

## **NASA's Ninth Workshop for Probabilistic Risk Assessment Methods (PRAM9)**

**SATERN Course Title:** Probabilistic Risk Assessment Methods (PRAM) for Practitioners and Managers

**SATERN Course ID:** SMA-RISK-OSMA-0001

March 23-25, 2010 (PRAM9)

Kennedy Space Flight Center

### **Overview**

This three-day workshop will cover the applicability of Probabilistic Risk Assessment (PRA) to NASA programs/projects and activities, the current state-of-the-art of PRA methodology for aerospace applications, and its use in risk-informed decision-making (RIDM). The workshop will be valuable to both program/project managers and PRA practitioners. It will begin with an introduction to PRA for managers, including the PRA role in the RIDM process based on the draft of the RIDM handbook developed by OSMA. Following this introduction, there will be a discussion of the major concepts used in PRA. Several recently completed studies that have used PRA techniques to support decision-making will be presented.

Topics to be covered are:

- PRA Overview and its Role in Decision-Making
- The Concept of Probability and its Application in PRA
- Logic-based Modeling Techniques and their Application to PRA
- Simulation-based Modeling Techniques and their Application to PRA
- PRA of a Preliminary Design Concept
- Application of PRA to Design of Launch Systems
- Event Probabilities and Hardware Failure Models
- Modeling of Uncertainties and Data Analysis
- Modeling and Quantification of Dependent Failures
- Human Reliability Analysis
- Importance Measures and Risk Ranking and Their Applications
- Uncertainty Propagation
- Bayesian Inference Techniques
- PRA Modeling Process
- Physical and Phenomenological Models
- Software Failure Modeling
- Precursor Analysis

### **Objective**

The objective is for participants to understand the fundamentals of PRA and its potential role in decision-making. This understanding is essential to meet the requirements of NPR 8705.5, Probabilistic Risk Assessment Procedures for NASA Programs and Projects; NPR 8715.3, NASA General Safety Program Requirements (System Safety Requirements); and NPR 8000.4A, Agency Risk Management Procedural Requirements.

### **Instructors (listed in alphabetical order)**

- Dr. Homayoon Dezfuli, NASA Headquarters

- Dr. Frank Groen, NASA Headquarters
- Mr. Dana Kelly, Idaho National Laboratory
- Mr. Peter Prassinis, NASA Headquarters
- Dr. Fayssal Safie, Marshall Space Flight Center
- Dr. Curtis Smith, Idaho National Laboratory
- Dr. Michael Stamatelatos, NASA Headquarters
- Dr. Robert Youngblood, Idaho National Laboratory

### **Organizer**

Dr. Homayoon Dezfuli  
NASA Headquarters  
[hdezfuli@nasa.gov](mailto:hdezfuli@nasa.gov)  
(202) 358-2174

### **Point of Contact for Registration**

Ellen Blahut  
NASA Safety Center  
[ellenblahut@oai.org](mailto:ellenblahut@oai.org)  
(440) 962-3109

### **Registration**

Please register online at <https://satern.nasa.gov>  
Registration start date: February 04, 2010  
Registration deadline: March 12, 2010; 5:00 pm eastern time

*Notes: Priority will be given to Civil Service personnel. Contractors will be included on a space-available basis.*

Registration of Civil Service personnel will be confirmed via email no later than March XX, 2010.  
Registration of contractors and late registrants will be confirmed via email by March XX, 2010.

### **Cost**

There is no registration fee for PRAM workshop.

### **Reference Material**

NASA PRA Procedures Guide  
<http://www.hq.nasa.gov/office/codeq/doctree/praguide.pdf>

NASA Fault Tree Handbook  
<http://www.hq.nasa.gov/office/codeq/doctree/ftfb.pdf>

NASA Risk-informed Decision Making Handbook  
<https://secureworkgroups.grc.nasa.gov/armwg>

NASA-SP-2009-569: Bayesian Inference for NASA Probabilistic Risk and Reliability Analysis  
<http://www.hq.nasa.gov/office/codeq/doctree/SP2009569.pdf>