

# F-35C Integrated Direct Lift Control. How It Works

## IDLC will make carrier approaches easier



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Two Lockheed Martin F-35C Lightning II carrier variant test aircraft launch together and conduct formation flying at Naval Air Station Patuxent River, Md., April 18, 2012. The F-35's IDLC will make carrier landing approaches much easier for future Navy pilots. Lockheed Martin photo

A few months ago NAVAIR issued a press release touting the F-35C's new Integrated Direct Lift Control (IDLC), highlighting its potential to make flying carrier approaches easier.

The press release described IDLC as new flight control software that "translates pilot commands into choreographed changes to engine power and control surface movement, greatly improving glide path control." I felt that was a little vague, so I called NAVAIR and chatted with F-35C test pilot Cmdr. Eric "Magic" Buus to break down what IDLC does in more concrete terms.

IDLC's job is to quickly help the pilot make glide slope adjustments during the carrier approach, Buus explains. It is resident within all three F-35 variants, not just the C model.

*"What provides a huge benefit to the pilot is that [IDLC] moves the trailing edge flaps up or down to increase or decrease lift, which gives the airplane a very precise glide path control. It almost feels like a predictive control because it happens so quickly and you can get such effective changes in glide path. The trailing edge flaps are pretty large on the F-35C. For a carrier approach we nominally set them to 15 degrees trailing edge down, which is a half-flap configuration. So there's room for the flaps to come down and to come up and either increase or decrease lift."*

In essence, one could call IDLC "automatic flap response." Its effect is to literally "heave" the airplane in the vertical axis, Buus says.

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Cmdr. Eric "Magic" Buus touches down at Patuxent River Naval Air Station in F-35C airframe during a test sortie. Lockheed Martin photo

"The F-35C is designed to be an auto-throttle flyer on approach. So the pilot will engage auto-throttles and then he just has to fly glide path and lineup with the stick. When he makes pitch-stick inputs to control the glide slope – if he pulls back on the stick a little – the airplane will respond by lowering the flaps to increase lift. The seat-of-the-pants feel is a lot more in the vertical axis. It actually changes the G-level of the airplane; as the flaps come down, they add lift, increasing G and vice versa."

The pilot is indirectly flying the flaps with the stick, Buus says. From the cockpit, IDLC gives the F-35C exaggerated throttle/pitch response, the test pilot affirms. "It's almost immediate. It takes longer to make the correction in legacy airplanes."

NAVAIR contends that IDLC can potentially shorten the carrier qualification learning curve for new pilots by offering more control during the approach, and Buus agrees.

"The flight control engineers have really done an amazing job. IDLC is just one part of it. It's an easier airplane to fly behind the ship. The easier the airplane is to fly, the safer it is and the easier to train pilots to fly it well. Over time, I think it will reduce some of the training costs and burden to the Fleet."

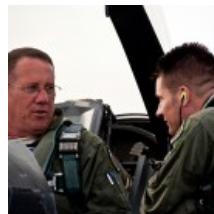
*"In a few years the F-35C's flight control system will pair with the Joint Precision Approach and Landing System (JPALS) to enable data-linked approaches controlled from the carrier. IDLC will take relevant incoming data from the flight control computer and aid in making the process that much more precise."*

With its larger wing and flaps and control harmony, the F-35C benefits more from IDLC than its sister variants. But they too enjoy more precise approach control with the system, Buus maintains. And he adds that it could be integrated into legacy aircraft such as the F/A-18E/F Super Hornet and EA-18G Growler.

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