2016 Flight Prediction Workshop

TECHNICAL INTERCHANGE MEETING TO EVALUATE THE CURRENT CHALLENGES OF FLIGHT PREDICTION 17 – 19 MAY 2016; GILRUTH CENTER; NASA JOHNSON SPACE CENTER

Workshop Objective

Accurate flight prediction methods are critical for all aspects of vehicle performance, handling characteristics, and structural integrity. The first NASA/DoD workshop on wind-tunnel flight correlation was held in 1981, when discrepancies arising from Reynolds number effects, aeroelastic effects, and tunnel wall and sting-interference effects posed significant barriers to experimentally-based prediction methods in use at that time. Significant advances in ground-based experimental capabilities and facilities, CFD methods, and flight test technology in the next 20 years had significantly improved the tools available for predictions. In addition, numerous new production and experimental military and civil aircraft have completed flight testing, offering an unprecedented experience base and data for assessing the accuracy of current prediction methods and practices. Thus, the first Flight Prediction Workshop (FPW) was held in 2002. The objective of the 2002 workshop and the current 3 day workshop for technical specialists is to provide a forum for the exchange of: experiences and lessons learned, critical assessments of the state of the art, and recommendations for further developments in flight prediction methodology. Information and opinions provided by the workshop will be incorporated in R & T planning for future government investments in flight prediction methodology. Information of the art, and recommendations for further developments and lessons learned, critical assessments of the state of the art in flight predictions, including recommendations for future research. A discussion of uncertainty and risk quantification is desired.

Participation & Speakers

Participation in the Flight Prediction Workshop is by invitation only. The meeting is restricted to U. S. Persons to permit the discussion of topics controlled by ITAR regulations.

Speakers from NASA, the Department of Defense and aerospace companies will be participating. They include:

NASA
AFRC, GRC, HQ, JSC, LaRC, and MSFC

Dept of Defense
US Army, USN, USAF, JHU/APL

Industry
Aerospace Corp, AMA, Aurora, Blue Origin, Boeing, Lockheed Martin, Mooney Int., Northrop Grumman, Sierra Nevada, SpaceX, Textron Av, and UTAS

Breakout Teams

Workshop participants will be assigned to teams for break-out discussions. The workshop will conclude with technical assessments in several areas, followed by a round-table discussion devoted to participant-led summaries of the state of the art in flight prediction methodology. The discussion will identify critical shortcomings in current methods and recommend research to improve capabilities. The individual reports will also identify factors that are currently adequately predicted. The organizing team will prepare a brief summary document of the findings after the workshop. The NASA/DoD Team will use these inputs to identify high payoff and mature areas for future planning in aerosciences research.

Flight Prediction Workshop Charter

Due to new product development cost and time constraints, the U.S. aerospace community needs new capabilities that will:

• Facilitate the development of new products with improved performance with less risk in less time and at less cost, and

• Permit the exploration of new, novel configurations with a minimum of flight testing

To develop a coordinated effort to address flight prediction issues and reduce flight test cost and time, the 2016 FPW has six principle goals:

1. Identify future requirements and gaps in flight prediction capability, certification, and sustainment

2. Identify requirements for computational and experimental model and tool development, characterization, validation, and information management systems

3. Identify flight prediction capability goals over the next 5, 10, 25 years

4. What types of problems should we be working? What capabilities do we need? What are our skill, computing, and facility gaps? What are accuracy and efficiency needs for our prediction methods? Priorities?

4. Identify requirements for uncertainty quantification for computational and experimental methods

5. Share best practices in computational and experimental methods through lessons learned in recent vehicle developments

6. Develop a community of practice for flight prediction

Session Topics

During the 3-day workshop, sessions will address the following themes: Civil and Military Aircraft Flight Predictions, UAV and Launch Vehicle Flight Predictions, Prediction Methodology, and Summary & Recommendations.

Perspectives on the adequacy of existing and emerging ground and flight test facilities and CFD methods (based on experiences) are desirable. Presentations should conclude with the speaker’s personal assessment of the state of the art in flight predictions, including recommendations for future research. A discussion of uncertainty and risk quantification is desired.

Military Aircraft Presentations will address the state of the art in flight predictions for fixed-wing military aircraft of all classes. In addition to the factors considered for presentations on civil aircraft, there is the scope of discussion should address flight prediction methods for areas unique to military aircraft, such as: maneuverability at extreme envelope conditions across the speed range, prediction of responses in carrier approach conditions, engine integration and propulsion effects, cockpit buffet characteristics, recovery from out-of-control and spin conditions, parachute/landing characteristics, carriage and release of external stores, compatibility with low observable requirements, vertical and horizontal tail buffet, vortical lift, effectiveness of maneuver devices (chines, strakes, maneuvering flaps), jet interactions and acoustic loads, and nose-down control at extreme angles of attack.

Launch Vehicles and Munitions Presentations will address the state of the art in flight predictions for munitions and launch and crew vehicles of all classes. The scope of discussion should address flight prediction methods for areas unique to these classes of flight, such as: vehicle performance, acoustic environments, propulsion, flight controls, and trajectories.

Lunches & Contact Information

Lunches and refreshments will be available for a fee. A block of rooms have been reserved at Hilton Houston NASA Clear Lake. Finally, a no-host dinner has been organized for Tuesday at 7:00 pm at Mamacita’s – NASA Houston.

For complete information about the workshop site, hotel, and costs, go to:
http://www.nianet.org/flight-prediction-workshop/

Organizing PO:

Mary Catherine Bunde (registration/administration)
(757) 532-5381
mary.bunde@nianet.org

Tracy Hunter (administration)
tracy.a.hunter@nasa.gov

Douglas Ball (NIA)
doug.ball@nianet.org

• Laurence Leavitt (NIA)
larry.leavitt@nianet.org

• Steve Bauer (NASA), (757) 864-5946
steven.s.bauer@nasa.gov

• Joseph Morrison (NASA), (757) 864-2294
joseph.h.morrison@nasa.gov

• Sidra Silton (US Army - ARL), (410) 306-0792
sidra.silton.civ@mail.mil

• Tony Washburn (NASA), (757) 864-1290
anthony.e.washburn@nasa.gov

Organizing Committee Members

• NASA: Mike Fremaux, Benjamin Kirk, Dave Schuster, Rach Wahlen

• USN - NAVAIR: Dave Findlay

• USAF - AFRL: Jack Benek, Gary Dale, Ryan Plumley