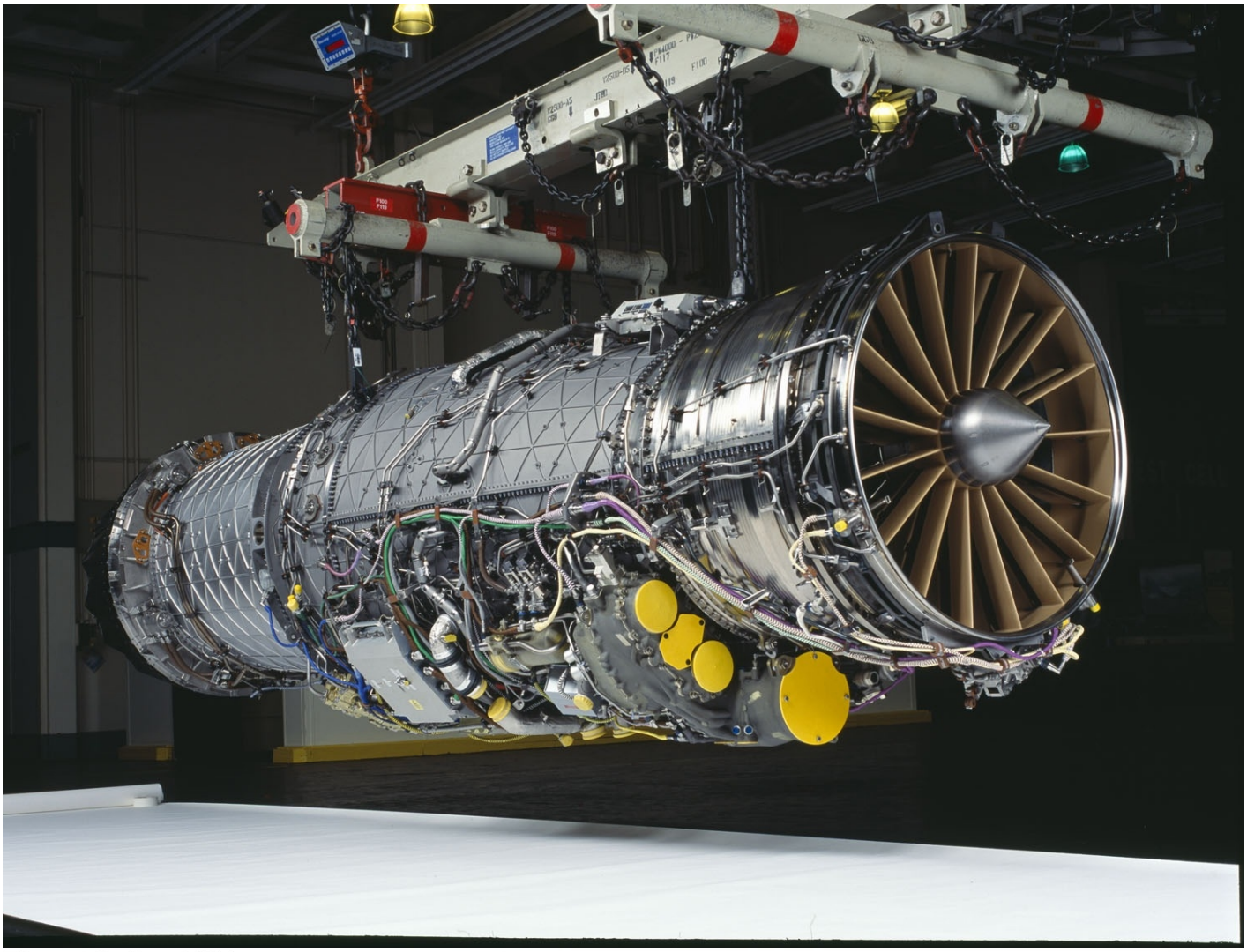
P&W WRAPPING UP F135 ENGINE DEVELOPMENT

News / Manufacturer



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Pratt & Whitney expects to wrap up system development and demonstration (SDD) of the F135 propulsion system for the F-35 Lightning II in July after 15 years of work, but the company will remain engaged with the wider Joint Strike Fighter flight test effort which runs until late 2017.

The P&W's head of military engines Bennett Croswell tells *Flightglobal* that the F135 team is also about 85% of the way through correcting an engine fault inherent in 180 early-model units and caused one aircraft to catch fire on the runway at Eglin AFB, Florida in June 2014. The problem was traced to hard rubbing in the engine's compressor section.

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The incident temporarily grounded the F-35 fleet and prevented the US Marine Corps F-35B from debuting at the Farnborough Air Show. “I feel very confident we’re going to get across the ditch this time,” Croswell says.

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P&W

Now that development is wrapping up, Croswell is looking to an F135 engine component improvement programme that receives $33 million per year in the US Air Force’s budget as well as new science and technology initiatives as vehicles for developing block upgrades for the 43,000lb-thrust afterburning turbofan.

The F135 represents the present and the future of P&W’s military engines business, says Croswell, and new developments will reduce fuel burn, increase thrust and lower the overall life

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cycle cost. The F135 will evolve in increments like the F100, of which P&W delivered 7,000 over 40 years and 3,900 remain in service today.

A P&W engine has been chosen to power the still-classified Northrop Grumman B-21 long-range strategic bomber, but the US Air Force won't confirm if it's some derivative of the F135. Croswell also won't discuss the next-generation heavy ordnance carrier, but says planned improvements to the F135 will support current F-35 operations and help P&W win new business in the future, perhaps even re-engining contracts.

Initial changes will be software related, Croswell says, with no significant components changes required. The next step up will come via the US Navy's Fuel Burn Reduction programme, which aims to cut F135 fuel consumption by 4% by about 2020.

P&W is also engaged in the Air Force Research Laboratory's Adaptive Engine Technology Development (AETD) project that is developing adaptive cycle engines with a third bypass stream. The ultimate goal is an engine 25% better fuel efficiency than today's engines and 10% greater thrust. P&W and GE Aviation have moved their competing designs from AETD through to the preliminary design review phase and are conducting fan and core demonstrations this year.

The two American engine manufacturers expect follow-on contracts, each worth up to $1 billion, for the Adaptive Engine Transition Programme (AETP) by mid-year. The AETP demonstration phase runs through budget year 2021, with engine performance and durability tests expected in 2019 and 2020. The best engine is likely to power the next Air Force and Navy fighter platforms.

"When you look at when next-generation will be fielded, you need to back it up and start now," says Croswell. "We'll expand on variable cycle features. We're doing an AETD/AETP engine with a variable cycle fan and we're looking at things like a variable cycle core as well.

"That'll be the foundation for what we do in next-gen. We'll do some significant durability testing, go to altitude and test the engine across the full envelope."

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Lockheed Martin

The F135 is derived from the F119-100 turbofan that powers the F-22 Raptor and was installed on the Lockheed X-35 and Boeing X-32 JSF prototypes. Since F-35 development began in October 2001, P&W has delivered 270 F135s, including the Rolls-Royce LiftFan-equipped -600 version for the F-35B – the only supersonic short takeoff, vertical landing combat aircraft.

This month, the company finalised a contract for 66 Lot 9 engines under $1 billion deal and is should receive funding for the next 100 Lot 10 units soon. P&W recently received funding for Lot 11 long-lead parts as aircraft production ramps up in Texas, Italy and Japan.

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