

## **Risk Committee**

In early 2004, the Range Safety Group of the Range Commanders Council initiated Phase II of a Risk and Lethality Commonality Team effort to revise RCC 321, *Common Risk Criteria for National Test Ranges*. The acceptable risk criteria defined in NASA Procedural Requirements NPR 8715.5; *Range Safety Program*, is based on the guidance provided by this document. Because injury criteria were not defined during Phase I of the Risk and Lethality Commonality Team effort, the Department of Defense major range and test facility bases have diverged from use of the standard since it addresses acceptable risk criteria pertaining only to fatalities.

### **Establishing Risk Criteria Based on Casualties**

The second phase of the Risk and Lethality Commonality Team effort has focused on establishing acceptable risk criteria based on casualties. The Range Safety Group also recommended that RCC 321 be updated and expanded to include flight safety hazards in addition to inert debris. The second phase of the Risk and Lethality Commonality Team was initially established as an ad hoc committee under the Range Safety Group. However, after a few meetings, the identification of additional risk-related topics and the more detailed development of tasks, the need for a standing committee was realized.

In February 2005, the Risk and Lethality Commonality Team was renamed the Risk Committee with a specific objective to rewrite RCC 321. In 2007, the Risk Committee was formally recognized as a standing committee by the Range Safety Group. Over the last four years, the committee has focused on establishing updated acceptable risk criterion and developing detailed supporting rationale for inert debris and other range hazards, including distant focusing overpressure and toxics. The group has also decided to establish an aggregated risk criterion, evaluating the combination of all launch hazard risk against one acceptable level. Current practice consists of evaluating each hazard against hazard unique criterion.

### **Update of RCC 321, *Common Risk Criteria for National Test Ranges***

In June of 2007, RCC 321-07 was officially issued through the Range Commanders Council. Updates to the document included the following:

- Risk acceptability criteria and supporting rationale for additional flight safety hazards and consequences potentially generated by range operations
- The major activities required to conduct the entire risk management process and considerations to address hazards beyond just inert debris
- Top-level requirements for computational models used to analyze the risks posed by inert and explosive debris
- Updated hazard thresholds for inert and explosive debris, as well as screening criteria for other hazards including toxics, distant focusing overpressure, and ionizing and non-ionizing radiation
- Factors and considerations for acceptable debris risk assessment models

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### Additional Topics Requiring Discussion

During the revised document development effort and through discussions at Risk Committee meetings, the group has identified a number of additional topics that require discussion. Following review by the Range Commanders Council Executive Committee, approved topics will be addressed by the committee and guidance provided in upcoming revisions to RCC-321. The topics include:

- *State of the art review of risk uncertainty and catastrophe aversion and development of approaches to launch risk uncertainty for application to risk acceptability.* A state-of-the-art review of how industries and governments which have technological endeavors that could produce high risk to the public deal with the uncertainties from their risk assessments and also with the quantification of catastrophe potential.
- *Treatment of conditional risk criteria for foreseeable conditions.* Development of guidelines and rationale for modeling the risk from controlled activities such as flight termination action, engine shutdown, and use of alternative flight paths for reusable launch vehicle aborts.
- *Asset protection.* Establishment of roles, responsibilities, guidelines, and criteria for the protection of critical assets.
- *Responsibility for satellite protection beyond orbital insertion.* Establishment of roles and responsibilities for satellite tracking beyond orbital insertion and for unmanned space systems.
- *Space craft protection for exo-atmospheric and orbital debris hazards.* Development of consensus criteria and characteristics for analyses used to address exo-atmospheric and orbital debris hazard risk to space craft.
- *Business jet vulnerability criteria.* Development of vulnerability thresholds and modeling characteristics for assessment of transoceanic business class jets.
- *Mitigation of large numbers of minor injuries.* Investigate the need to develop acceptable risk criteria and/or mitigation guidelines for minor injuries such as those resulting primarily from toxics and explosive debris.
- *Reusable launch vehicle and other controlled reentry related issues.* Development of policy and guidelines for range operations involving reusable launch vehicles and reentry issues associated with any vehicle.
- *Hazard threshold for land vehicles.* Development of hazard thresholds to protect land vehicles such as automobiles, buses, trucks, and trains from shock waves from explosions and impacting debris.

Submittal of the above tasks has been completed with Executive Committee review anticipated in January 2008.