Our Services

Aircraft Design and Analysis

Advanced Rotorcraft Technology Inc. (ART) offers expert consulting support for the design and analysis of rotorcraft, eVTOL and other air vehicles. ART supported the aerospace industry since 1982, and ART performed design, analysis, and test and evaluation services for manufacturers and the U.S. government that include performance, stability and control, loads, vibrations, aeroelastic stability, etc.

Model Development and Simulator Integration

ART has developed an extensive library of rotorcraft models using FLIGHTLAB® that include variable fidelity modeling options to support applications ranging from comprehensive analysis to real-time simulation. ART also offers integration support for interfacing our rotorcraft simulation models with our customers' training or engineering simulators. We customize our model interface and interface protocol based on the customer's needs.

Avionics and Flight Control Testing

ART provides customized simulation models for interfacing with and testing avionics and flight control hardware. The integrated solution allows testing and refinement of hardware prior to installation on rotorcraft and other air vehicles.

Flight Test Support

ART supports rotorcraft flight test programs and the post processing of flight test data. Both U.S. Army and U.S. Navy customers have used ART's FLIGHTLAB® modeling and analysis tool to support rotorcraft flight testing. ART has developed unique software to simulate the standard flight test scenarios performed in evaluating rotorcraft. ART can use these scenarios with FLIGHTLAB® flight dynamics models to simulate a complete rotorcraft flight test program, allowing for the optimization of sensor types and locations, maneuvers, and flight conditions.

Accident Investigation

ART provides expert support for flight reconstruction, often as part of a rotorcraft accident investigation. ART applies FLIGHTLAB® models and known information about a particu-lar flight in order to reconstruct the flight. Using the reconstructed flight, we can predict flight data that may be missing or not recorded.

MULTI-BODY DYNAMICS

- Rotor Dynamics — Aeroelastic Response
- Unsteady Aerodynamics
- Blade Element Aerodynamics
- Vortex Wake
- Unsteady Airloads Main Rotor/Tail Rotor/Fuselage Flow Interaction
- Dynamic Stall
- Interference
- Transonic Flow (Shock Wave)
- Noise
- Engine and Drive Train
- Flight and Engine Controls
- Multiple Bodies
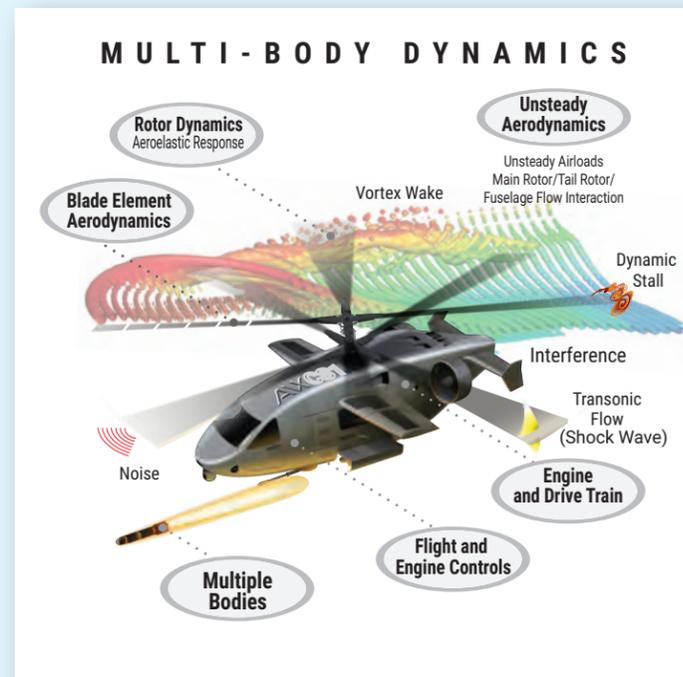
Life Cycle Phases

Conceptual Design
- Performance

Preliminary Design
- Stability and control

Detail Design
- Aeroelastic stability
- Loads
- Vibration

Test and Evaluation
- Flight test support
- Hardware-in-the-loop simulation

Crew Training
- Real-time simulation
- Simulator integration
- Simulator acceptance testing

Operations
- Sling loads
- Shipboard operations
- Accident investigation

Configurations

Our Products

FLIGHTLAB®

FLIGHTLAB® is a finite element, multi-body, selective fidel-ity modeling and analysis software package. It supports modeling and simulation of rotorcraft, fixed-wing aircraft, compound aircraft, including eVTOL drones and air mobility aircraft, and experimental aircraft configurations. FLIGHTLAB® comprehensive modeling capabilities include interfacing with Computational Fluid Dynamics (CFD) codes and the Viscous Vortex Particle Method to model interactional aerodynamics between multiple vortex producing sources. Coupling these interactional aerodynamics with FLIGHTLAB's internal Computational Structural Dynamics (CSD) modeling capability provides fully coupled CFD/CSD/VVPM modeling and analysis. [1]

FLIGHTLAB® consists of two products:

- Development System
- Run-time System

As well as a selection of add-ons:
- Viscous Vortex Particle Method (VVPM)
- Simulation Qualification Tool (SIMQT)
- PilotStation

Flight Dynamics Models

ART supplies off-the-shelf and customized models for rotorcraft (helicopters, multi-copters, etc.) and fixed wing aircraft. Models are available in three categories: [2]

- Generic Flight Dynamics Models
- Aircraft Specific Flight Dynamics Models
- Custom Flight Dynamics Models

GRCAS - Graphical Rotorcraft Comprehensive Analysis System (U.S. only)

The Rotorcraft Comprehensive Analysis System (RCAS) is a leading tool for comprehensive aeroelastic analysis of rotorcraft and other air vehicles. The analysis includes structural dynamics, aeroelastic stability, vibration, and loads prediction. RCAS is supported and utilized by the U.S. government, as well as rotorcraft designers and manufacturers. RCAS uses a finite element approach and is capable of modeling existing and novel configura-tions at varying levels of fidelity through an extensive library of structure, airloads, airwake, interference, and control elements. GRCAS is an enhanced version of RCAS, with a Graphical User Interface that facilitates model development and analysis.[3]

Available FLIGHTLAB ® Flight Dynamics Models

Level D

MH-60M	Lynx
UH-60M	Bell 412
OH-58D/Bell 407A	UH-60A/L

Level 6

AH-64A	UH-1
AH-64D	TH-67
AH-64E	AS350/550
UH-60A	KMAX
CH-47D	Super Puma
CH-47F	AH-1W

Basic Engineering Models

OH-6	EC145
XV-15 Tiltrotor	EC155
SH-60B	A129
MH-60R	R-22
CH-53	Boeing 737
S-76	A320
S-92	A340
MD 500	F-16
Bell 206	T-45
EC135	V-22

Detailed Product Description available:
1. http://www.flightlab.com/services.html
2. http://www.flightlab.com/flight-dynamics-models.html
3. http://www.flightlab.com/grcas.html

WHO WE ARE

Located in the heart of Silicon Valley in Sunnyvale, CA, Advanced Rotorcraft Technology, Inc. specializes in air vehicle simulation. Our emphasis is on rotorcraft and helicopter simulation, software, models, and consulting services. Our simulation software features selective fidelity for a range of applications including commercial and military pilot training, research, and aircraft design. Our software and models are thoroughly validated and are utilized by the U.S. government, Boeing, Sikorsky, and others. Our team of engineers, including internationally recognized experts in rotorcraft simulation, provide consulting support to manufacturers for design and analysis of new and novel air vehicle configurations.

THE COMPANY

Since 1982, our staff of experts have supported all aspects of engineering analysis in regards to rotorcraft simulation and helicopter simulation. This list includes aerodynamics, controls, structures, propulsion, handling qualities, and more. We are an industry leader in the field of modeling, analysis, and real-time simulation for rotorcraft and helicopters. ART has developed two major comprehensive analysis and simulation tools for rotorcraft, helicopters, and other air vehicles; FLIGHTLAB® and, under the guidance of the U.S. Army's Aviation Development Directorate (ADD), the Rotorcraft Comprehensive Analysis System (RCAS). These tools are used throughout the rotorcraft industry and we continue to enhance their capabili-ties through research and development of advanced rotorcraft simulation tech-nologies.

ADVANCED ROTOCRAFT TECHNOLOGY

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ADVANCED ROTOCRAFT TECHNOLOGY
A LEADER IN ROTOCRAFT SIMULATION

Services

Aircraft Design and Analysis
Avionics and Flight Control
Testing Simulator Integration
Flight Test Support

Products
FLIGHTLAB®
Flight Dynamic Models
    Including multiple rotor eVTOL and FVL configurations
GRCAS