Connecticut Space Grant Helicopter Program

National Council of Space Grant Directors Fall Meeting

Portland, ME
October 14-16, 2010
Hands on learning experience
Exposure to principles of helicopter flight
Experience actual testing of helicopters
Operate rotor blade and helicopter configuration test fixtures
Introduction to UAV technology applied to helicopters and aircraft
Build remotely operated aircraft
Classroom Instruction

- Principles of helicopter flight
- Helicopter aerodynamics and wind tunnel testing
- Designing, building and flight testing of VTOL remote control aircraft
- Design of Experiments
- UAV autonomous electronics, design and flight testing
Hands on Learning

- Wind Tunnel Testing
- Human Powered Helicopter Experimentation
- Building VTOL RC Aircraft
- Flying a helicopter
K-MAX (Burro) Flight Testing/ procedure
Met with KAMAN Aerospace engineers
Sikorsky Aircraft, Blackhawk manufacturing
Met with Sikorsky Aircraft engineers
SH-2G Flight Demonstration
Autonomous UAV flight demonstration
Where Did the Students Come From

University of Arkansas
University of Nebraska
Bradley University
University of Washington
University of Idaho
University of Arkansas
Portland State University
University of Nebraska
University of Nebraska
Burlington Technical Center
Burlington Aviation Technical School
Holyoake Community College
UMASS Amherst
University of New Hampshire
Yale University
Fairfield University
University HS CT
East Haddam HS
University of Hartford
CCSU
West Virginia University
University of Wisconsin
NASA CT Space Grant 2010
Helicopter Program
Student Info

- 4 Ph.D. Student
- Undergrad, Mechanical, Aerospace, Electrical, Engineering
- Undergrad, Math, Physics, Engineering Technology
- Advanced High School Students
- 6 Females, 19 Males
2010 Helicopter Program
Sunday August 1, 2010

- RC Aircraft flight simulation
- CX2 Helicopter flight instruction
- RC Aircraft flight instruction
- CCSU has an indoor track for indoor flight

NASA CT Space Grant 2010
Helicopter Program
Monday, Tuesday August 2–3, 2010

Classes (Morning)
- RC Aircraft Design
- Basic aerodynamics, wind tunnel testing
- Principles of helicopter flight
- Design of Experiments

Hands on activities (Afternoon)
- Building VTOL RC Aircraft
- Operating human powered helicopter test fixtures
- Flying helicopters

NASA CT Space Grant 2010
Helicopter Program
Monday, Tuesday August 2–3, 2010, Operating Human Powered Helicopter Test Fixtures
Monday, Tuesday August 2–3, 2010, Building VTOL RC Aircraft
Monday, Tuesday August 2–3, 2010
Flying Helicopters
Wednesday, August 4, 2010

- Classroom Instruction (Morning)
  - Helicopter aerodynamics
  - Wind Tunnel Testing (Actual operation of a wind tunnel)

- Helicopter Manufacture Tour (Afternoon)
  - KAMAN Aerospace
  - Experience testing of the KMAX (Burro) UAV helicopter
Wednesday, August 4, 2010

- Classroom Instruction (Morning)
  - Helicopter aerodynamics
  - Wind Tunnel Testing (Actual operation of a wind tunnel)
Wednesday, August 4, 2010

- Helicopter Manufacture Tour (Afternoon)
  - KAMAN Aerospace
  - Experience testing of the K-MAX (Burro) UAV helicopter
Thursday, August 5, 2010

- Building VTOL RC Aircraft
- Classroom Instruction (UAV Technology)
  - How to design and build a UAV (Introduction)
- Helicopter Manufacture Tour (Afternoon)
  - Sikorsky Aircraft
  - View the manufacturing of the Blackhawk Helicopter
Friday, August 6, 2010

- RC VTOL Aircraft Competition (Flying what students built)
- Helicopter demonstration flight
- UAV demonstration flight
- Helicopter Program student evaluation
- Aerospace Careers (Discussion, how to land a job in aerospace)
What the student built, everything was flown by
Luke Ionno  Alfred Gates or students
Best vertical take off

Friday August 6, 2010
Flying student team aircraft
Friday August 6, 2010
Flying student team aircraft
Fastest Design

Friday August 6, 2010
Flying student team aircraft
Friday August 6, 2010
Flying student team aircraft

Yes the missile flew well
Flying Student Art Work

(this art work ??? glued to a plane)
SH-2G Flight Demonstration
2010 CT Space Grant Helicopter Program

Similar activities as 2010 with improvements

**Classroom instruction**: principles of helicopter flight, aerodynamics, wind tunnel testing, DOE, control theory and design and building of VTOL RC aircraft and helicopters, UAV design and operation

**Hands On**
- Helicopter flight
- Wind tunnel testing of intermeshing UAV helicopter* Scale K–MAX
- Static test of intermeshing UAV helicopter*
- Human power helicopter rotor blade testing
- Building of VTOL Aircraft
- Students fly Remote Control helicopters and airplanes and flight simulators
- Programming a UAV to fly and UAV flight*

**Tours/ Observations**
- KAMAN Aerospace
- Sikorsky Aircraft
- New England Air Museum, VIP Tour of helicopters*
- Time to take a trip to New York City*
- UAV Helicopter flight*
- RC helicopter flight, 600 size, coaxial, intermeshing, conventional*

**Notes**
- * New/ improvement from 2010 Helicopter Program Assessment

**Early Bird Special $500.00**

June 19-26, 2011
UAV Helicopter Testing

- Test fixture with load cells
- Test coaxial, intermeshing (K–MAX), conventional helicopters

New for 2011
Instructors

- Alfred A. Gates
- Frank Gallagher
- Fu-Shang (John) Wei
- Peter Baumann
- Nidal Al-Masoud
- Luke Ionno

NASA CT Space Grant 2010
Helicopter Program
Web Sites

- www.ctspacegrant.org
- Website: http://www.cthelixp.com

- Or just do a search on CT Space Grant Helicopter Program to get more info