"The personal computer has allowed humankind to make more and bigger mistakes than any other invention in history, with the possible exceptions of tequila and handguns" Technology Magazine, 1994

Why “The Subversive Spreadsheet”?

- Academic Research shows
  - 25 - 80% error rate
  - 20 - 30% have errors even after testing / debugging
- UK TAX Experience indicates
  - > 10% in error
  - 70 - 80% high risk applications have errors
Spreadsheet Risk Areas

- Uncontrolled Development
  - Design Errors
    - Mechanical
    - Domain
  - Poor Documentation
- Uncontrolled Use
  - Changes Saved?
  - Overwritten Cells
- Difficult to Audit
- Deliberate Manipulation

Uncontrolled Development

- "Traditional" Development
  - Analyst
  - Programmer
  - Input Staff
  - Data Control
  - Users
  
    Check each other & the data
    Still gives a 5% error rate

- Spreadsheet
  - Users
  
    Who Checks?
    Enormous error rate

Uncontrolled Development

- Errors in design of worksheet
  - Has the user programmed the worksheet to do the right things?
  - Has the user included & updated the key variables?
- DOMAIN errors
  - 40% - 55% undetected
**Errors in design of worksheet**
- **Domain Errors** (Has the user programmed the worksheet to do the right things with the right constants?)
- **Mechanical Errors**
  - Are all the Calculations Correct?
  - Do the formulas refer to the right numbers?
  - Are all the numbers reflected in the totals?

**Hidden Areas**
- You can hide
  - Individual Cells
  - Ranges of cells
  - Whole Columns
  - Whole Worksheets
  - Whole versions or Scenarios

**Poor Documentation**
- What Happens when the designer of a complex worksheet leaves?
- Or when changes need to be made....?
Uncontrolled Use

- Figures may be Changed without being Saved
  - Is the worksheet a "What-if" Calculation?
  - Is What you see on the print what you get on the disk?
  - Is Recalculation set to manual?

Difficult to check

- In Experiments...
  - 40-54% of errors not found
- How do you .....?
  - Check a formula like
    123-456+7909+546756+345678 (=900010)
  - Keep track of Multi-Page or multi-file applications?

Deliberate Manipulation

- How do we spot (right figure - 1,000) on a printout?
Beware Of Spreadsheets!

- Most large spreadsheets will contain errors (Prof. Ray Panko, University of Hawaii, 2000)
- One error in a Spreadsheet will subvert all the controls in all the systems feeding into it

Why does this happen?

- Human Nature
  - Hunter-Gatherer Ancestry
- Human Memory Capacity
  - $7 \pm 2$ simultaneous concepts
- Human Over-Confidence

What’s been done about the problem?

- Publicity
  - Papers and Articles since at least 1983
- Audit Tools
  - Spreadsheet Auditor
  - Cambridge Spreadsheet Analyst
  - Spreadsheet Professional
  - SpACE
  - Audit tools in major spreadsheets
- Development Tools
  - OAK
Founded 2000
First International framework for research
Five successful Conferences
Getting to Regulators
  - Financial Services Authority
  - Tax Authorities
Getting to trainers…
  - Academia
  - ECDLF

Beware Of Spreadsheets!

You CAN counter these Risks....
Prevention
  - Using & promoting good practice & standards in your organisation’s spreadsheets
Detection & Correction
  - Testing and Auditing

Some Recent Examples from www.eusprig.org

- Allied Irish Bank / Allfirst
  - 2002, US$691.2 Million
- Fannie Mae
  - 2003, US$1.136 Billion
- MCI Billing
  - 2003, US$2.1 Million
- TransAlta Power Hedging
  - 2003, US$24 Million
- Toledo University
  - 2004, US$2.4 M
Allied Irish Bank / Allfirst

**Cause**
- Fraud involving (among other things) falsification of spreadsheets used for monitoring alleged perpetrator’s work
  - Transaction entries in Value At Risk spreadsheet
  - Exchange Rates ostensibly downloaded into spreadsheet from Reuters on-line feed

**Impact**
- Total US$691.2 Million
- False Bonus US$549,000 (not all paid)

**Detection**
- False entries – by accident when fraud already detected
- False exchange rates – manual spreadsheet review by internal audit

**Prevention**
- Don’t believe spreadsheets!
- Monitoring / checking regularly
- Source documents: spreadsheet check would have found false transactions
  - SpACE would have found the false rates

**Audit Tools would have found the Existence of Links…**
AIB / Allfirst

And highlighted them

Allied Irish Bank Outcome

- Rusnak was sentenced in January 2003
  - 7 ½ years in prison
  - 5 years’ probation on release
  - Repay US$ 691 Million

Fannie Mae Balance Sheet

- Amended press release about third quarter results…
- Errors in reported unrealised gains…
  - Securities $1.279 Billion
  - Other comprehensive income $1.136 Billion
- Total shareholder equity out by $1.136 Billion
- Cure? CHECK, CHECK, CHECK
MCI WorldCom

- Alleged fraud against US government
- Invoices summarised on spreadsheet…
- …amounts overstated by $2.1 Million
- History of “padding” allegations
- Cure – DON’T Trust other peoples’ spreadsheets

TransAlta

- US$ 24 Million SNAFU in power transmission hedging
- Cut-and-paste error
- Cure ? CHECK, CHECK and CHECK again.

Toledo University

- Showed Increase in student numbers instead of 10% decline…
- Overestimated enrolment and therefore revenue..
- Error in formula by employee..
- Cure
  - Train the users
  - CHECK !!!
Common Threads

- Lack of checking until it was too late
- Lack of control over development
- Lack of checks within the spreadsheets used
- Poor training of users..
- ...In fact the usual suspects

Finding Out More

- Ray Panko’s Spreadsheet Research website
  www.cba.hawaii.edu/panko/ssr/
  If it’s not here, there’s a link to it from this site
- European Spreadsheet Risks Interest Group
  www.EuSpRIG.org
- PWC Spreadsheet Modelling Best Practice
  www.pwcglobal.com/uk/eng/about/svcs/bsl/pub.html

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