



Universal Risk Scale(s)

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Topics

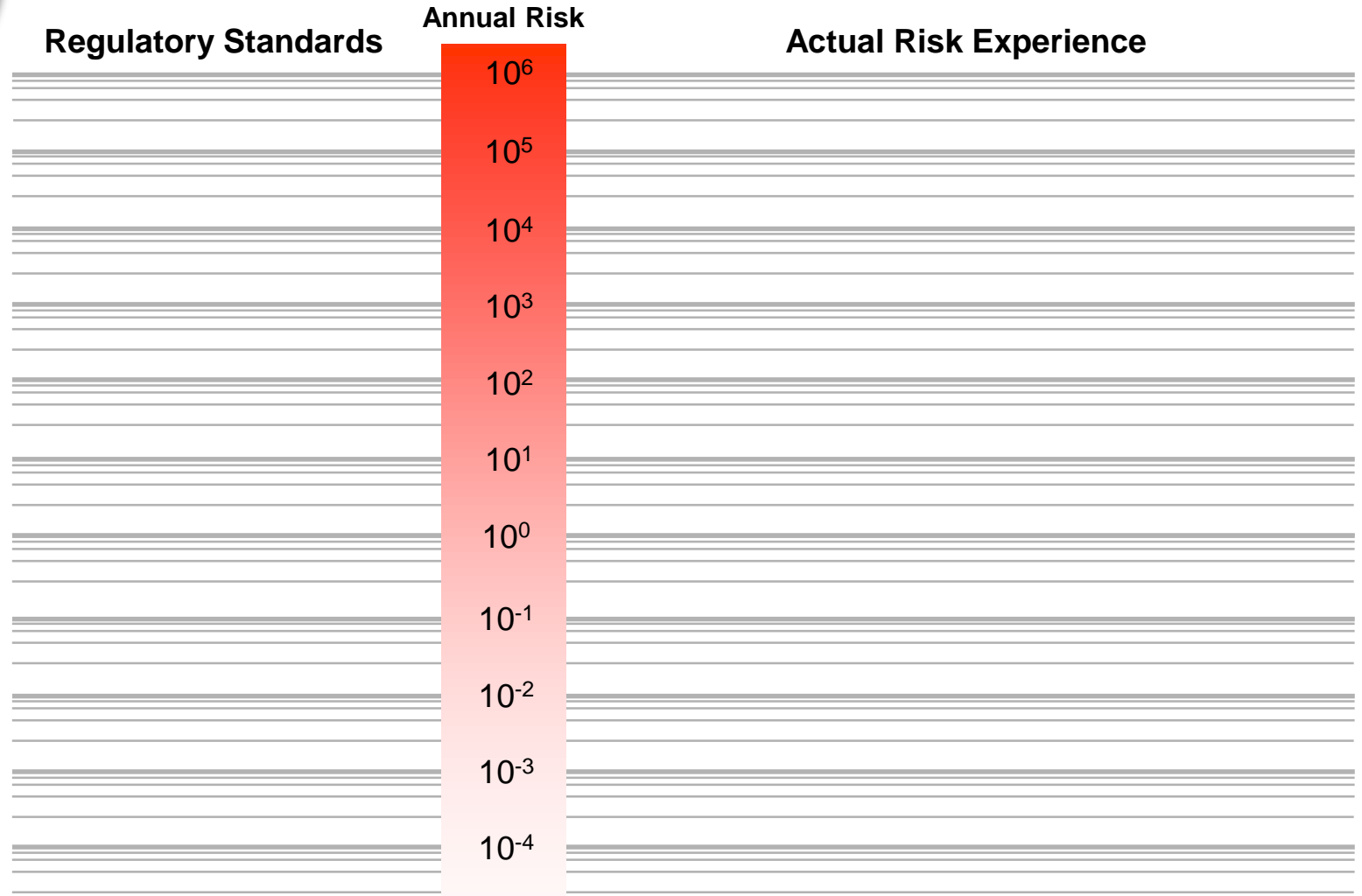
- » Uses
- » Description
- » Voluntary, Involuntary Risk for Individuals
- » Setting Standards with URS
- » System Safety Applications
- » Recommendations

URS, what is it?

- » A method of comparing risks from multiple known risks.
- » A method of communicating risk and explaining level of concern and orders of magnitude.
- » A method of selecting acceptable risks...
“How safe is safe enough?”
- » A useful tool for system safety professionals.
- » A potential tool to calibrate RAC matrices.

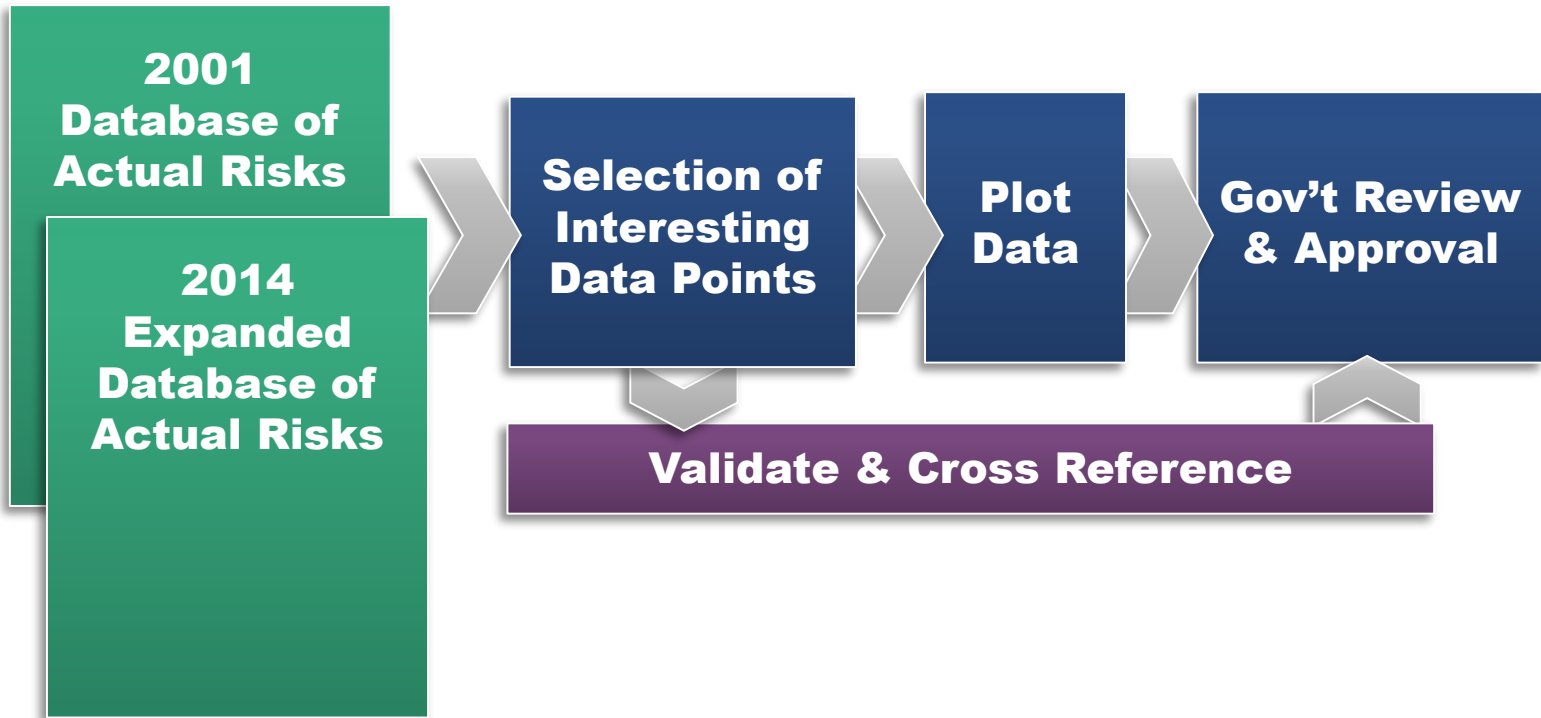


URS Format



Use of logarithmic scale facilitates comparison of risks over many orders of magnitude.

Process of Developing URS

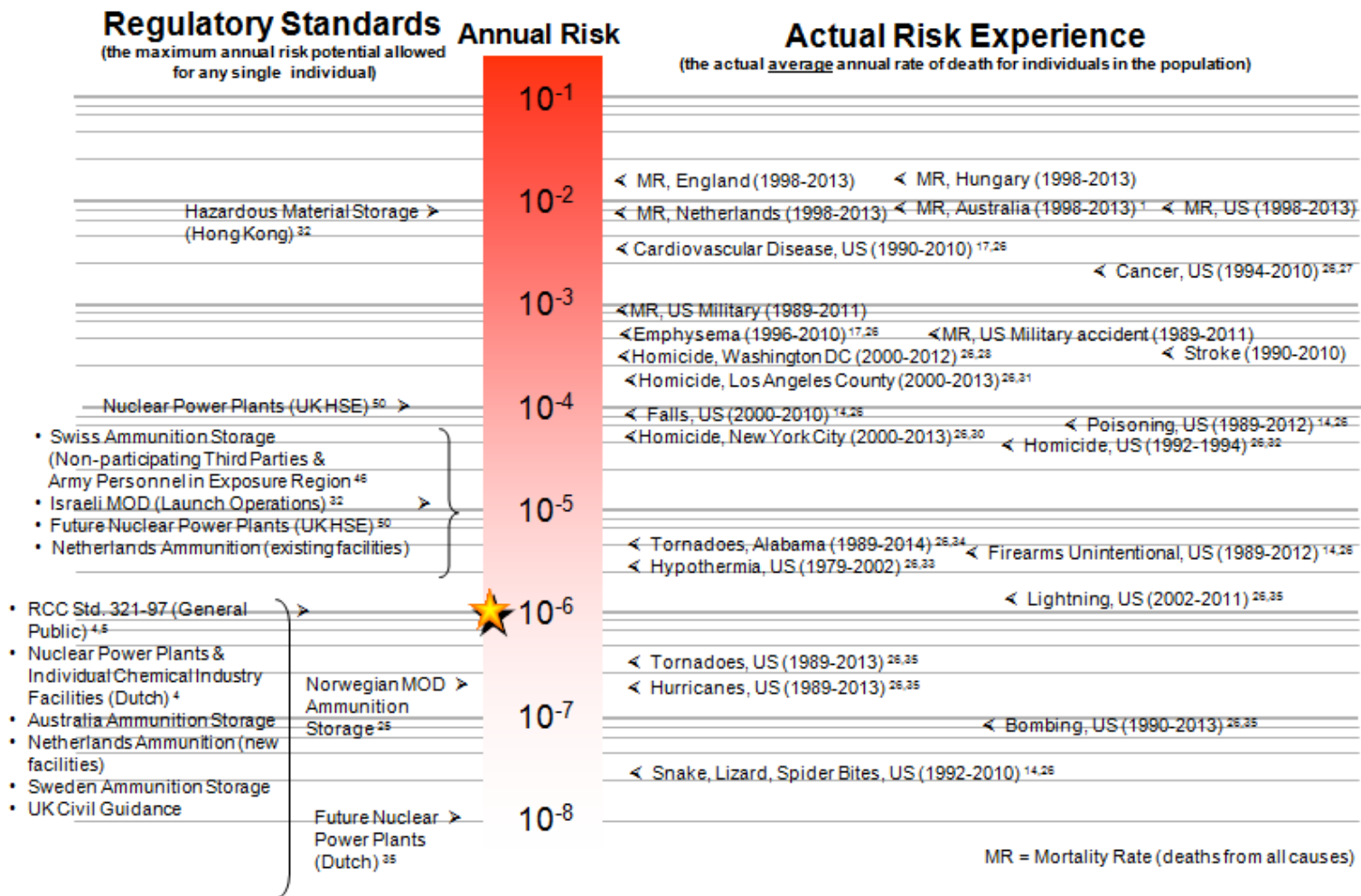


Work has been sponsored by DDESB.



Individual Involuntary P_f

Individual Involuntary P_f



★ DDESB Criterion (Maximum allowable)

MR = Mortality Rate (deaths from all causes)



Voluntary P_f

Individual Risk (P_f) (Voluntary Actions)

Regulatory Standards and Legal Precedents

Annual Risk

Actual Risk Experience



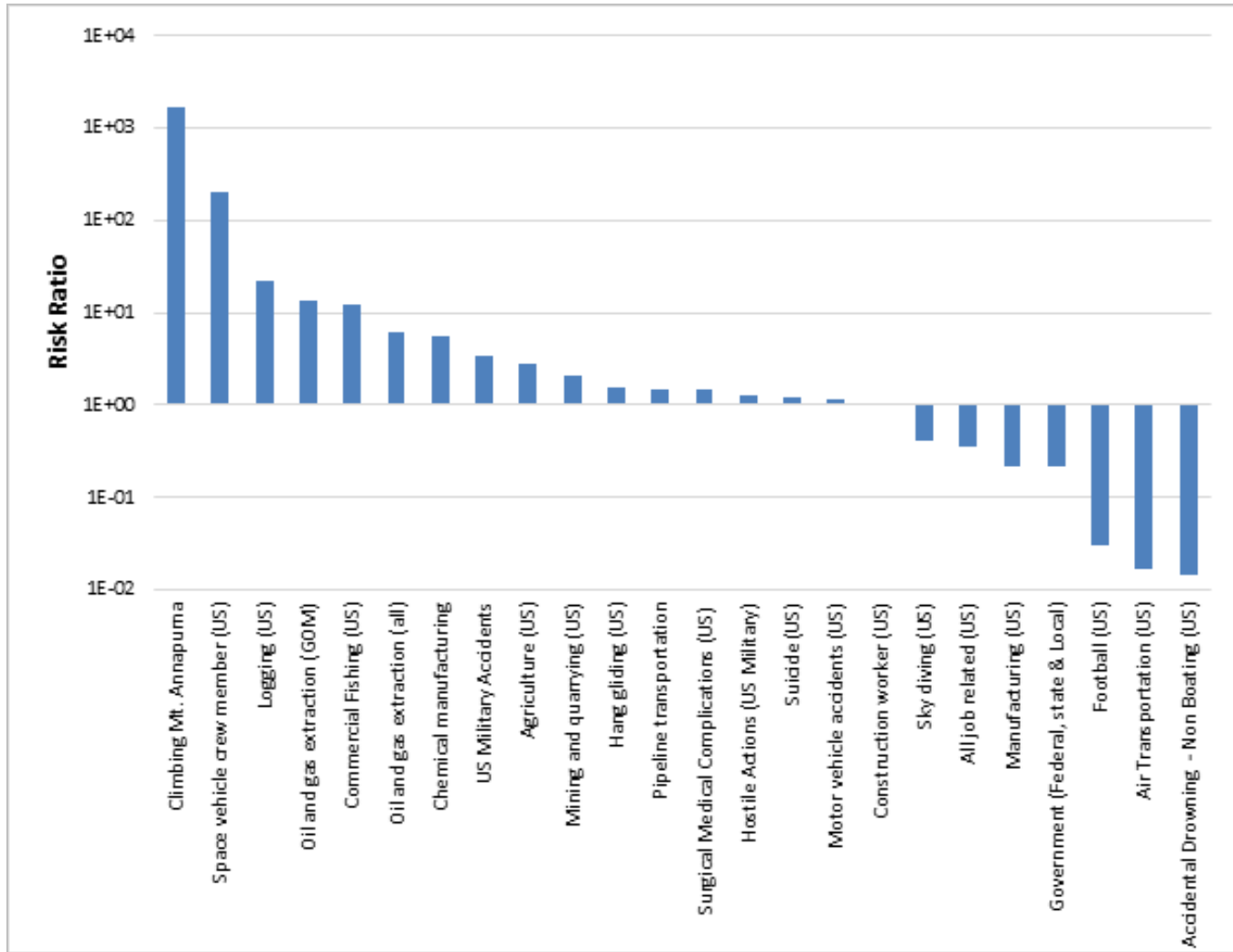
★ **DDESB Criterion (Maximum Allowable)**

MVA = Motor Vehicle Accidents



Comparison of Standard to Accident Data

Individual Risk



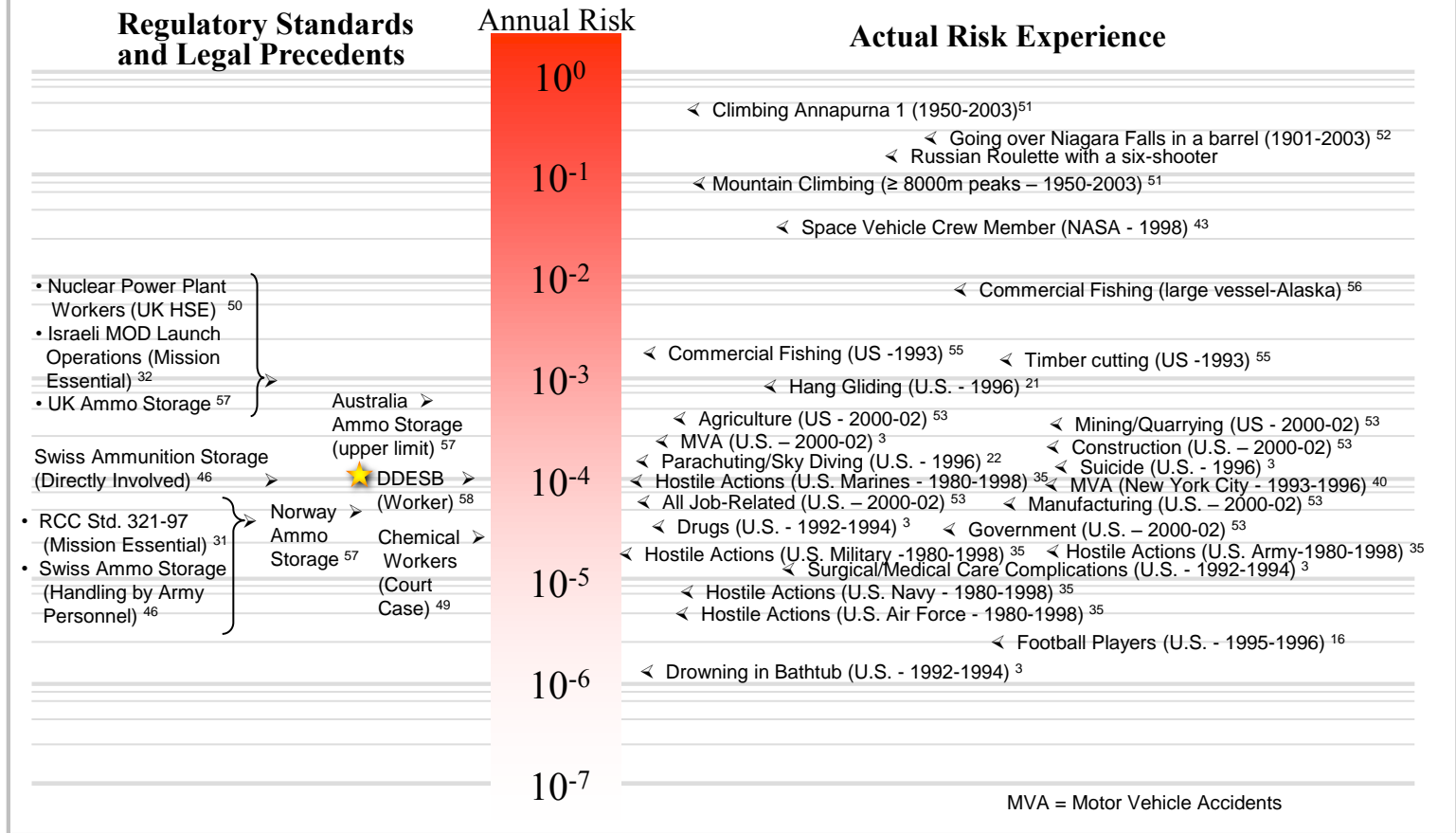
Comparison of crossover indicates risk criteria is more or less conservative than the selected set of actual risks.



URS can become a decision aid

The risk of our “system” can be compared to other known risks.

Individual Voluntary (Worker) P_f



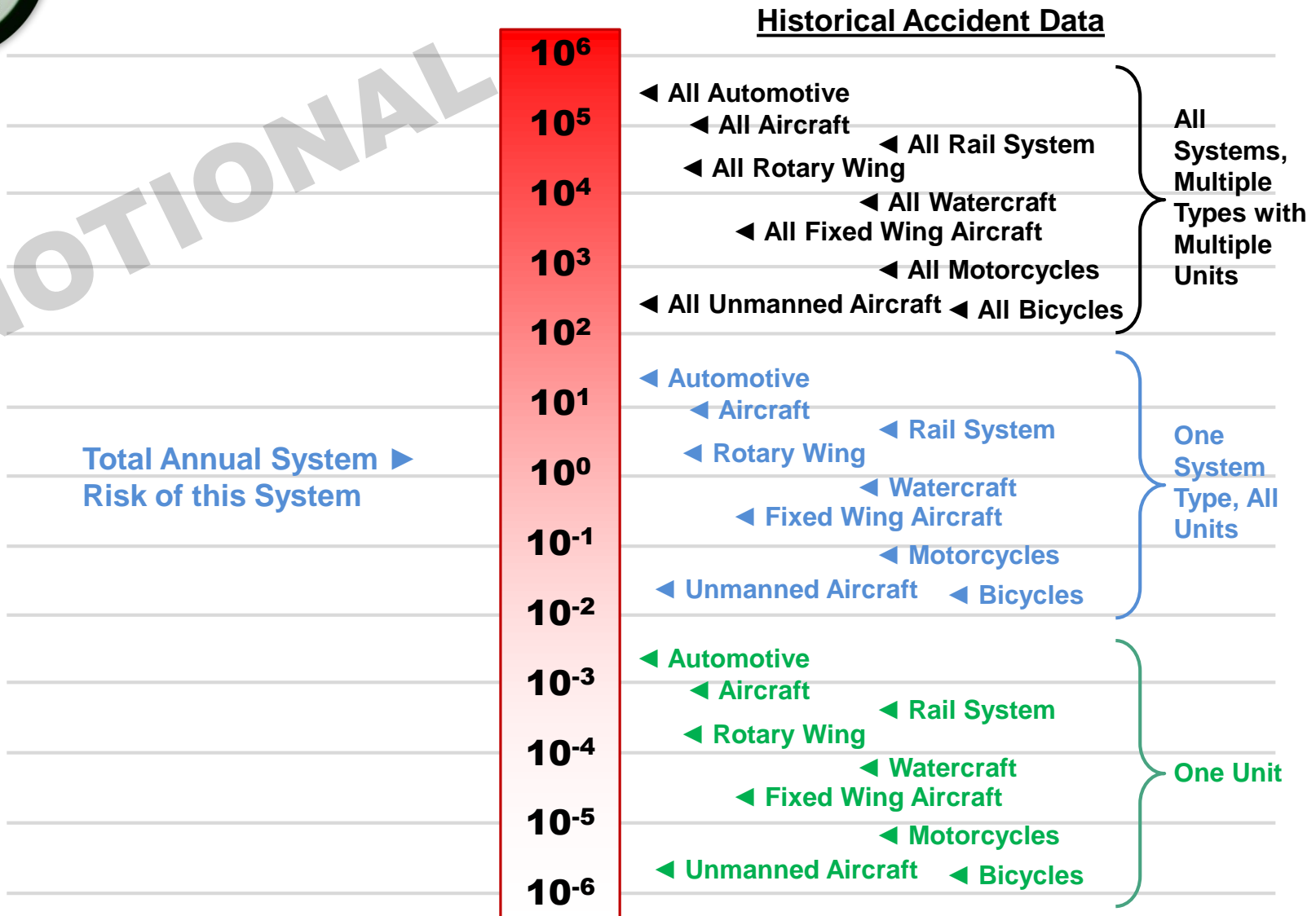
Helps make more informed decisions.



URS for Total System Risk

for US Populations – Transportation Systems

NOTIONAL



Annual Risk of Fatality

Summary

- » URS is useful for:
 - > Setting standards
 - > Communication of risks
 - > Determining “How safe is safe enough?”
 - > Informing decision-makers

- » More research is needed for:
 - > Comparing system risks
 - > Evaluating total system risk

If agencies, safety organizations, or professional societies are interested in value-added research, this is a worthwhile project.