



RELCON SCANDPOWER
Risk Management



Relcon Scandpower AB

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RiskSpectrum, Current Status and Future Plans

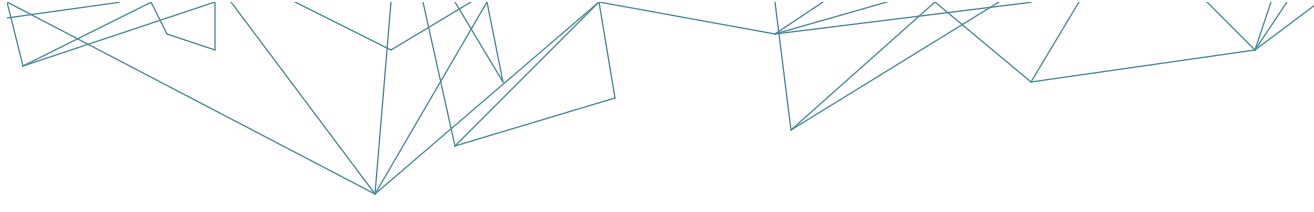
Ola Bäckström
Manager Software

RiskSpectrum Software

- Current Status and Future Plans

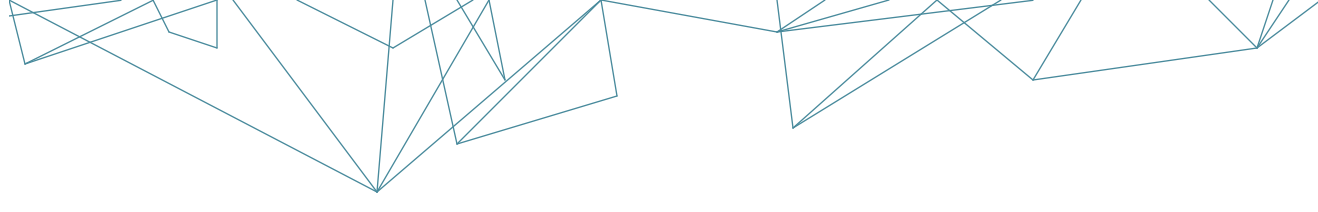
Agenda

- RiskSpectrum World-Wide
- Software Development Team
- The RiskSpectrum Software Family
 - RS32
 - RSAT development
 - BDD
 - RiskWatcher
 - PSADoc



RiskSpectrum World-Wide

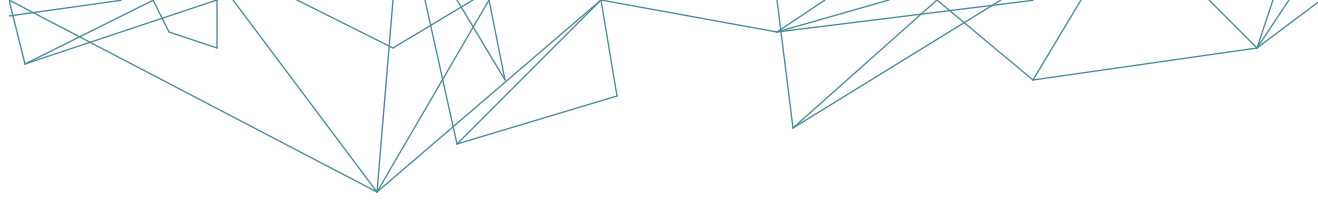
- **There are currently more than 1100 RiskSpectrum users in 380 organisations in 42 countries:**
 - Nuclear power plant PSA (47% of the worlds nuclear power plants)
 - Various military applications: Missiles, submarines, radar systems, etc.
 - Air and space industry
 - Transportation
 - Chemical and process industries
 - Oil and gas industry
 - Others (consultants, universities, electronics, computers, biochemical)



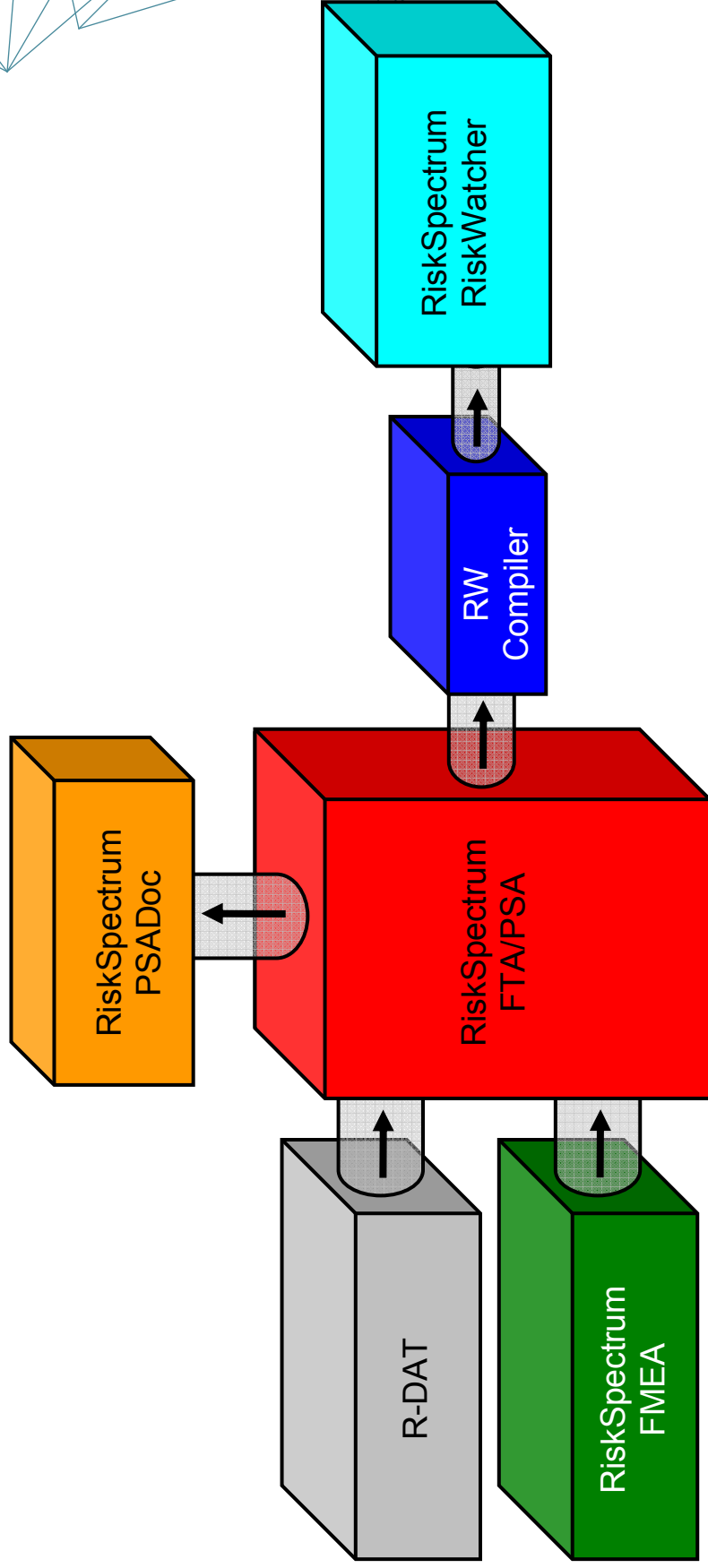
Software Development Team

Location: Stockholm

- 3 full time developers (and increasing)
- 2 part time developers
- 3 part time support personnel (experienced PSA consultants)
- 1 software sales and marketing

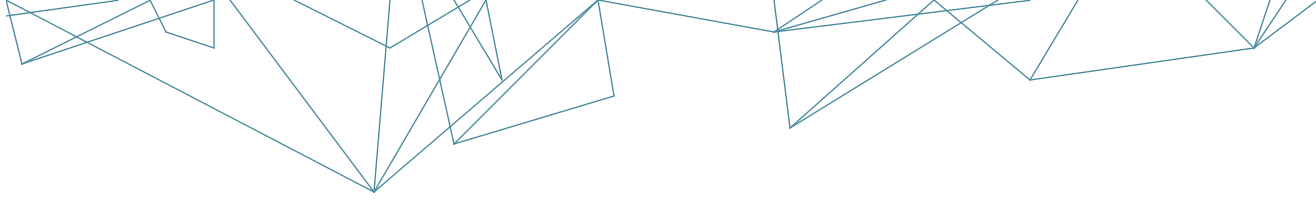


The RiskSpectrum Family



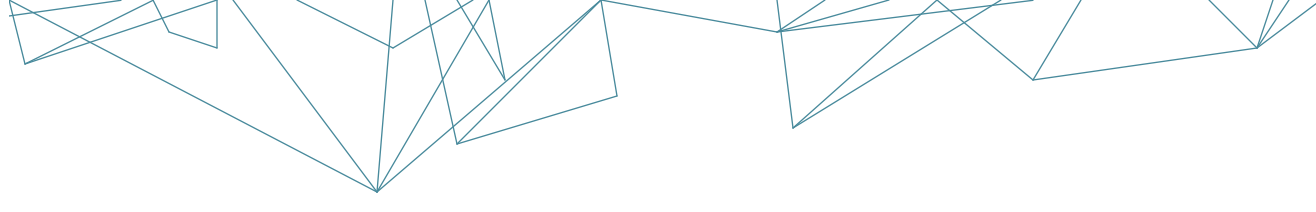
RiskSpectrum PSA (RS32): The next generation of RiskSpectrum® Software

- **Background**
 - First RiskSpectrum Windows® version released in 1998
 - Current version is a 16 bit application developed in Microsoft® VB3
 - VB3 does not allow use of more memory
 - New features cannot be added
 - Difficult to fix bugs
 - Future Windows versions will not support 16 bit applications
- **Main advantages**
 - More user-friendly
 - Possible to extend the software with new functionality



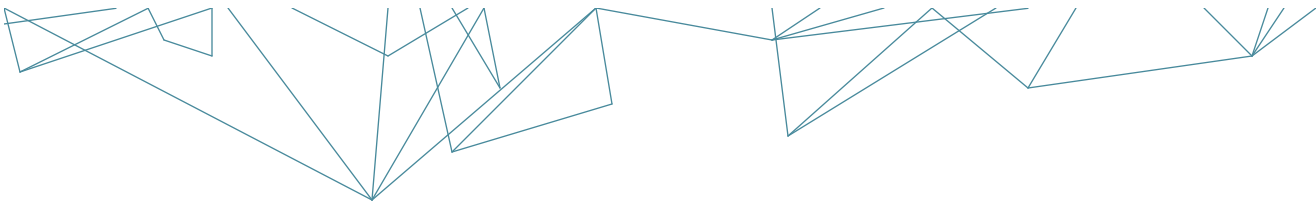
Project Scope, RS32

- **Redesign of the RiskSpectrum FT and PSA Professional user interface**
 - Microsoft .NET platform – a platform for the future
 - Database is moved to SQL server – handle larger models
- **Limited update of the RiskSpectrum Analysis Tool (RSAT) is included in this project**
 - New functions/possibilities in RS32 interface are implemented also in RSAT



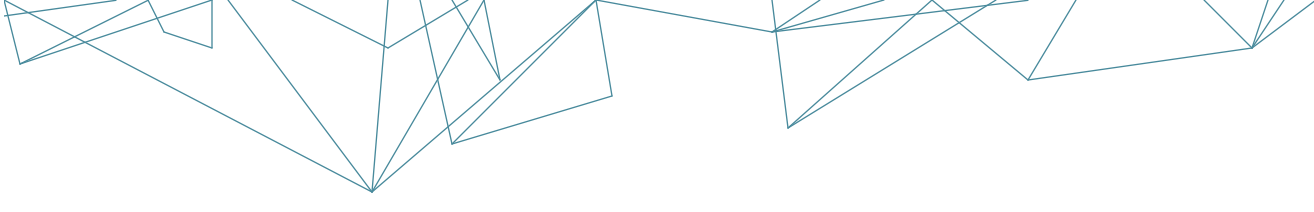
Resources Spent in the Project

- **Resources so far – approximately 250 man-months**
 - Development
 - QA
 - Manuals
 - Tests
- **How close are we?**
 - Approximately 20 bugs and feature requests left to fix (identified in the tests)
 - Final test round
 - -> Very close



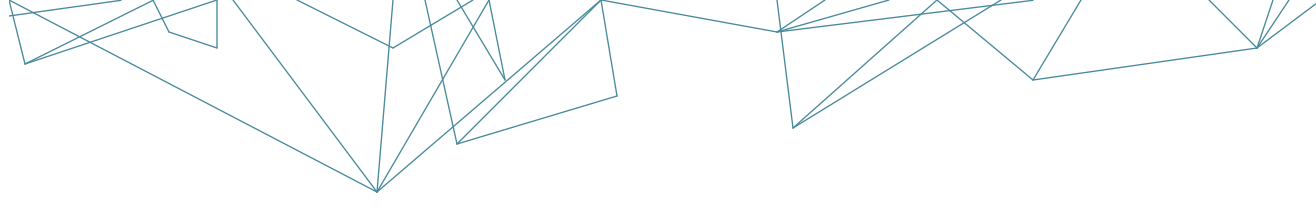
Some new features

- **QA in RS32**
 - User login, with user right management
 - QA-module (Review and Approve)
 - Enhanced tracking of changes
- **Enhanced editing**
 - Undo
 - Enhanced “Record list” functionality – drag and drop
 - Improved filter functions (“Quick Filter”)
- **Improved printing functionality**
- **Improved calculation possibilities**
 - Possibility to define basic events as “initiator” or ”enabler” (reliability analysis)
 - Possible to use a boundary condition set as part of another boundary condition set
 - Possibility to display more than one result window at a time
- **Enhanced FT interface**



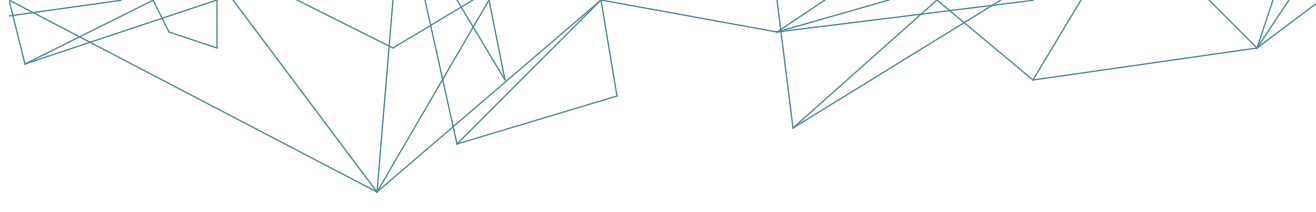
RiskSpectrum PSA

- **Some of the new features waiting...**
 - Long list of features, e.g.
 - New CCF model
 - UNICODE
 - A new FT editor
 - Improved MCS editor
 - Improved tracing of MCS
 - Improved result presentation



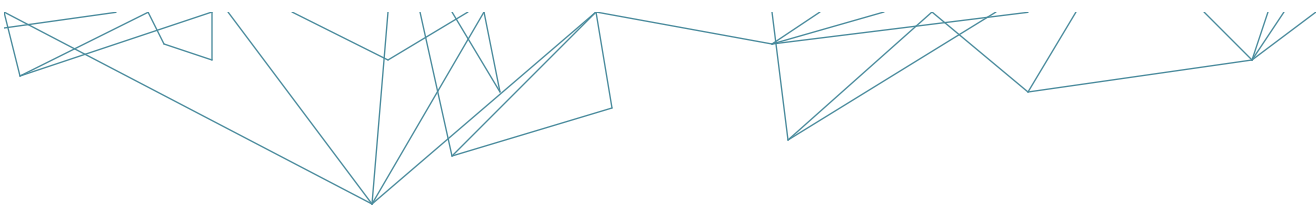
RiskSpectrum Analysis Tools Development

- **Continuous development!**
- **Development areas right now**
 - Inclusion of functions in respect to RS32
 - Expanded treatment of NOT-logic in MCS analysis
 - Speed improvements
 - Accuracy in calculation of MCS list – MCS-BDD
 - BDD directly from ET / FT



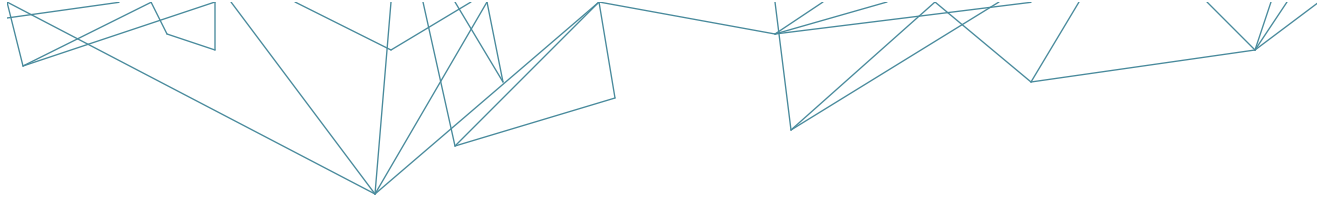
RiskSpectrum MCS

- **Why do we continue to develop the MCS generation algorithm (or MCS generation and then BDD from MCS)?**
 - Can treat very large problems
 - actually, we have not found a problem that has been unsolvable!
 - Speed - efficient
 - The accuracy is sufficient
 - MCS BDD solves the potential problem with high probability events
 - The importance measures are also sufficient
 - Risk increase factor / RAW may be an underestimation



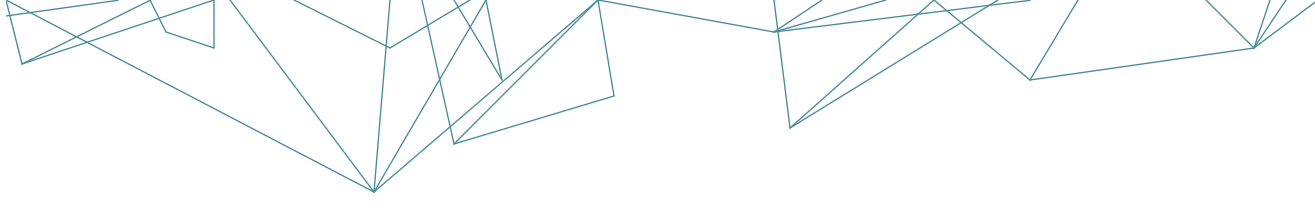
RiskSpectrum MCS-BDD

- **The MCS BDD is mainly intended to solve problems with many high probability events**
 - Rare event approximation or MCUB turns bad
 - Main potential problem in studies
- **Includes possibility to consider success of functions in event trees**
 - The "success modules" are quantified conditionally based on the failed/success of other events
 - Will make it possible to quantify success also
- **The MCS-BDD will still be based on the MCS list**
 - RIF will not be correct for all events unless the MCS list is very long
- **Commercial product**



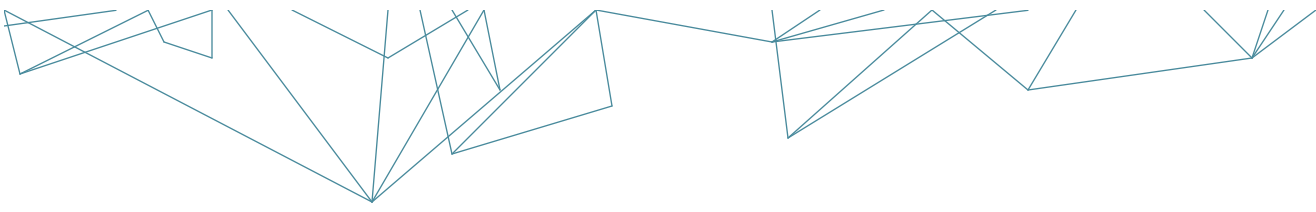
RiskSpectrum BDD

- **Why BDD?**
 - An exact solution is always better...
- **Problem?**
 - A large model will most likely not be possible to solve completely in a reasonable time
- **Use of BDD directly from FT**
 - Use BDD from FT for risk monitors (acceptable to have a very long BDD generation time)
 - Hybrid methods?
- **Development project**
 - Current algorithm solves small FT cases, strong dependence on FT layout



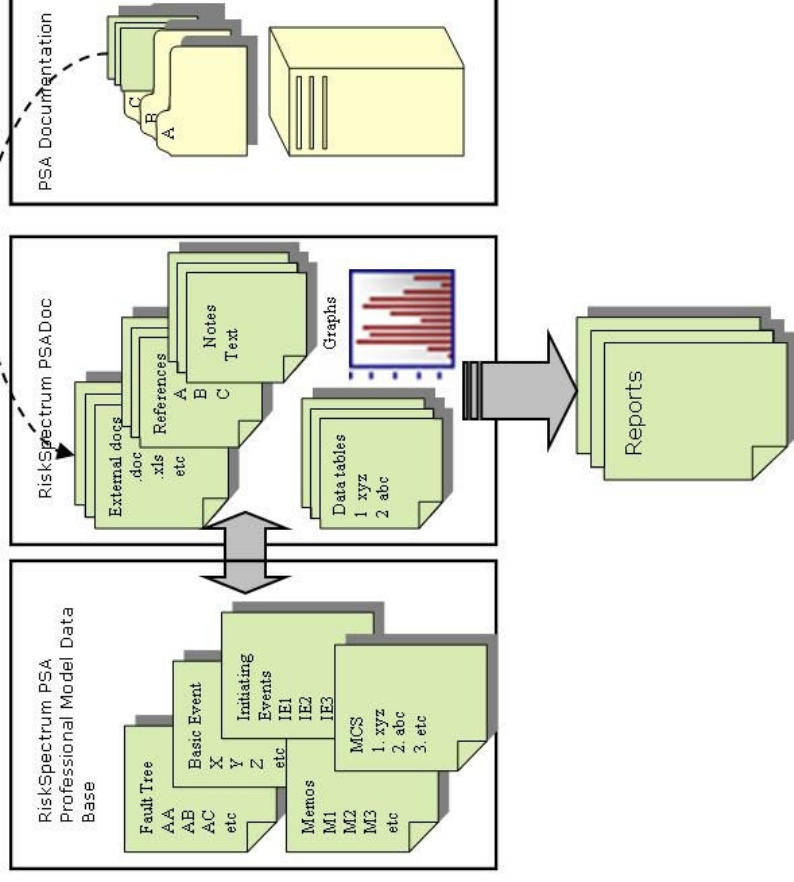
RiskSpectrum RiskWatcher

- **A risk monitor software for managing risk at nuclear power plants**
- **Calculates risk based on a PSA model**
 - Probabilistic
 - Deterministic (defense-in-depth)
- **Provides for means to take into account e.g.:**
 - plant operating mode
 - equipment outages
 - system configurations
 - periodical tests
 - environmental factors
- **It is optimised to work together with RiskSpectrum PSA**
 - Definitions for the RM are in the PSA model – one PSA/RM model
- **Does not need Relcon Scandpower involvement in the setting up of the RM**



RiskSpectrum Doc

- Facilitate the PSA documentation handling
- Strong connection between documentation and PSA model
- Easy to produce reports based on notes and information in the PSA model
- Produce reports using report templates
- Quickly produce reports using your most recent analysis results and FTs





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