hereafter referred to as MP, for mishap pilot) were scheduled for back-to-back air combat maneuvering flights in AV-8B *Harriers*. The aircraft assigned to the instructor had Airframe Change #332 incorporated. This change involved installation of a redundant DECS (digital engine control system) enable switch mounted on the top of the fuel shutoff handle bracket. This switch is wired in parallel with microswitches in the fuel shutoff handle to provide power to the DECS. Either the redundant switch or the shutoff handle microswitches can energize the DECS. Formal approval of a DECS power check procedure was pending. (An urgent Naval Air Training and Operating Procedures Standardization (NATOPS) change containing the prestart checks had been submitted by the Model Manager prior to the mishap.) Because of this, the aircraft had been flown primarily by instructor pilots to avoid any confusion that a replacement pilot might experience with the new DECS enable switch.

The MP's VRS, a visual recording system used on training flights and in debriefs to enhance the "lessons learned" aspect of instructional hops, was inoperable. Therefore, the MP and IP, whose VRS was working, swapped aircraft. The MP thus flew the *Harrier* with Airframe Change #332.

The first flight went well and the *Harriers* returned to base for refueling. The AV-8B launched again. Climbing through 1,000 feet, the MP heard a caution tone and observed a PROP (fuel flow proportioner) caution light. The MP secured the PROP, turned it back on, and the caution light remained on. He then informed the IP about the light. The IP interpreted the report as relating to the mean pump light. The MP repeated his problem and spelled out "P-R-O-P" over the radio. He then secured the PROP switch and left it off. It was not clear to the IP as to what cockpit indications the MP really had, but the flight continued.

During air combat maneuvering in the working area, the MP was in a nose-low, left-hand turn with the IP at

his 7:00 position. As the IP was bringing his nose onto the MP's aircraft, the MP reduced throttle to idle then rapidly advanced it to full power.

As the engine spooled up, the MP heard a warning tone and saw a red EFC (engine fuel control) digital warning light and a yellow EFC caution light. The MP rolled wings level and retarded his throttle halfway. He noted a red overtemp warning light, which normally comes on at 765 degrees. The MP reported he had a problem with the DECS.

"Are you in manual fuel?" asked the IP.

"Yes, I am, and I have an overtemp of 800," answered the MP. But the engine was stable.

The MP assumed the lead and turned toward home base, 60 miles away. The JPT (jet pipe temperature) was 770 degrees. The MP reduced throttle and the temperature declined to the high 600s. The fliight declared an emergency and began a shallow descent direct to the field.

Following a transmission, the MP thought the IP suggested setting power at 75 percent. The MP did so and the JPT increased, fluctuating in the high 700s. The IP later noted that the MP was "speaking calmly but that his transmissions were difficult to interpret as there was distinct electronic crackling."

The IP attempted to compare engine parameters. His aircraft was at 75 percent rpm, 72 ppm (pounds per minute) fuel flow, and 400 degrees JPT. The MP's JPT was "600 something," fuel flow 102 ppm, and the 15-second caution light was still on. The IP then asked for the status of the MP's IGVs (inlet guide vanes).

"Forty degrees," he responded. IGV angle at 75 percent is normally about five degrees. The mechanical stop for the IGVs fully closed is 40 degrees.

The IP did not pursue the IGV angle. He asked, "Is it [the engine] running OK?"

The MP said, "Yes," and the IP suggested that the cockpit indications could possibly be faulty.

The *Harriers* neared the airfield. On short final, the IP noted 15-foot, red-orange, high-pressure flames – like afterburner – emitting from his hot nozzles. They lasted four seconds then went out. The IP surmised that the MP was reverting to a fixed-nozzle, slow-landing technique and was modulating the throttle.

The IP warned, "Quit jockeying the throttle. What's your engine doing?"

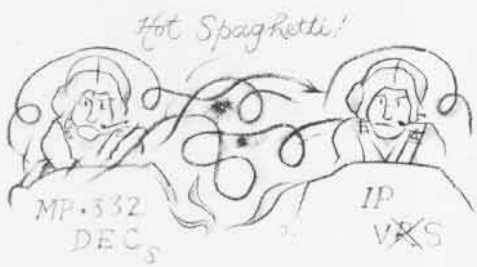
"I'm not; 56 percent," the MP said. The MP also observed the overtemp warning light on.

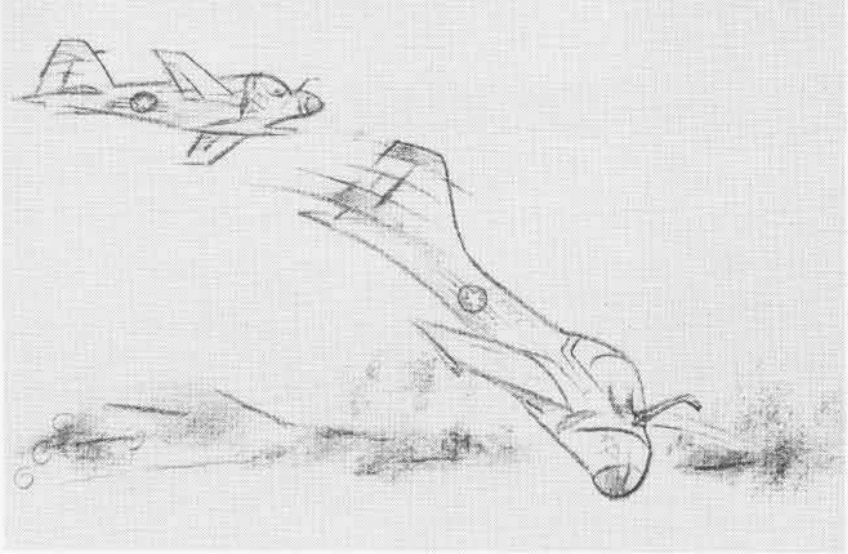
Flames again shot from the nozzles, at which point the IP advised, "You're on fire. Shut the throttle off. Eject, eject, eject. You're on fire."

The MP pulled the handle and successfully ejected. The *Harrier* impacted nose down in a river. Wind carried the MP overland, where he broke an ankle on impact with the ground but was otherwise OK. The elapsed time from the initial malfunction to ejection was seven minutes. At no time did the MP observe a fire warning light.

**Grampaw Pettibone says:**

**Lots of complicated things can happen in a high-tech aircraft in**





**seven eternal minutes. The MP improperly analyzed the multiple malfunctions that ruined his whole day. He experienced the DECS problem and properly switched to manual fuel. Then there was the high JPT, and retarding the throttle was the right thing to do. (Incidentally, there is no NATOPS procedure that tells the pilot to land ASAP in the event of fuel flow proportioner failure.)**

**But, for whatever reason, increasing throttle to 75 percent made things "hotter." If he had dealt specifically with the overtemp situation alone and used the pocket checklist, the MP would have operated the engine at minimum power and made a conventional landing. The MP didn't realize he had an IGV problem. When the MP called up the engine page on the digital display indicator, the 40 degrees IGV angle didn't seem unusual to him. Had he recognized this as a predicament, the "stuck IGVs" section of the checklist would have "told" him to operate the engine at minimum power.**

**When the IP, a highly respected aviator who had the MP's fullest confidence, indicated the possibility of indicator failure, that became readily – if incorrectly – acceptable as a reason for the problems.**

**In the end, the *Harrier* engine couldn't take the heat.**

**Ole Gramps feels that crew coordination among these single-seat flyers left room for improvement. Better explanatory advice and a more lucid exchange of vital factors might have produced a happier – and less costly – end to the flight. You folks in the community of one seat/one pilot aircraft: Think about it!**

## Bombing Blunder

Two A-6 *Intruders* launched on a night mini-WASEX (war at sea exercise) to be followed by a secondary mission of practice bombing using the MK-58 smoke flare. Shortly after the brief, the original wingman became ill and a second was assigned. The flight was rebriefed on the salient points for the WASEX and thoroughly briefed on the conduct of the night bombing mission.

For the bombing phase, the flight was to drop flares in section at 1,000 feet followed by a breakup into a racetrack pattern for level or shallow (5-10 degree) continuously computed impact point deliveries. Minimum altitude was 1,000 feet with downwind pattern altitude briefed at 2,500 feet, flying at 250 knots.

Weather featured broken to overcast layers of clouds with no definable horizon. The wingman experienced vertigo in formation during the initial part of the WASEX. However, both A-6s flew two profiles in formation against a target ship at 1,800 feet with no apparent difficulties.

Approaching the bombing pattern after the WASEX, the wingman noted that lead was in an excessive rate of descent, 5,000 fpm, while dropping down in formation for the flare drop. At 2,500 feet, rate of descent was 2,500 fpm. The flight went down to 700 feet before lead brought it back up to 900 feet, still 100 feet below briefed, minimum release altitude.

After flare release, lead broke left and up. The wingman broke four seconds later. The wingman noticed lead roll out downwind at 2,000 feet. The wingman stabilized at 2,200 feet. At this time, he could see lead's wingtip and tail lights only.

The wingman momentarily lost sight of lead as he began the inbound turn to the target. Lead called inbound at eight miles and the wingman observed him at the 9:30 position, two miles away and slightly below the wingman's altitude.

The wingman then scanned inside the cockpit to execute the inbound turn, and as he neared completion of it, both the pilot and bombardier navigator (BN) observed a bright flash near the run-in heading. There was a large, expanding fireball that lasted eight seconds on the water surface.

The wingman climbed to transmit a distress call and assumed on-scene commander responsibilities. Rescue efforts continued through the night and were concluded the next morning. The pilot and BN were lost, the aircraft destroyed. Multiple pieces of aircraft debris were sighted but were unrecoverable due to the sea state and presence of sharks in the area. There was no sign of the crew except for their helmets, which were recovered.

**Grampaw Pettibone says:**

**Whether it's the "real thing," as in Desert Storm, or preparing for same, there's no substitute for solid basic airwork: flying the aircraft by the numbers, scanning the gages, and watching airspeed, altitude, angle of bank *and* respecting old man vertigo – particularly when his bosom companion, the black of night, is around.**

**This unfortunate crew "busted" altitude during the flare drop and it got worse from there. Situational Awareness went by the boards. We'll never know why the BN was unable to caution the pilot in time. Maybe the wingman's crew, aware of the unusually steep rate of descent and the *Intruder*'s behavior after that, coulda helped with a warning.**

**There was no indication of mechanical trouble, by the way.**

**Flight Discipline is the buzzword for this tragedy. Before you worry about bombing or other phases of the mission, FLY THE AIRPLANE!**