

# *Risks*



*Social Implications of Computers*

# *Risks Digest (Peter Neumann)*

- # 1.1 *Recent yet-to-be-merged items*
- # 1.2 *11 Sep 2001 and Homeland Security*
- # 1.3 *Space*
- # 1.4 *Defense*
- # 1.5 *Military Aviation*
- # 1.6 *Commercial Aviation*
- # 1.7 *Rail, Bus, and Other Public Transit*
- # 1.8 *Ships*
- # 1.9 *Automobiles*
- # 1.10 *Motor-Vehicle and Related Database Problems*
- # 1.11 *Electrical Power (nuclear and other) and Energy*
- # 1.12 *Medical, Health, and Safety Risks*
- # 1.13 *Other Environmental Risks*
- # 1.14 *Robots and Artificial Intelligence*
- # 1.15 *Other Control-System Problems*
- # 1.16 *Other Computer-Aided-Design Problems*
- # 1.17 *Accidental Financial Losses, Errors, Outages*
- # 1.18 *Financial Frauds and Intentionally Caused Losses*
- # 1.19 *Stock-Market Phenomena*
- # 1.20 *Telephone Frauds*
- # 1.21 *Other Telephone and Communication Problems*
- # 1.22 *Election Problems*
- # 1.23 *Insurance Frauds*
- # 1.24 *Security Problems*
- # 1.25 *Cryptography*
- # 1.26 *April Foolery and Spoofs*
- # 1.27 *Privacy Problems*
- # 1.28 *Spamming, Phishing, Junkmail, and Related Annoyances:*
- # 1.29 *Other Unintentional Denials of Service:*
- # 1.30 *Law Enforcement Abuses, False Arrests, etc..*
- # 1.31 *Identity Theft, Internet Fraud, Mistakes, Related Problems*
- # 1.32 *Other Legal Implications*
- # 1.33 *Other Aggravation*
- # 1.34 *Calendar/Date/Clock Problems including Y2K*
- # 1.35 *The Game of Chess:*
- # 1.36 *Miscellaneous Hardware/Software Problems*
- # 1.37 *Other Computer System Development Difficulties*
- # 1.38 *Achieving Better System Development and Operation*
- # 1.39 *The Proper Role of Technology?*

<http://www.csl.sri.com/users/neumann/illustrative.html>

# Therac-25

- *Therapeutic X-ray machine (1985-87)*
- *6 accidents, 4 deaths*
  - *but 100s of lives saved*
- *no bad guys (cf. Ford Pinto case)*
- *Software doesn't degrade like hardware*
  - *but it rots anyway*
  - *but it has much greater complexity*
- *Therac bugs*
  - *no atomic test and set*
  - *- hardware interlocks removed*
  - *User interface problems:*
    - *cursor position*
    - *defaults*
    - *too many error messages*
- *documentation*
- *organizational response*
  - *easy to see after the fact, but problems are inherent in organizations (esp. ones that can be sued)*
- *Solutions*
  - *redundancy*
  - *fail soft (work despite bugs)*
  - *audit trail*
  - *Software Engineering (an attitude about programming)*
    - *Design techniques*
    - *Verification techniques*
    - *Debugging techniques*

# *Apocalyptic risks*

- *Nanotechnology*
  - *self-replicating “grey goo”*
- *Genetic engineering*
  - *super-viruses*
  - *supermen*
- *Low probability, high damage*