

Challenges in the Airspace Safety Monitoring

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(Based on joint project with BOBASMA, AAI & ISI)

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**New Chapters in Indian Air Traffic Management
Air Traffic Controller's Guild (India)**

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- This means, an airspace is safe, when out of 2×10^8 , that is, 2 cores flights flying *nominally* in that airspace in an hour time, on an average we will observe at most 1 fatal accident involving two such flights.

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- Monitoring agencies such as *En-route Monitoring Agency (EMA)* or *Regional Monitoring Agency (RMA)*, use such data to estimate collision risks.

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- Then the separation standards were
 - 50 NM lateral separation between all the parallel routes;
 - 10 minutes/80 NM longitudinal separation between the front and behind aircrafts.

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- The MoA between AAI and ISI has been renewed from this year.

Reduced Horizontal Separation in the Indian Airspace

- Since 2011, with active work by various committees and organizations under AAI and our successive safety analysis confirming the safety of the Indian airspace, finally resulted to an implementation of the *reduced horizontal separation (RHS)*, in sixteen routes, in the region, leading to
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Lateral Collision Risk: 0.759155×10^{-9} ; and

Longitudinal Collision Risk: 4.0239×10^{-9} .

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- Our model has been accepted by some of the leading monitoring agencies, such as, *FAA, AAMA* and *SEASMA*, as a better model, which decouples *random lateral deviations* and *deviation due to gross navigational error*, giving a more conservative/robust estimate.

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- For the longitudinal safety analysis, our approach of using the *velocity*, instead of time lag, has been recognized as a more robust statistical method.

Improvement in Data Quality

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- The analysis should also include an appropriate risk projection under properly estimated growth rate of the volume of the traffic.

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- Myself and my colleague, Dr. Deepayan Sarkar from ISI, Delhi, are in the process of establishing a robust statistical procedure based on *resampling techniques* to provide standard error for the estimates.
- We plan to report our study in the next RASMAG meeting. This will be the first such analysis and we hope will generate a wider discussion and recognition by the safety assessment community.

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- We strongly believe that we have the technical and other expertise to analyze data for the *Reduced Vertical Separation Monitoring (RVSM)*.
- Thus we hope to work as a RMA as well.
- But (in my understanding), there are several administrative and diplomatic hurdles to overcome, before India can successfully built a RMA.
- We also hope to get actively involved with positive contribution in the *Mathematics subgroup in the SASP*, a think tank for establishing the safety standards.

References

- BOBASMA, AAI. Horizontal Safety Monitoring Report. *WP/09 RASMAG/19*, May 27 – 20, 2014.

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Thank You