



Not just a part — a pathway.

Plane Support built a dedicated aerospace additive manufacturing laboratory around the Markforged FX10 — and gained CASA approval to manufacture cabin air conditioning ducting for McDermott Aviation's Bell 214B.

PLANE SUPPORT × MCDERMOTT AVIATION · QUEENSLAND, AUSTRALIA · 2026

APMA

CASA parts manufacturer
approval
214B (B-1) cabin A/C ducting

~2 yrs

of development and
approval work with CASA

29

Bell 214s operated by McDermott
15 × 214B + 14 × 214ST

FX10

core platform of the
dedicated aerospace AM lab

The Challenge

PARTS YOU CAN'T GET HOLD OF

APPROVAL HOLDER Plane Support — Australian aviation engineering, manufacturing and maintenance; serving the industry for almost 30 years	INITIATED BY McDermott Aviation — Australia's largest privately owned helicopter operator, Sunshine Coast, Queensland
AIRCRAFT Bell 214B (B-1) · McDermott holds the Type Certificate for both the 214B and 214ST	PART Cabin air conditioning ducting
FRAMEWORK CASA Australian Parts Manufacturer Approval (APMA) · expands existing CASA Part 21K AM capability	PLATFORM Markforged FX10 · dedicated aerospace additive manufacturing laboratory

The Bell 214B is no longer in production. McDermott Aviation operates the world's largest collection of the type — 15 × 214B and 14 × 214ST — flying aerial firefighting, heavy lifting, agricultural spraying, infrastructure support and emergency response. At that fleet scale, **a component you cannot source is not an inconvenience; it is an aircraft on the ground.**

And the responsibility has nowhere else to go. McDermott holds the **Type Certificate** for both the 214B and the 214ST — long-term support for the type sits with the operator itself.

“An aircraft waiting on a component you can't easily get hold of is an aircraft that isn't working. Being able to have approved parts made here in Queensland gives us far more control over that.”

— John McDermott, Founder & President, McDermott Aviation

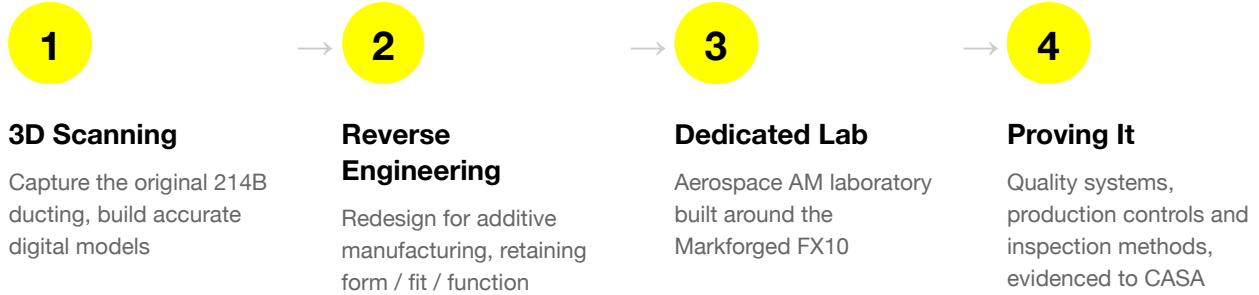


The class of part approved: cabin air conditioning ducting for the Bell 214B, reverse engineered and redesigned for additive manufacturing while retaining the original form, fit and function.

The Solution

SCAN, REVERSE ENGINEER, PROVE IT

Plane Support took the engineering, manufacturing and approvals side; McDermott brought decades of knowledge operating and maintaining the aircraft. It took the two companies **almost two years**, in close consultation with CASA, to take one duct from original component to approved part.



What are APMA and Part 21K?

APMA (Australian Parts Manufacturer Approval) is CASA's approval for a parts manufacturer: it allows an organisation other than the original manufacturer to legally produce specified aircraft parts for installation. The approval binds who makes it, what they make, and how.

Part 21K is the airworthiness category covering parts manufacture. This approval expands Plane Support's existing Part 21K additive manufacturing capability — meaning the capability was never built for a single part.



The platform: Plane Support established a dedicated aerospace additive manufacturing laboratory for the project, built around the **Markforged FX10** industrial platform. Image: Markforged official.

“Ducting sounds simple until you try to reproduce it. These are complex shapes that have to fit exactly and perform in the aircraft just as the originals do, and we had to prove every step of that to CASA.”

— **Jason Hazell**, Director of Engineering, Plane Support

What Was Approved

SCOPE, PRECISELY

Scope of the CASA Approval

WHO, WHAT AND UNDER WHICH FRAMEWORK

Holder	Plane Support — as the parts manufacturer
Part	Bell 214B (B-1) cabin air conditioning ducting
Framework	CASA Australian Parts Manufacturer Approval (APMA)
Effect	Expands Plane Support's existing CASA Part 21K additive manufacturing capability
Standing	Part 21K · Part 21G · Part 145 approvals, operating an AS9100 quality management system

APMA

Approved to manufacture and install

21K

Existing Part 21K scope expanded by this project

~2 yrs

Development and evidence, in consultation with CASA

1 → n

The same groundwork extends to other parts and types

What this approval really produced is not the duct. It is **a route that has been walked once**: with no established process to follow, the procedures, quality systems and inspection methods were built from the ground up and evidenced item by item to the regulator. With that groundwork in place, the next part takes the same route.

“We didn't have an established process to follow, so we developed our own procedures, quality systems and inspection methods and worked them through with CASA. That groundwork now gives us a pathway for other components and other aircraft types.”

— Jason Hazell, Director of Engineering, Plane Support

A note on wording

CASA's approval applies to Plane Support as a manufacturer and to the manufacturing solution for that specific part; the Markforged FX10 is the platform used within the approved process. The precise formulation is “**a process built around the Markforged FX10, approved by CASA under APMA**”. The public release does not disclose lead times or costs, and none are estimated here.

Significance & Lineage

WHY IT TRAVELS FURTHER THAN ONE DUCT

For **fleet operators and Type Certificate holders**, out-of-production parts now have a lawful local supply route that does not depend entirely on the OEM supply chain's pace. For **MROs and parts manufacturers**, APMA and Part 21K are qualifications that accumulate — the first part is the hard one; after that it is reuse. The case also makes a wider point: **the barrier to airworthiness evidence sits in procedure and inspection, not in the printer.**

Markforged platforms have an existing track record in certified civil aviation parts:

- **2024** **Spectrum Networks × ALOFT AeroArchitects (USA)**
 Over 10,000 certified parts produced in a single year and flying on aircraft today, on FX10 and X7 platforms; laser micrometer inspection layer by layer with automated conformance reporting. VIP and head-of-state cabins, and obsolete part replacement.
- **Qualified** **Cabin Management Solutions (USA)**
 Onyx FR-A and Carbon Fiber FR-A qualified on the X7 through the NCAMP process; 100+ end-use flight parts developed with full material traceability.
- **Materials** **Flame-retardant composites and continuous fibre**
 Onyx FR-A / CF FR-A address FAA 14 CFR 25.853 cabin flammability requirements; continuous fibre reinforcement delivers aluminium-class strength at roughly one third of the weight.
- **2026** **Plane Support × McDermott Aviation (Australia · this case)**
 A process built around the FX10 gains CASA APMA approval for Bell 214B cabin air conditioning ducting.



The weight of the Type Certificate: John McDermott, Founder & President — “We own the Type Certificate for this aircraft, so keeping it supported sits with us.”

What Makes the Evidence Hold

MATERIAL · TRACEABILITY · SIMULATION

Plane Support built the procedures, quality systems and inspection methods — that is the substance of the submission. What holds it up are three capabilities that map directly onto airworthiness requirements: the parts are printed in **Onyx FR-A**, the flame-retardant aerospace grade; **Inspection** supplies on-board metrology for part traceability and conformance reporting; and **Simulation** validates structural performance before the build starts.

■ Material

Onyx FR-A — the flame-retardant aerospace grade used here

Flame-retardant composite addressing **FAA 14 CFR 25.853** cabin flammability requirements. FR-A is the **NCAMP aerospace grade**, qualified on the X7 through the NCAMP process; **the FX10 runs the same material**. Paired with continuous fibre it delivers aluminium-class strength at roughly one third of the weight. The **-A** suffix denotes the traceable / qualification grade.

■ Traceability

Inspection — on-board metrology and process control data

An **on-board laser micrometer** scans internal and external features during the build; the part is verified the moment it finishes and a **customisable pass/fail measurement report** is generated automatically, with heat maps and point clouds. **Process control data is retained — who printed it, when, on which machine and software version** — which is precisely the chain an airworthiness submission calls for. It removes the cost and delay of outsourced CMM inspection, and **Part Approval Workflows** formalise part review and sign-off.

■ Simulation

Simulation — replacing part of the physical testing

Inside Eiger, part strength and stiffness are simulated: configure print settings to predict performance → visualise deformation under load → auto-configure settings that meet the requirement while minimising print time and material → select the best of several solutions. The purpose is to **replace expensive, slow physical testing and shorten the development cycle**. PUNCH Torino cut a camshaft locking tool from 8 iterations to 1.



Consistency is the point: a finished batch still on the plate. Process traceability is not about whether one part passes — it is about whether **every part is the same**, and the answer is recorded as the build happens. Image: Markforged official.

A note on plan tiers

Simulation and Inspection are modules of Digital Forge Complete (DFC) Advanced — they are not bundled with the printer, and the On-Prem (air-gapped) configuration differs in scope. Confirm plan tier and printer support before deployment (Inspection supports the X3 / X5 / X7 / FX10 industrial series).

Printing it was never the hard part. Proving it can fly was.

Certify once. Reuse the pathway.

Plane Support spent almost two years taking a single Bell 214B duct from 3D scan, through reverse engineering and redesign, all the way to a regulator's signature. With the procedures, quality systems and inspection methods in place, the next part — and the next aircraft type — takes the same route. That is why this approval is worth considerably more than the part it covers.

SOURCES

AerialFire Magazine — “Plane Support Gains CASA Approval for 3D Printed 214B Helicopter Parts” (12 October 2026)
Plane Support — planesupport.com · McDermott Aviation — mcdermottaviation.com

Note: facts, titles, quotations, regulatory framework and timelines are taken from the public release issued jointly by the two companies. CASA's approval applies to Plane Support as a manufacturer and to its specific part manufacturing solution; it is not an airworthiness endorsement of any printer brand. The release does not disclose lead times or costs, and none are estimated here. Photographs remain the copyright of their respective owners.