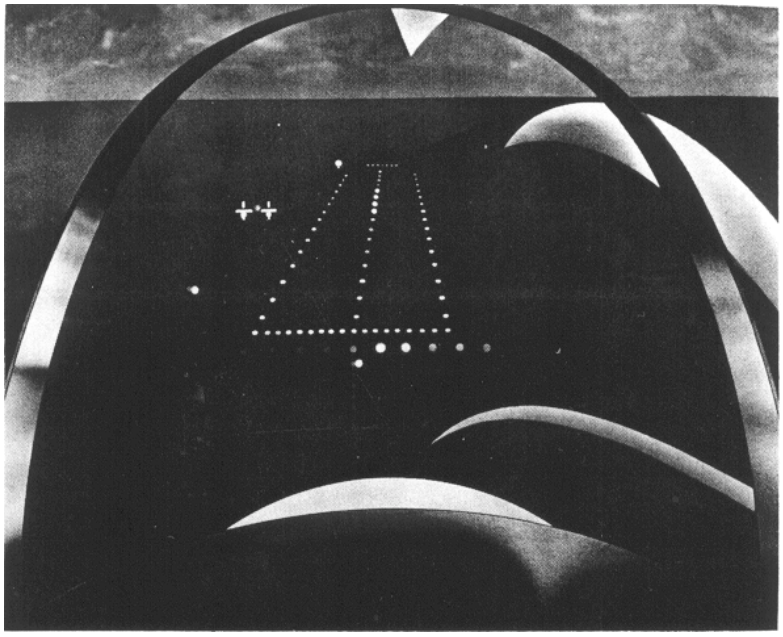
Be the Laser

By Lt. Dave Howe



RECENTLY, I spent two weeks at the Naval Air Engineering Center in Lakehurst, N. J., evaluating the Improved Carrier Optical Landing System (ICOLS). ICOLS incorporates five subsystems:

- a Fresnel lens with improved sensitivity
- a fore and aft long-range glideslope indicator
- a crossbar long-range lineup indicator
- a laser glideslope indicator
- a laser centerline localizer

The tests were conducted during the day and at night using several types of carrier-based aircraft. Ten approaches per sortie were flown using the various systems, at different ranges, down to touch-and-go landings. Because the two long-range indicators were not well-re-ceived by the test group and probably won't be seen by fleet aviators, I won't discuss them here. Instead, let me concentrate on the other three subsystems.

The new Fresnel lens will either be a larger version of the current Fresnel lens system (10 cells instead of five) or an even better version, the CAI MOD 2, which uses fiber optics and high-quality lenses that vastly improve the ball resolution. The lens used in the evaluation was the 10-cell version.

The increased sensitivity allows pilots to see slight deviations in glideslope at a significantly increased range and enables them to start flying the ball at a mile and a quarter instead of the normal three-quarters of a mile. Since the average pilot does not usually see and react to a deviation until he is a half-ball high or low, the increased sensitivity would allow him to react when, on the current lens, he would see little or no deviation. The laser glideslope indicator and the laser centerline localizer are single-point sources that provide accurate and usable information out to the limits of visibility, usually more than 10 miles. The lasers illuminate vertical and horizontal corridors with amber, red, green, flashing red and flashing green light.

The tests showed that there should be no doubt in a pilot's mind which color he is seeing or which indicator he's referencing, regardless of range. If he's low and lined up left, he'll see two distinct red lights. If he's low and right, he should see a red and a green. If the airplane gets further out of parameters, the light would flash the appropriate color. "On and on" would show as two amber lights. The laser glideslope also provides excellent pushover cues as the airplane drives in at 1,200 feet.

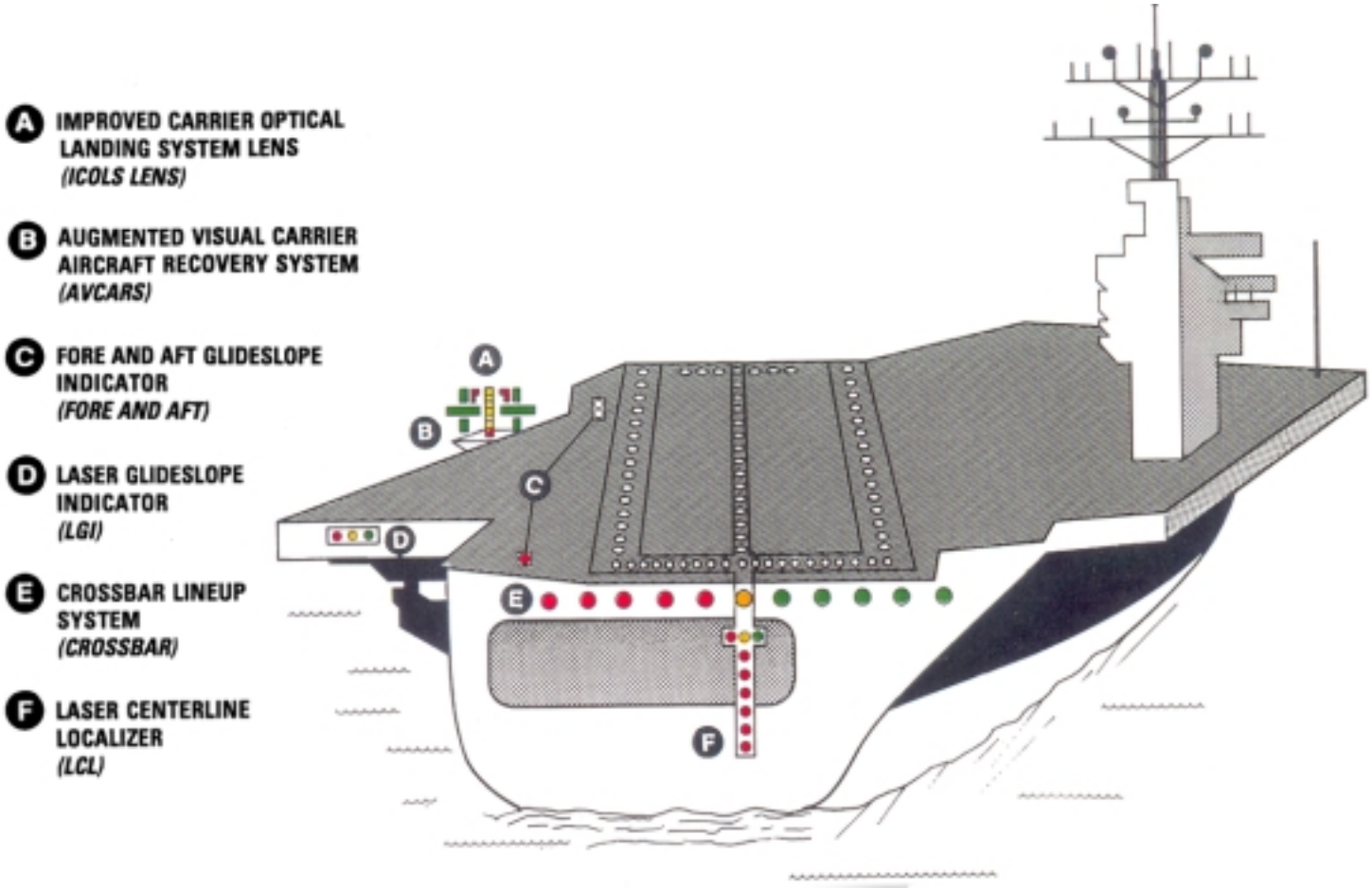
The combination of the laser glideslope, laser centerline localizer, and the improved Fresnel lens could make the "eye test" of flying the ball a thing of the past. With the new system, safety would be improved and boarding rate could, quite conceivably, approach 100 percent.

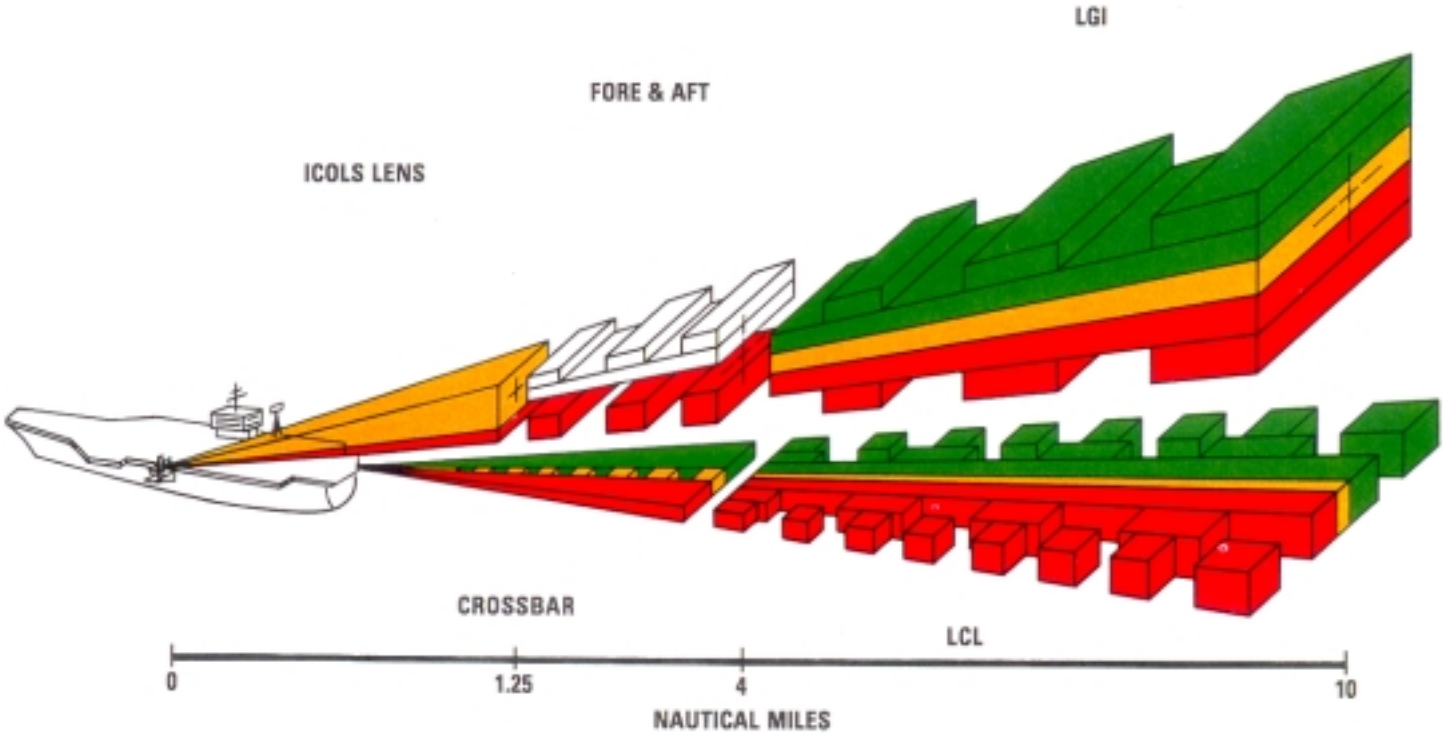
The only problem I foresee with the new technologies is the following scene:

(Paddles enters the ready room for an LSO debrief)
Paddles: "Who was in 103?"
Dangerboy: "I was."
Paddles: "Let's see . . . SRD.X HIM CD.DLIC LL NO-GRADE 3-WIRE."
Dangerboy: "NO-GRADE?! I caught a 3-wire!"
Paddles: "So did the rest of the recovery. We had to target the 2-wire for awhile to give the 3-wire a rest. You were high in the middle."
Dangerboy: "I was only three balls high!"
Paddles: "I know, but you landed *THREE FEET LEFT*!"
We could live with this.

Lt. Howe is an instructor at the LSO School, an FRS instructor pilot and an LSO with VF-101.

ICOLS


A IMPROVED CARRIER OPTICAL LANDING SYSTEM LENS (ICOLS LENS)
B AUGMENTED VISUAL CARRIER AIRCRAFT RECOVERY SYSTEM (AVCARS)
C FORE AND AFT GLIDESLOPE INDICATOR (FORE AND AFT)
D LASER GLIDESLOPE INDICATOR (LGI)
E CROSSBAR LINEUP SYSTEM (CROSSBAR)
F LASER CENTERLINE LOCALIZER (LCL)


LGI
FORE & AFT
ICOLS LENS
CROSSBAR
LCL
0
1.25
4
10
NAUTICAL MILES