5 steps to better quality requirements –

Uncovering poor quality requirements through Validation

Ian Alexander & Fergal McGovern

25th Feb, 2010

VisibleThread™

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Administrative Notes

- All audio lines have been automatically muted bar the speakers' lines
- Questions can be routed to the moderator through the questions feature. This is also private. Any questions related to the speakers will be directed to them and answered publicly; any questions not addressed will be answered by mail afterwards.
- We plan that the session will run for 60 mins, but can run longer
- We will send you a feedback survey afterwards, I hope you will submit your views
- A recording of this Webinar will be posted on www.VisibleThread.com and www.ModernAnalyst.com
- All slides will also be available for download

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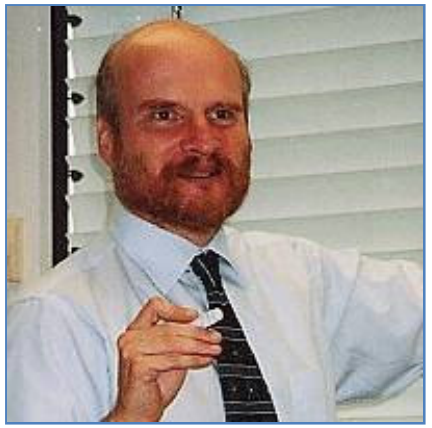
Introducing Ian Alexander



- Internationally renowned requirements engineering specialist
- best known for authoring ‘Writing Better Requirements (2002), Scenarios, Stories, Use Cases (2004), and Discovering Requirements (2009)’,
- as a trouble-shooter for organisations in transportation, telecommunications, aerospace, government and public service sectors
- and as chairman of the BCS (British Computing Society) Requirements Engineering Specialist Group

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Introducing Fergal McGovern

- Founder and CEO of VisibleThread
- previously founder of Requirements Management vendor SteelTrace prior to its acquisition by Compuware in April 2006, now Microfocus OptimalTrace,
- with deep experience in the applicability of requirements driven development & quality oriented IT process
- and currently most interested in early defect detection in BRDs (Business Reqs Doc) and associated docs at program / project level

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Todays Agenda

- Part 1: Ian
  - 5 steps to better quality
- Part 2: Fergal
  - Automation of document quality inspections with VisibleThread
- Q & A

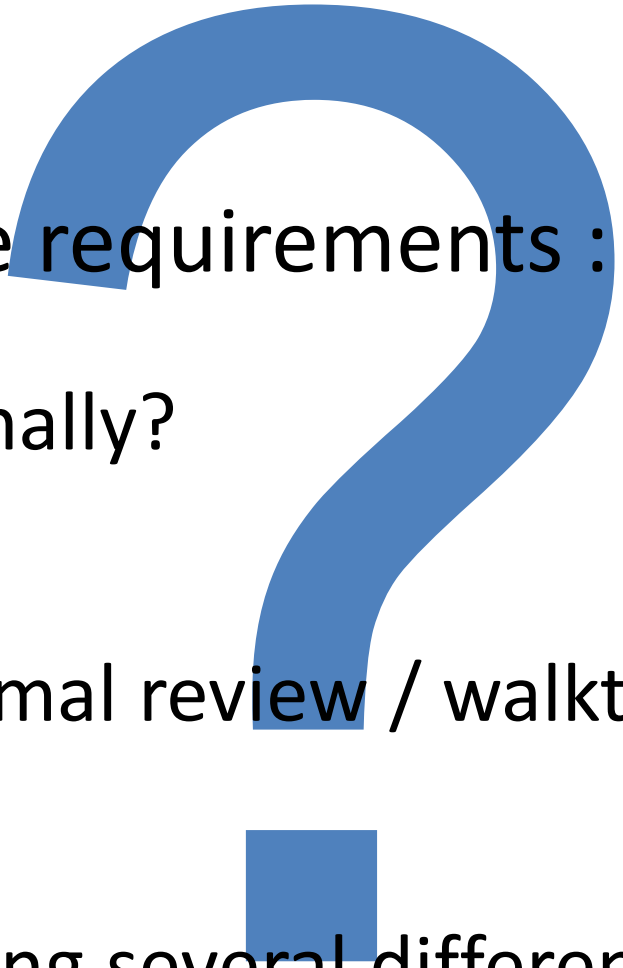
5 Easy Steps to
Validating Requirements

Ian Alexander

http://www.scenarioplus.org.uk

February 2010

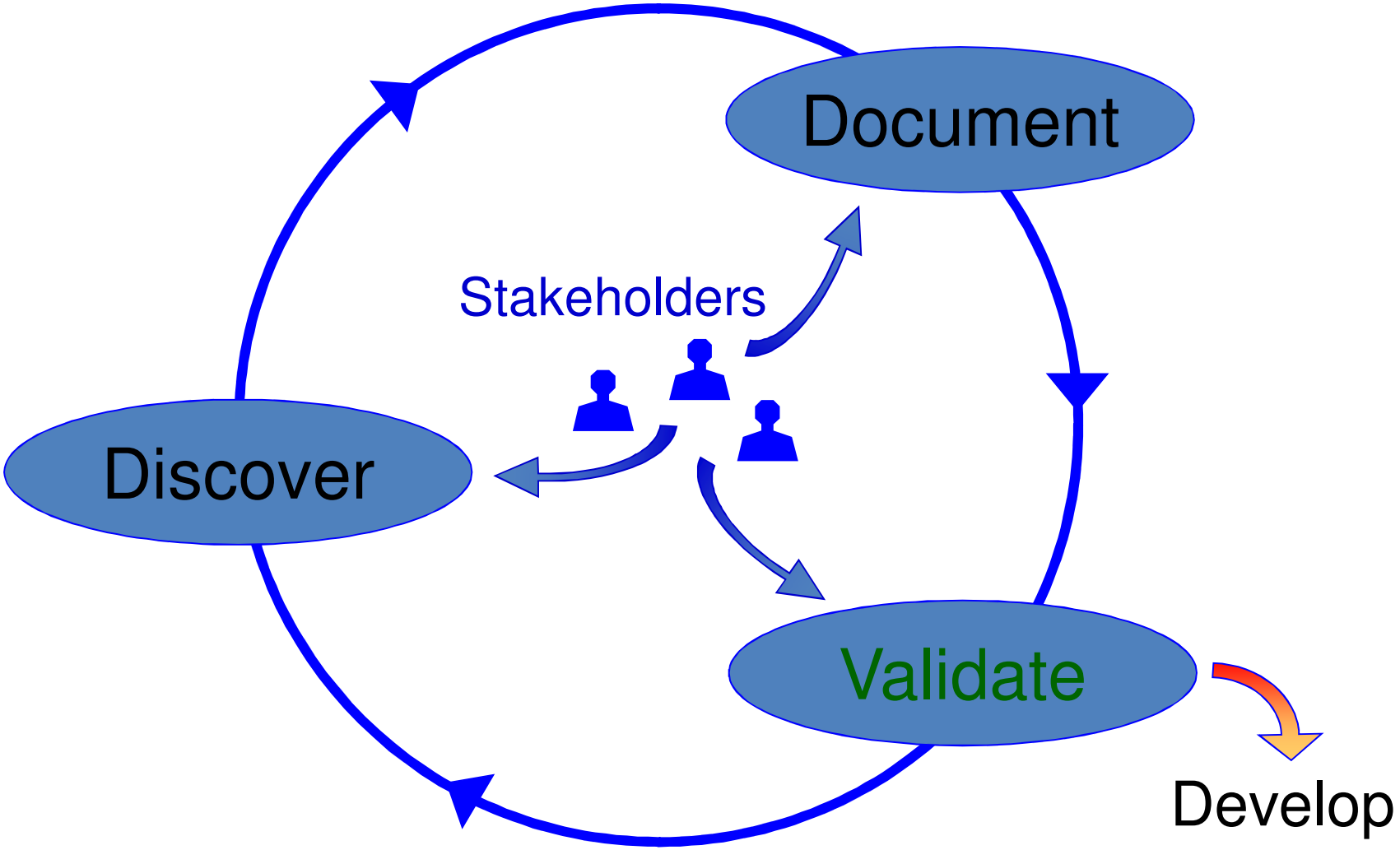
Poll (Vote)



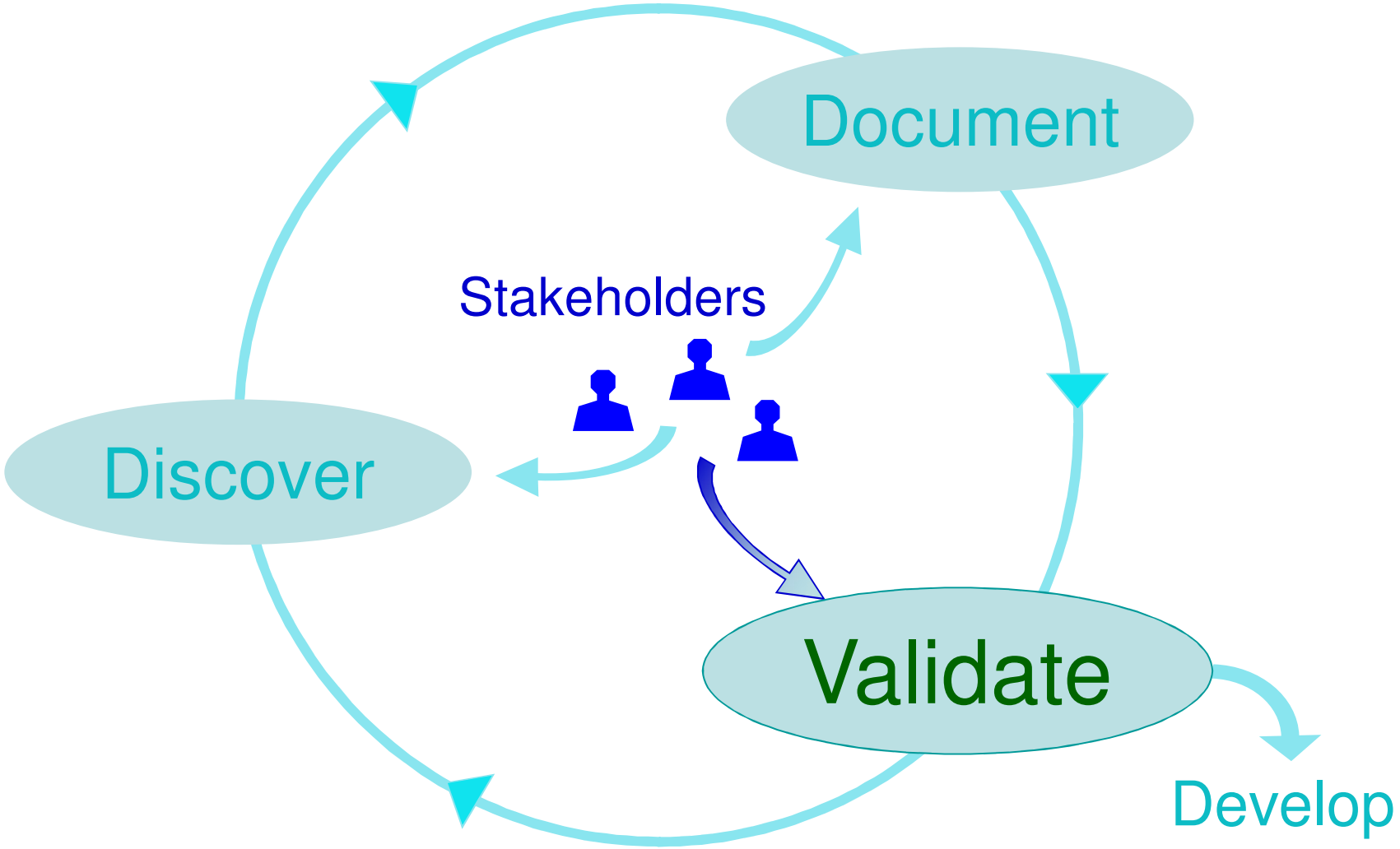
Do you validate requirements :

1. only informally?
2. only by formal review / walkthrough?
3. by combining several different methods?

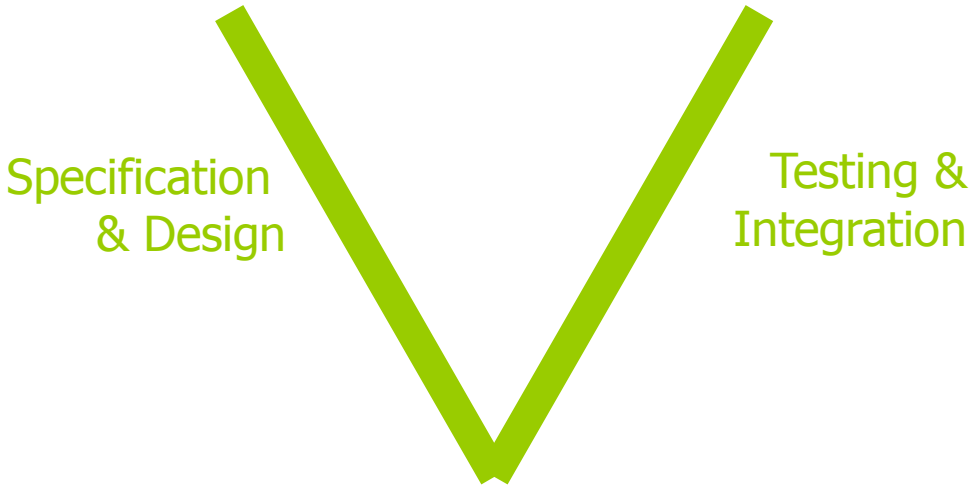
Creating Requirements



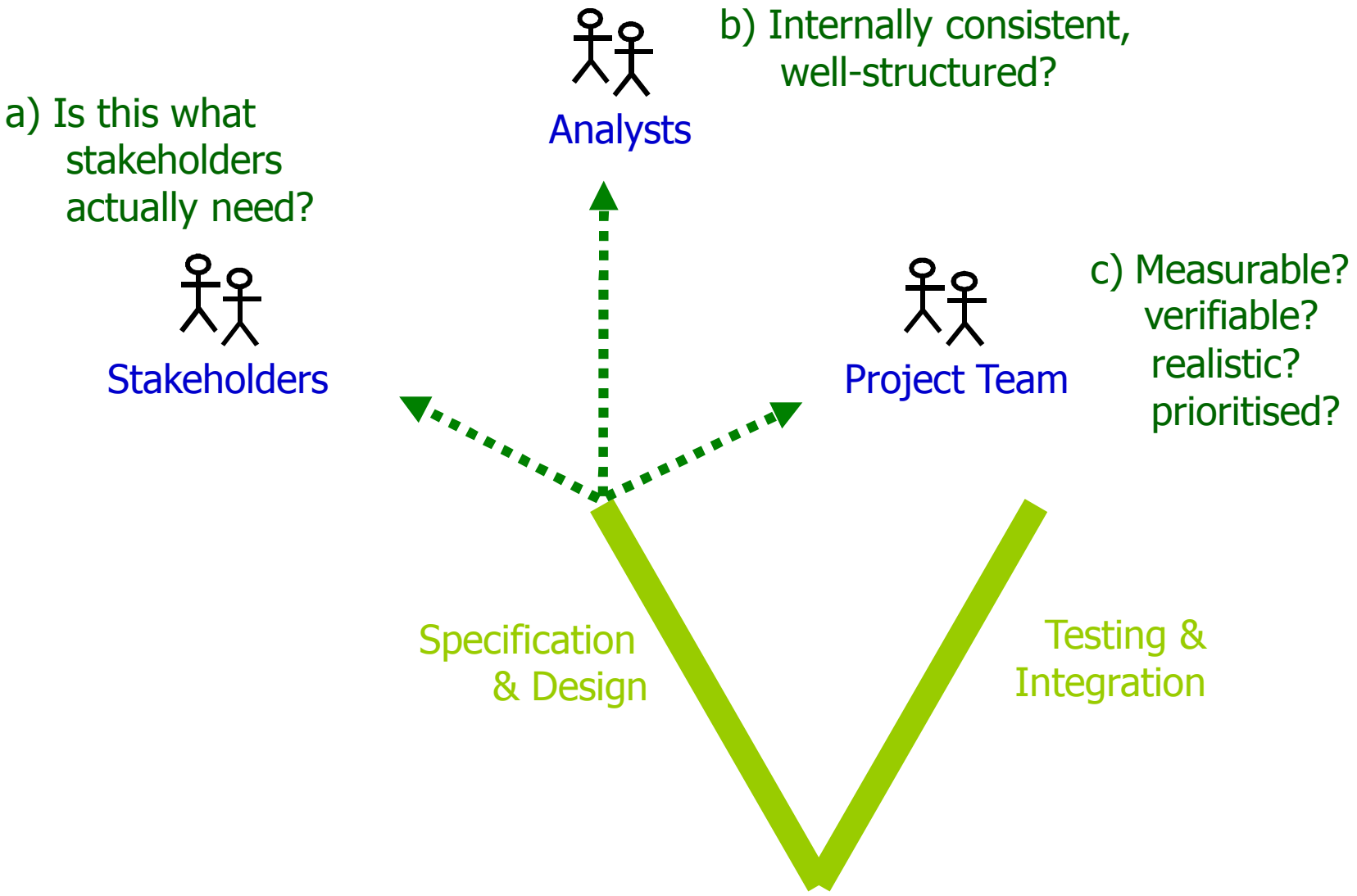
Validating Requirements



Validation



Validation



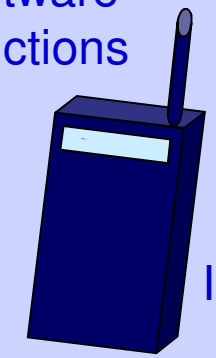
Context

We're creating an embedded-software device to be useful to every outdoor leisure activity

speed, distance, heading, map, lamp

rescue beacon, temperature

Software Functions



User Interface

position, time

barometer, weather, map, flashing light

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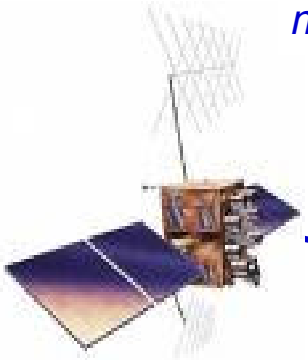

GPS (satnav)

Software Functions

User Interface

GPRS (mobile data)

position, time

barometer, weather, map, flashing light

A Few *Draft* Requirements…

Functions

It would be helpful to provide a barometric pressure display.

An emergency light should be built in, unless this is too large and heavy.

The system must include a rescue beacon for skiing, etc.

MFD* should be able to issue weather warnings.

As it may be difficult to find batteries, MFD must be able to recharge them.

** The Multi-Function Device*

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Qualities & Constraints

MFD shall be shockproof.

MFD shall be waterproof.

MFD must be light to carry.

MFD must be small and convenient.

MFD should be easy to use.

** The Multi-Function Device*

These may ***LOOK*** all right…

- ***But how do we tell?***

These may ***LOOK*** all right…

- ***But how do we tell?***

- Choose ***independent*** ways of checking:

1. Grammar & Syntax
2. Missing Measurements
3. One-off Terms
4. Conflicts
5. CRUD check

… … …

Plenty more options …

1. Grammar & Syntax

It **would** be **helpful** to **provide** a barometric pressure display.

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The system must include a rescue beacon for skiing**, etc**.

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1. Grammar & Syntax

It **would** be **helpful** to **provide** a barometric pressure display.

An emergency light should be built in, **unless** this is too large and heavy.

The system must include a rescue beacon for skiing**, etc**.

MFD **should** be able to issue weather warnings.

As it **may** be **difficult** to find batteries, MFD must be able to recharge them.

provide is vague. What should it do?

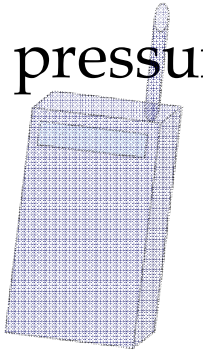
Get out clause, so, not necessary?

etc = for example! so, not necessary?

would, helpful, should, may so, not necessary?

2. Missing Measurements

MFD shall **display** barometric pressure.



MFD shall be **waterproof**.

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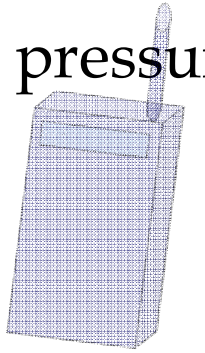
MFD should be **easy to use**.

MFD must be **small** and **convenient**.

2. Missing Measurements

MFD shall **display** barometric pressure.



To what accuracy?

MFD shall be **waterproof**.

To what depth?

MFD must be **light to carry**.

What limit on mass?

MFD should be **easy to use**.

How much training?
With gloves on?

MFD must be **small** and **convenient**.

What limits on size?

Grammar: and
Is this 2 requirements?

3. One-off Terms

MFD shall display **barometric pressure**.

An **emergency light** should be built in, unless this is too large and heavy.

The system must include a **rescue beacon** for **skiing**, etc.

MFD should be able to issue **weather warnings**.

As it may be difficult to find **batteries**, MFD must be able to **recharge** them.

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MFD shall display **barometric pressure**.

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MFD should be able to issue **weather warnings**.

As it may be difficult to find **batteries**, MFD must be able to **recharge** them.

These terms each occur only once

Should they be in Goals?

Should they be in Scenarios?

Should they be in Project Dictionary?

Are any of them Synonyms?

4. Conflicts

MFD **shall** display barometric pressure.

An emergency light **should** be built in
unless this is too large and heavy.

As it **may be difficult** to find batteries,
MFD **must** be able to recharge them.

4. Conflicts

MFD **shall** display barometric pressure.

An emergency light **should** be built in **unless** this is too large and heavy.

Internal conflict?

As it **may be difficult** to find batteries, MFD **must** be able to recharge them.

Possible external conflicts, if mass, power, size, development cost limit no. of functions

5. CRUD check

- Data elements can be
  - Created
  - Retrieved
  - Updated
  - Deleted

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MFD shall be able to issue weather warnings.

5. CRUD check

- Data elements can be
  - Created
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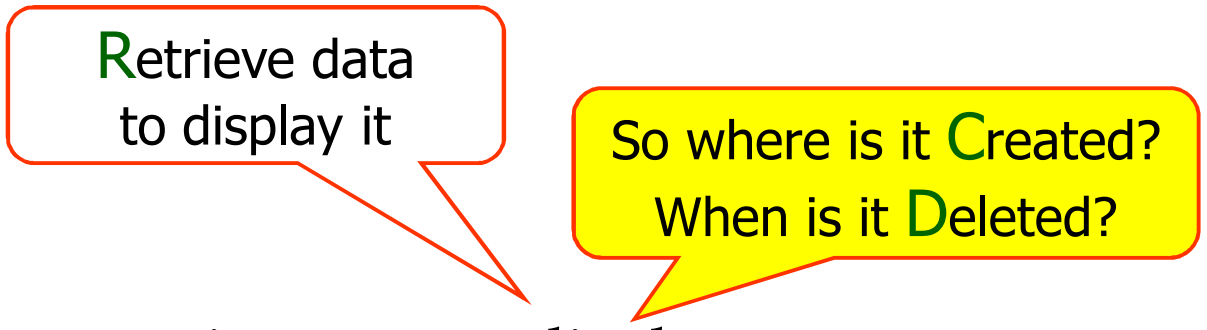

MFD shall provide a barometric pressure display.

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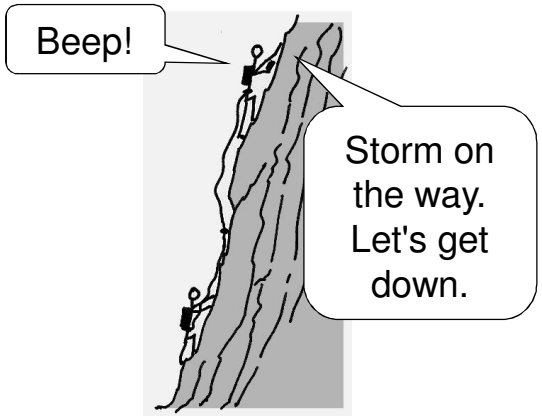
CRUD Scenario*

- Create data
- Retrieve data
- Update data
- Delete data



** or Use Case*

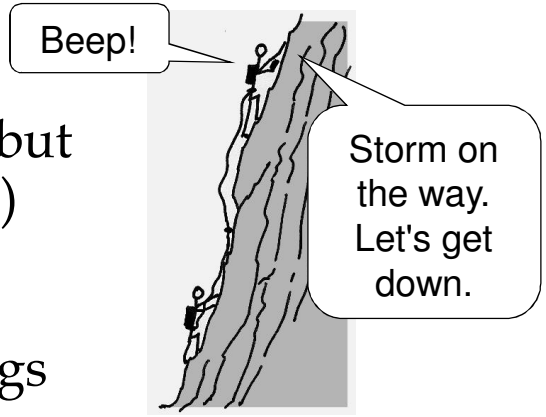
CRUD Scenario

More detailed, System-level requirements

- Create data
  - MFD measures barometric pressure at intervals of t seconds, storing it in data buffer.
  - MFD calculates rate of change of pressure.
- Retrieve data
  - When user requests barometer, UI displays current pressure.
  - When pressure is *falling rapidly*, UI displays Storm Warning.
- Update data
  - (Measurements are not edited, but overwritten when buffer is full.)
- Delete data
  - MFD discards pressure readings more than 3 hours old.

"When" style for event-handling requirements

Term defined in Project Dictionary



Finally, Requirements

Functions

MFD shall display barometric pressure accurate to 1 millibar.
MFD shall supply at least 5 minutes of emergency light.
MFD shall transmit digital avalanche beacon signals on demand.
MFD shall issue a storm warning when barometric pressure falls rapidly.
MFD shall issue weather warnings when available from local radio.
MFD shall be rechargeable in the field without additional equipment.

Finally, Requirements

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MFD shall be rechargeable in the field without additional equipment.

Qualities & Constraints

Qualities

MFD shall be shockproof to BSI Standard 123456.
MFD shall be waterproof to BSI Standard 654321.

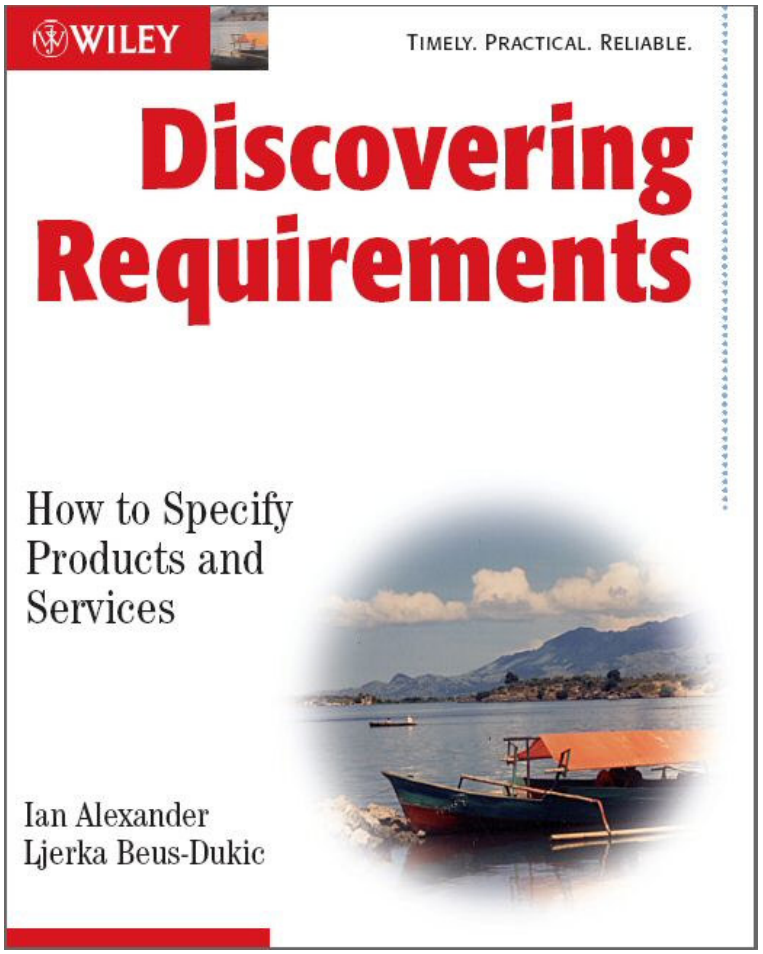
Physical Constraints

MFD shall weigh no more than 400 grams.
MFD's dimensions shall be no more than 15cm x 10cm x 4 cm.

Usability

MFD shall be operable with thermally-gloved hands.

🕮 Finding out more…



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Cost Impact of defective requirements

- Requirements errors consume 28% to 42.5% of total software development costs (Hooks and Farry, 2001). If project costs $500k then $150k is fixing defects due to bad requirements

- Finding and fixing defects outside their phase of injection can cost 400 times as much (Reifer 2007). Spend $80 on inspection then you avoid a cost of $16,000

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Ian's techniques, is it possible to automatically check for defects?

1. Grammar & Syntax
2. Missing Measurements
3. One-off Terms
4. Conflicts
5. CRUD Check

VisibleThread™ VisibleThread – *Document Intelligence*

VisibleThread metrics include:

- Document Quality: ambiguous language (‘appropriate’)
- Document Structure: ensuring what is required is actually present
- Document Quantity/Size: appropriate amounts of content by sections
- Document Change over time: degree of change appropriate for phase in lifecycle
- Document Term Frequency: CRUD-able?, one-offs

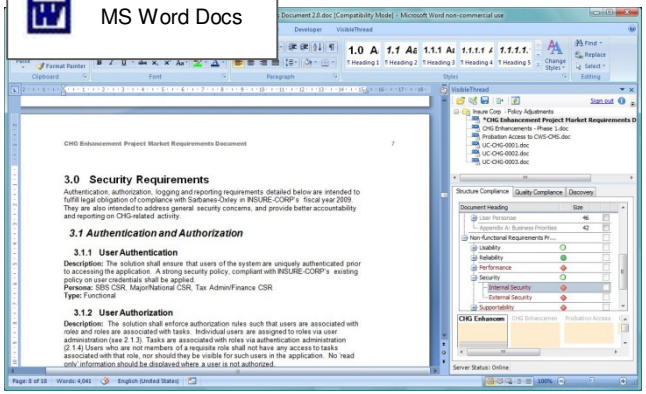
Benefits

- Real-time visibility & Objective metrics
- Continue with MS, no change to how authors work
- Quality guidance for authors
- Major reduction in analysis costs & over 65% ROI in year 1

VisibleThread – Deployment

Authoring

MS Word Docs



- Spot defects and quality issues within documents
- Provide guidance on Best Practice – 'soft guidance'
- Update document and save back to VT Server

HTTPS

HTTPS

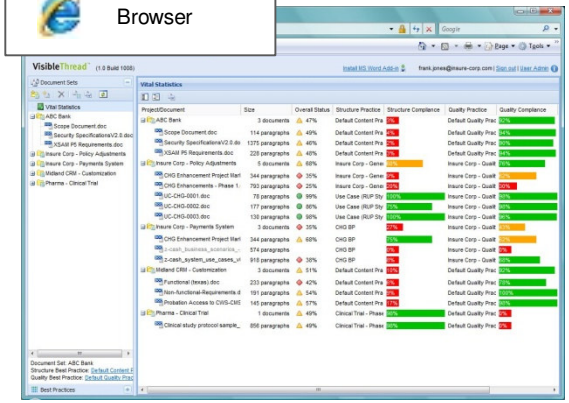
VisibleThread Server

Repository*
(Subversion)

- Best Practice Models
- Analysis Snapshots
- Documents
  - MS Word

Oversight & Review

Browser



- Manage Documents
- Define and maintain SDLC Reference Models / Best Practices
- Review Quality Issues/Defects
- Track changes

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But how…? - Demo Time

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In summary

VisibleThread:

- takes raw MS Word documents,
- with no mark-up needed,
- then uses NLP & pattern matching to
- yield clear quality metrics allowing automated defect detection

…and it:

- Tracks change across all projects documents (full audit trail)
- Performs Structure checks using heading validation
- Performs analysis on ‘entities’ (noun frequency) across documents highlighting completeness

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Benefits to Automated Validation

- Catch issues early – avoid scope creep
- Catch issues early – avoid ‘Lost in Translation’ moments
- Catch issues early – avoid different interpretations
- Catch defects early – $500k of which $150k can be avoided!

So it is in everyone's interest to make this better!

  - PMO & Program Managers
  - Business Analysts & Project Managers
  - Technical Development
  - QA & Test
  - Executives

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Q & A

More Resources

- Whitepapers at: www.visiblethread.com/products/whitepapers
- 2 minute demo: www.visiblethread.com/products/demo/
- 21 Free trial: www.visiblethread.com
- NASA's (ARM) work at: http://satc.gsfc.nasa.gov/tools/arm/
- Mail fergal.mcgovern@visiblethread.com if you'd like to learn more about VisibleThread

THANKS