30YofAI- A business perspective: PolySpace Company

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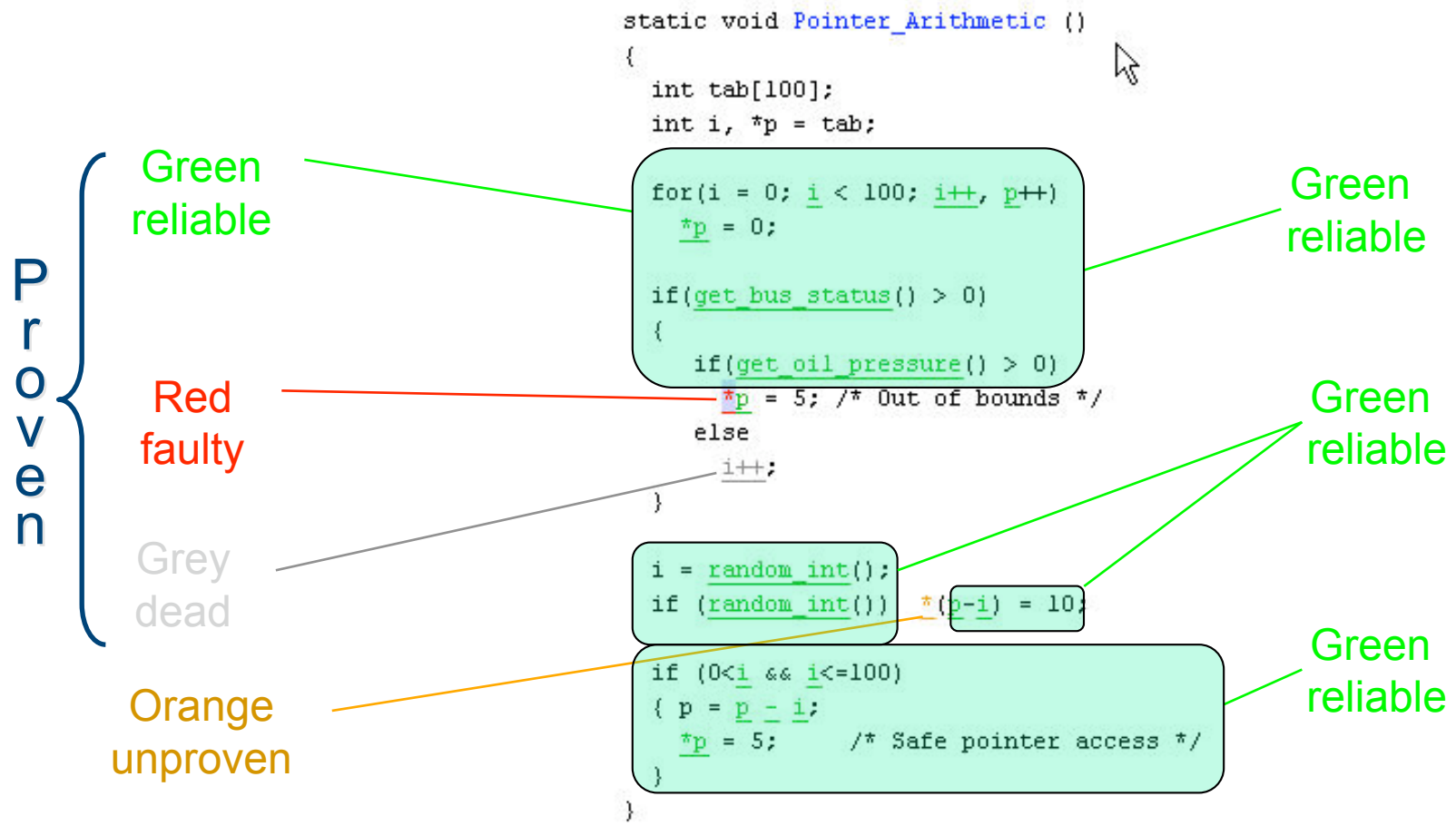
The MathWorks/Business Developer and PolySpace co-founder

Which products?

- Prove the absence of run-time errors
  - In C/C++ and Ada programs
  - By Abstract Interpretation (A. Deutsch)
    - Pointer aliasing, inter-procedural, flow-sensitive, concurrency analyses
- Develop a product that is simple enough to be used by software developers

PolySpace™ Solution

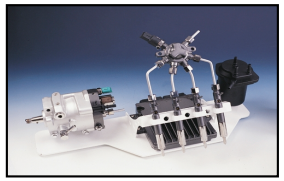


Which markets?

- Primarily the aerospace market



- Then, the automotive market



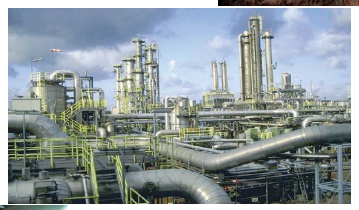

- Expand to the markets where run-time errors matter

E.g.: Overflow, division by zero, pointer de-referencing, out-of-bounds array access

Which applications?

- Initially the software controllers:
  Where lack of quality has more impact

- Expand to critical applications
  - Mission critical
  - Safety critical
  - Life critical
  - Business critical



Which business model?

- A subtle balance between sustainable revenues, R&D and marketing investment, and external funding
  - How to decide product improvements?
  - Where to invest marketing dollars?
  - When to call for external funding?

How to deal with customers' needs?

- Few challenges:
  - Finding representative users
  - Choosing between usability and technology improvements
  - Sticking to core values
  - Focusing on satisfying users within target markets

Which positioning?

- From “static analysis” to “continuous code verification”
  - Abstract Interpretation provides better value when used in conjunction with development activities
  - Proving the absence of errors is a better value-proposition than bug detection
- From “code verification” to “code certification”
  - Proving the absence of errors as a support for component certification (MISRA-C:2004, IEC 61508, DO-178B)
  - Abstract interpretation as a powerful complement to testing activities
  - Abstract interpretation as a way to measure software quality based on sound approximation of computer program semantics

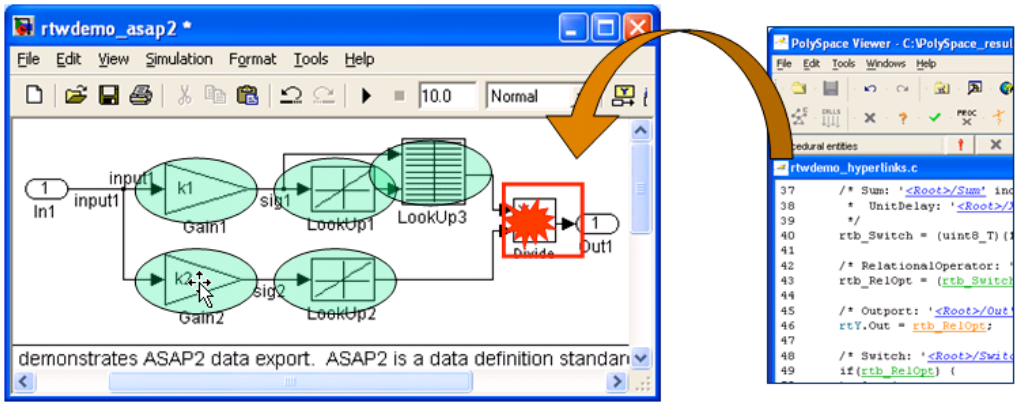
Why external funding?

- To fill the gap between technology capabilities and customer's demands
- To expand to new markets, to new locations
- To increase market exposure
- To maintain competitive offering

- Subtle balance between corporate independence (technology, market) and investors goals (growth and profitability)

Why the Mathworks?

- A win-win partnership
  - Proving the absence of design errors leading to run-time errors (e.g.: link between PolySpace and Simulink)
  - Automating code generation and code verification



- Many synergies
  - Joint presence on target markets
  - Market interest in V&V techniques

The PolySpace company

- Established in 1999.
  Acquired by The MathWorks in April 2007
- Abstract Interpretation applied to code verification in the embedded system industry
- 55 employees, ~$12M+ revenues (pre-acquisition)
- 2,000+ licenses installed on 300+ industrial sites worldwide
- Leader in Aerospace/Defense and Automotive industries

Key takeaways

- Abstract Interpretation
  - Makes software safer
  - Works and sells
  - Creates added-value and jobs opportunities (Join us!!)
  - Still contain a huge potential

- Abstract Interpretation still needs:
  - Strong support from academic world (scalibilit, precision)
  - Evangelization
  - Business ventures to niche market (Contact us!!)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TRW
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