Goal

To Be The Preferred Repair & Overhaul Facility for Engine Components

OUR VALUED CUSTOMER
Why CTL?

- Cost Competitive
- OEM Synergies for R&O Solutions
- Aggressive Turn Times
- Tailored Customer Service
- On-Wing Support
- OEM Synergies for R&O Solutions
- Repair Development
- Tooling Development

OUR VALUED CUSTOMER

High Quality

AEROSPACE, INC.
Aviation Repair and Overhaul

PROPRIETARY
History / CTL Aerospace Campus

- Founded in 1946
- Current Ownership 1983
- Plant 1 – 1988
  - 100,000 SqFt (OEM)
- Plant 2 -1997
  - 60,000 SqFt (MRO)
- Plant 2 Expansion – 2014
  - 90,000 SqFt (OEM)
About CTL

- Modern State-of-the-Art Facilities
  - 24/7 Operation
- 315 Experienced Associates
- FAA Licensed A&P Mechanics & Repairmen
- Strategic Location
- Advanced Technologies
- Privately Held / Non-Union
Contact List

• Bill Bowlin
  – General Manager
  bbowlin@ctlaerospace.com

• Bill Schmidt
  – Engineering Manager
  – Business Development
  bschmidt@ctlaerospace.com

• George Curiel
  – Manager, Quality Control
  – Chief Inspector
  gcuriel@ctlaerospace.com

• Cynthia Alford
  – Manager, Customer Service
  calford@ctlaerospace.com

• Capabilities List
  http://ctlaerospace.com/repair/resources.asp
CTL Advanced Capabilities

- Continuous Improvement
- Reverse Engineering Capabilities
- CMM
- Integrated Autoclave and Ovens
- Overhead Crane Capacity
- Paint Booths
CTL Advanced Capabilities Continued

• Non-Destructive Testing
• 5-Axis Machining and Routing
• Waterjet and Plastic Media Stripping
• Certified Weld Repairs
• Clean Rooms
• Shot peening
Limited Powerplant Ratings

Includes Inspection, Repair, Modification and Testing of Components for the following Engines:

- CF34
- CF6
- CFM56
- LM Series
- GE90
- GEnx
- CT7
- GP7000
CF34 Approved Engine Repairs

CF34 Component Repairs
- FWD Fan Case
- AFT Fan Case
- Insulation Blankets
- Vane Shrouds
- Seal Retainers
- FWD and AFT Spinners
- HPTR Coupling Nut
- Air/Oil Seals
- Bearing Support Assembly
CF6 Approved Engine Repairs

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<td>- Acoustic Liners</td>
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CF6-80A
CF6-80C2
CF6-80E1
CFM56 Approved Engine Repairs

CFM56 Component Repairs

- Bearing Aft Seal
- Air/Oil Seal
- Acoustic Liners
- FWD & AFT Fan Case
- Vanes
- Spinner Cones
- Bearing Stationary Oil Seal
- Bearing Retainers
- Bellcranks
GE90 Approved Engine Repairs

GE90 Component Repairs

- Fan Module
- FWD Acoustic Liner
- AFT Acoustic Liner
- Rotating Seal
- Stationary Air/Oil Seal
- Fan Blade Platform
- Acoustic Panels
- Bleed Air Panel
- Spinner Cone
- AFT Centerbody
- Exhaust Nozzle
- OGV
- Fan Blade Hardware
- Fan Case Trenchfiller/Abradable
GEnx Approved Engine Repairs

GEnx Component Repairs

- Fan Module
- Blade Platform
- Spinner Cone
- Speed Sensor
- Fan Blade Hardware
- Fan Case Trenchfiller/Abradable
GP7000 Approved Engine Repairs

GP7000 Component Repairs

• Air/Oil Seal
CT7 Approved Engine Repairs

CT7 Component Repairs
• Scroll Case Particle Separator
• AISBV Port Replacement

CT7-5
CT7-7
CT7-9
LM2500 Engine Repairs

Industrial Gas Turbine Engine (Non-FAA)

LM2500 Component Repairs
- Stg 1 and 2 HPC Vane Shroud
- IGV Shroud
- Bearing and Spanner Nuts
- Separator Cover
- #3 Stationary Seal
- Inlet Seal
- Inlet Duct
- Inlet Screen
- #3 Bearing Oil Seal
- Air/Oil Seal
- Ring Segments
- Inlet Duct
LM6000 Engine Repairs
Industrial Gas Turbine Engine (Non-FAA)

LM6000 Component Repairs

- #3 Bearing Seal
- Bearing and Spanner Nuts
- IGV Shroud
- Stg 1 & 2 HPC Vane Shroud
- Stage 0-3 LPC Shrouds
- Fan Booster Shroud
- Stator Cases
- Air Collector
- Ring Segments
- #7 Vent Seal
- Actuating Rings
- Fan Booster Shroud
Fan Case and Fan Module Repair and Overhaul

In-House and On-Wing Capabilities
Fan Case Repair and Overhaul

- Equipment capable of handling large hardware
- Complete Abradable Refurbishment and Machining
- Kevlar Containment Shroud Repairs
- Weld Repair
- Doubler Repair
- Bushing Repairs
- Corrosion Removal

CF6-80C2

CF6-80E1

CF34-3/-8/-10
Fan Case Repair and Overhaul Continued

- Complete Abradable Refurbishment and Machining
- Replacement of Mounting Hardware and Dampers
- Weld Repair of Cases
Fan Module Overhaul

**Typical Repairs:**

- Full replacement of the Abradable Rub Strip.
- Replacement of the inner and outer Thrust Reverser Support Rings.
- Thermal coating repair to the Support Rings.
- Thrust Reverser Support Ring seal repair and replacement.
- Removal, inspection and replacement of all defective hardware.
- Acoustical liner repair, overhaul, and replacement.
- OGV Vane inspection, repair and refinishing.
- Corrosion Removal
- Weld Repairs
- Complete refinishing of the Anodize coating and protective treatments on the cases.
CF6-80C2 Booster Case Overhaul

- Complete Inspection
- Thermal Coating Replacement
- Surface Treatment
- Insert/Dowel Pin Replacement
- Corrosion Removal
- Vane Bore Hole Repair
- Weld Repairs

Before

After
Composite and Metal Fairing Overhaul

- Metallic and Composite Fairings
- Complete Inspection
- Advanced Chemical Processing Techniques
  - Stripping
  - Anodize
  - Paint
- Bushing Repairs
- Corrosion Removal
- Weld Repairs
Spinner Cone Refurbishment

- Metal & Composite Spinners
- Conical, Elliptical & Conelliptical Spinners
- Complete Inspection
- Advanced Chemical Processing Techniques
  - Stripping
  - Anodize
  - Thermal Coating Repair
  - Custom Paint and Swirl
- Insert Replacement
- Shot Peen Surface Conditioning

GE90/GE90-100
GEnx

CF6-50/-80A/-80C

CF34 & CFM56-3/-5/-7
Fan Blade Platforms and Fan Hardware

- Repairs preformed on Metallic, Composite, and Hybrid Platforms
- Complete Inspection
- Replace Seals and Wear Strips
- Recondition
- Paint
- Repairs performed on Fan Blade Hardware
  - Blade Retainers
  - Dovetail Keys
  - Spacers
  - Shims
CFM56 Acoustic Panels

- Approved Repairs on Fwd, Mid & Aft Panels
- Complete Inspection
- Facesheet Repair
- Stiffener Crack Repair
- Replace Missing or Damaged Spacers and Cups
- Repaint

Fwd Panel

AFT Panel
Acoustic Liner Segment Repair

- Complete Inspection
- Face Sheet Replacement
- Back Sheet Replacement
- Honeycomb Repair
- Bushing Replacement
- Edge Seal and Bumper Replacement
- Closeout/Scoop Replacement
- Paint

CF6, CFM56, GE90
CF34 Air/Oil Seal Refurbishment

- Metallic and Composite Seals
- Complete Inspection
- Teflon Replacement
- Clean Testing
CFM56 Air/Oil Seal Refurbishment

- Metallic and Composite Seals
- Complete Inspection
- Oil Scoop and Cover Replacement
- Teflon Replacement
- Abradable Replacement
- Part Upgrades and Service Bulletins
- Pressure Testing
- Clean Testing
CF6-80C2 Air/Oil Seal

• Metallic and Composite Seals
• Complete Inspection
• Corrosion Removal
• Teflon Replacement
• Abradable Replacement
• Thermal Spray Repairs
• Part Upgrades and Service Bulletins
GE90 Air/Oil Seal

- Metallic and Composite Seals
- Complete Inspection
- Corrosion Removal
- Teflon Replacement
- Thermal Spray Repairs
- Part Upgrades and Service Bulletins
- Clean Testing

Before

After
Spanner, Bearing & Coupling Nut Overhaul

- Complete Inspection
- Silver Plating
- Black Oxide
- Molydag/Graphite Coating
- Mating Surface Repair
- Torque Test Certification
- Teflon, Vespel, & Abrabable Replacement
CF6-80C2 OGV Segment Repair

- Complete Inspection
- Carbon Fiber Repairs
- Vane slot boot replacement
- Bushing replacement
CF6-80C2 OGV Repair

- Complete Inspection
- Airfoil Surface Repairs
- Platform Seal Replacement
- Platform Crack Repairs
- Leading Edge Replacement
CF6-80C2 Booster Assembly

- Disassembly
- Inspection
- Vane Segment Replacement
- Teflon Replacement
- Assembly

Stator Vane Segments Stages 1-5

Stage 1 Vane Booster
CF34 Insulation Blanket Repair

- Complete Inspection
- Dent Repair
- Puncture Repair
- Capstan / Stud Replacement
CF6-80C2 Exhaust Nozzle Repair/Overhaul

- Disassembly
- Complete Inspection
- Full Section Replacement (Outer Sleeve)
- Weld & Cutout Repairs
- Hardware, Wear Pad & Seal Replacement
- Assembly
CT7 Scroll Case Particle Separator
AISBV Port Replacement

- Replacement Of Worn AISBV Port

Before

After
LM6000 Air Collectors

- Complete Inspection
- Sprint Kit retrofit
- Weld Repair
- Stud/Insert Replacement
- Refurb and Paint

LM6000
Fan Case Repair Development
On-Wing/On-Site Repair

- 24/7 Service
- World Wide Support
- Reduce Maintenance Ground Time
- Quick Turn Around Times
- Engines Currently Supported
  CF34, CFM56, CF6, GE90, & GEnx

GE90 Abradable Replacement

CFM56 Abradable Replacement

GEnx Abradable Replacement

CF6-80C2 Fan Case
FAA Certificate

Air Agency Certificate

Number: CL1R064K

This certificate is issued to
CTL AEROSPACE, INCORPORATED
whose business address is
9970 INTERNATIONAL BLVD, WORLD PARK
CINCINNATI, OHIO 45246

upon finding that its organization complies in all respects with the requirements of the Federal Aviation Regulations relating to the establishment of an Air Agency, and is empowered to operate an approved REPAIR STATION with the following ratings:

LIMITED POWERPLANT
LIMITED SPECIALIZED SERVICE (10/10/2008)
LIMITED NON-DESTRUCTIVE TESTING (02/25/2010)

This certificate, unless canceled, suspended, or revoked, shall continue in effect INDEFINITELY.

Date issued: August 11, 1997

Released: February 5, 2010

FAC-CVGC-FSDO
This Certificate is not Transferable, and any transfer of the aircraft, or any major change in the basic facilties, or in the location thereof, shall be immediately reported to the appropriate Regional Office of the Federal Aviation Administration.

Any alteration of this certificate is punishable by a fine of not exceeding $1,000 or imprisonment not exceeding 5 years, or both.

FAC Form 8110-4 (11/95) SUPERSEDES FAA FORM 380.
AF 12 electronic forms system - v7.7
Subject: Removal of EASA Part-145 approval

Dear Sir or Madam,

Following a positive recommendation from the FAA, the European Aviation Safety Agency (EASA) has removed the renewal validity of your EASA Part-145 approval until 31st August 2019, subject to certain conditions set forth in the EASA Part-145 Approval Certificate. In accordance with the agreement between the United States of America and the European Union, as provided for in the Regulation of Civil Aviation (No. 216/2013), the approval will remain valid subject to the following conditions:

1. The scope of the approval is limited to the specified in the 14 CFR part 145 repair station, Air Agency Certificate, and the associated Operations Specifications for work carried out in the United States.

CTO Aerospace, Inc.
EASA Part-145 approval certificate reference number: EASA.145.0083B

You are reminded that you will be required to submit your most recent examination package in accordance with the 14 CFR part 145, including the use of the FAA Form 8130-3 for release to service of components up to and including powerplants.

Kurt Specht

Date of Issue: 31 July 2017

Signed
For EASA
CAAC Certificate

MAINTENANCE ORGANIZATION CERTIFICATE

编号/No. F00100499

单位名称/NAM OF ORGANIZATION:
CTL Aerospace Inc

单位地址/BUSINESS ADDRESS:
9779 International Blvd World Park Cincinnati Ohio 45246 USA

经审查，该单位符合中国民用航空局第145部的要求，可以从事如下列维修工作:
Upon finding that the organization complies with the requirements of CHINA CIVIL AVIATION REGULATION (CCAR) Part 145, the above organization is adequate to accomplish maintenance of the following ratings:

Component Maintenance
Specialized Service

- -

本许可证被授予权，暂停或吊销。在下述期限内将一直有效。
This certificate, unless cancelled, suspended, or revoked, shall continue in effect until:
2020-12-31

局长授权/ FOR THE ADMINISTRATOR OF CAAC

签名/SIGNATURE:
XUE Shijian

职位/POSITION:
Deputy Director General of FSD

LOCATION: Cincinnati Ohio
Inspection, Repair, Overhaul and Modification of the following Components:
- Turbine/Turboprop Engine (ATA-72): Limit to Engine (Turbine/Turboprop); Turbine Engine Air Inlet Section; Turbine Engine Compressor Section; Turbine Engine Combustion Section; Turbine Section; Turbine Engine Accessory Drive.
- Engine Exhaust (ATA-78): Limit to Engine Collector/Exhaust/Nozzle; Engine Thrust Reverser.
- Specialized Service:
  1) Fluid Current Inspection ASTM E797/E797M-10; 2) Liquid Penetrate Inspection ASTM E1417.

局长授权/ FOR THE ADMINISTRATOR OF CAAC

签名/SIGNATURE:
XUE Shijian

职位/POSITION:
Deputy Director General of FSD

2019-08-08
ISO 9001:2008 Registered
HIGHEST QUALITY

AGGRESSIVE TURN TIMES

BROAD RANGE OF CAPABILITIES

REPAIR DEVELOPMENT

COST COMPETITIVE

ON-WING SUPPORT

PROFESSIONAL, COURTEOUS, RESPONSIVE CUSTOMER SERVICE

The Advantage