Session VIII. Airborne LIDAR

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Avionic Laser Multisensor Program at Litton Aero Products
Rod Benoist, Litton Aero Products

Litton

Aero Products

AVIONIC LASER MULTISENSOR PROGRAM AT LITTON AERO PRODUCTS

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DESCRIPTION OF LITTON AERO PRODUCTS

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Acro Products

- LITTON AERO PRODUCTS
  - COMMERCIAL AVIONICS
  - 600 EMPLOYEES
  - LOCATED IN MOORPARK, CALIFORNIA
  - WORLDWIDE PRODUCT SUPPORT
- CURRENT PRODUCTS OF AERO PRODUCTS DIVISION
  - ATTITUDE AND HEADING REFERENCE SYSTEMS
  - INERTIAL NAVIGATION SYSTEMS
  - OMEGA AND GPS NAVIGATION SYSTEMS
- OTHER LITTON DIVISIONS CAPABILITIES
  - AVIONICS DISPLAYS
  - FIBER OPTIC DATA BUSES
  - MILITARY LASER SYSTEMS

AVIONIC LASER MULTISENSOR PROGRAM

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- LONG RANGE PROJECT GOALS
  - NEW PRODUCT DEVELOPMENT OF A FORWARD LOOKING AVIONIC WIND VELOCIMETER BASED ON LASER TECHNOLOGY
  - PREDICTIVE WINDSHEAR DETECTOR
  - MULTIFUNCTIONAL CAPABILITY
- THIS FISCAL YEAR GOALS
  - COMPLETE EXPERIMENTAL BREADBOARD DEVELOPMENT USING SOLID STATE HOLMIUM LASER
  - PERFORM FIELD MEASUREMENTS OVER DIFFERENT ATMOSPHERIC CONDITIONS
  - COMPLETE ATMOSPHERIC MODELS AND SYSTEM WINDSHEAR PERFORMANCE ANALYSIS
  - DEFINE REQUIREMENTS OF OTHER POTENTIAL AVIONIC FUNCTIONS

COHERENT DOPPLER LASER RADAR

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- POTENTIAL AVIONIC APPLICATIONS
  - WINDSHEAR DETECTION
  - WINDS ALOFT MEASUREMENT FOR CRUISE FUEL SAVINGS
  - CLEAR AIR TURBULENCE DETECTION
  - WAKE VORTEX DETECTION
  - ALTIMETERY
  - GROUND VELOCITY MEASUREMENT
  - OBSTACLE AVOIDANCE
  - RUNWAY VISUAL RANGE
  - AIR DATA PARAMETERS (TRUE AIR SPEED, ANGLE OF ATTACK, ANGLE OF SIDESLIP)
  - PRESSURE ERROR MEASUREMENT
  - CRUISE GUST ALLEVIATION
  - CLOUD TOP IDENTIFICATION

BREADBOARD SYSTEM DEVELOPMENT

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- ASSEMBLY OF BREADBOARD LIDAR IS NEARING COMPLETION
- CONSTRUCTED A ROOF TOP TEST SITE SUITABLE FOR ATMOSPHERIC BACKSCATTERING AND WIND VELOCITY MEASUREMENTS
- DEVELOPED SYSTEM CALIBRATION PROCEDURE USING DIFFUSE HARD TARGETS

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FUTURE WORK

- PERFORM FIELD MEASUREMENTS AT APD AND OTHER LOCATIONS OVER DIFFERENT ATMOSPHERIC CONDITIONS (FOG, RAIN, ...)
- DEFINE REQUIREMENTS OF AVIONIC FUNCTIONS OTHER THAN WINDSHEAR DETECTION
- DESIGN AND BUILD FLYABLE PROTOTYPE SYSTEM

AVIONIC LASER MULTISENSOR PROGRAM

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SUMMARY

- HOLMIUM SOLID STATE LASER RADAR IS A PROMISING TECHNOLOGY FOR AVIONIC APPLICATIONS
  - DIODE PUMPING AND SINGLE FREQUENCY OPERATION HAVE BEEN DEMONSTRATED
- AVIONIC LIDAR OFFERS POTENTIAL FOR MULTIFUNCTIONAL CAPABILITY IN ADDITION TO WINDSHEAR DETECTION
  - SAFETY AND REVENUE ENHANCEMENT

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- APD WOULD LIKE TO ESTABLISH A DIALOG WITH GOVERNMENT AGENCIES, AIRLINES, AND AIRFRAME MANUFACTURERS TO DISCUSS
  - APPLICATIONS
  - INSTALLATION QUESTIONS
  - SYSTEM/USER INTERFACE AND DISPLAYS

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Questions and Answers

Q: MIKE McCLENDON (American Airlines) - How long until a flying prototype? How long will the evaluation last? How long until a production system? How much dollars?

A: ROD BENOIST (Litton Aero Products) - Each year we do a project plan which looks at these numbers and I'll tell you what our plan is. Basically we see a prototype as being an 18 month project and then the production system another 18 months. So you're looking at from a kick off of about three years to production. In terms of dollars, I certainly listened very interestedly to what Dr. Targ had to say and wouldn't disagree with him at all on any point. We have a very aggressive target price though of $50,000. It's a target. So we're probably looking at 3 to 4 years to production and we're not kicked off on a prototype right now. However, an order for 100 systems, 1000 systems would probably do it.

Session IX. Airborne Passive Infrared