



# 5 steps to better quality requirements –

Uncovering poor quality requirements through Validation



Ian Alexander & Fergal McGovern

25<sup>th</sup> Feb, 2010

## VisibleThread™

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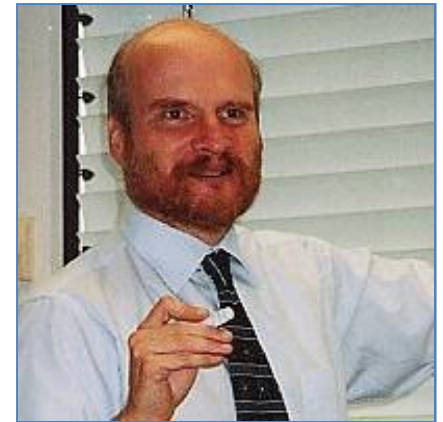
5-7 Pearse Street, Dublin 2, Ireland  
+(353) 1 685 7730

[www.visiblethread.com](http://www.visiblethread.com)

- 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](http://www.VisibleThread.com) and [www.ModernAnalyst.com](http://www.ModernAnalyst.com)
- All slides will also be available for download

## 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



## 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



## Today's 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>

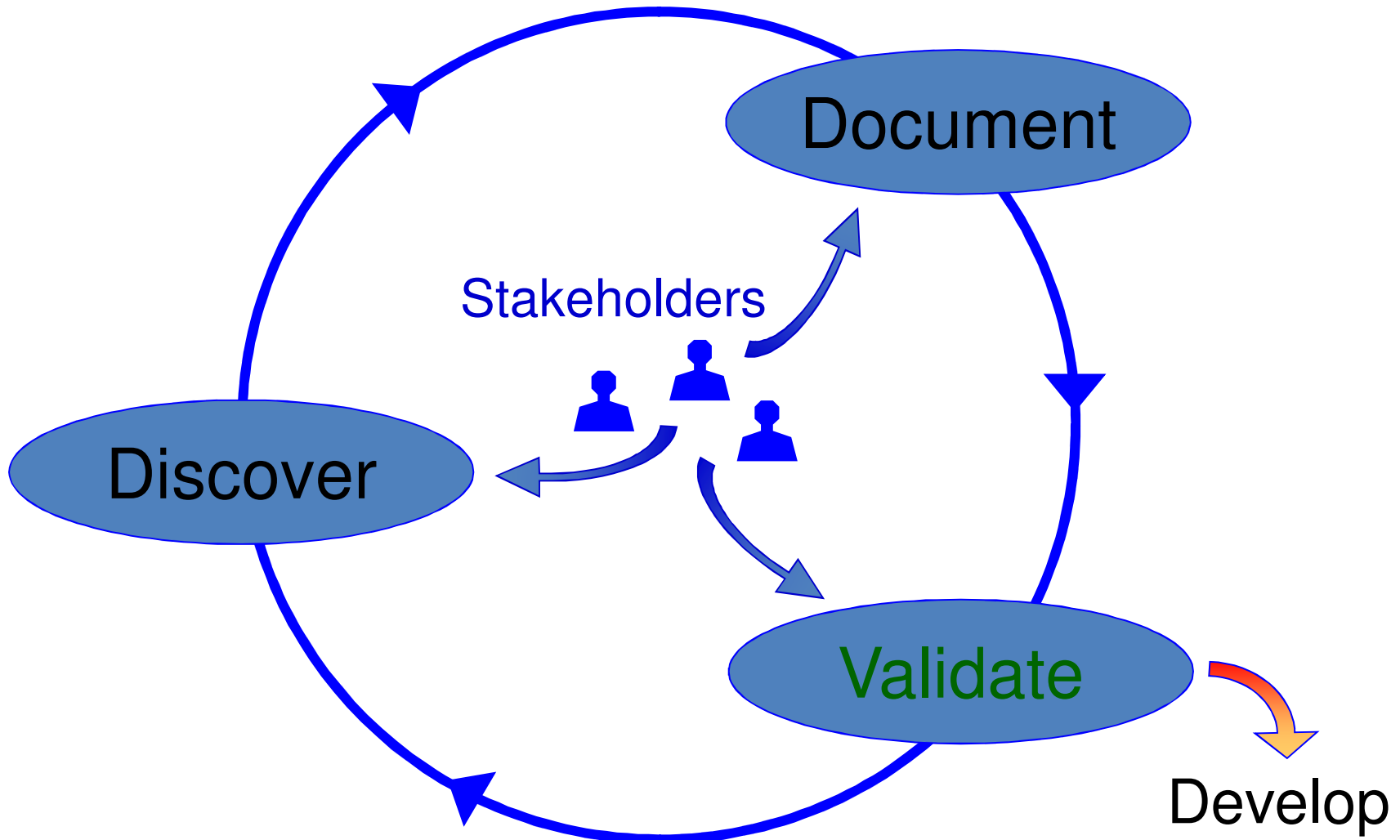
February 2010

# Poll (Vote)

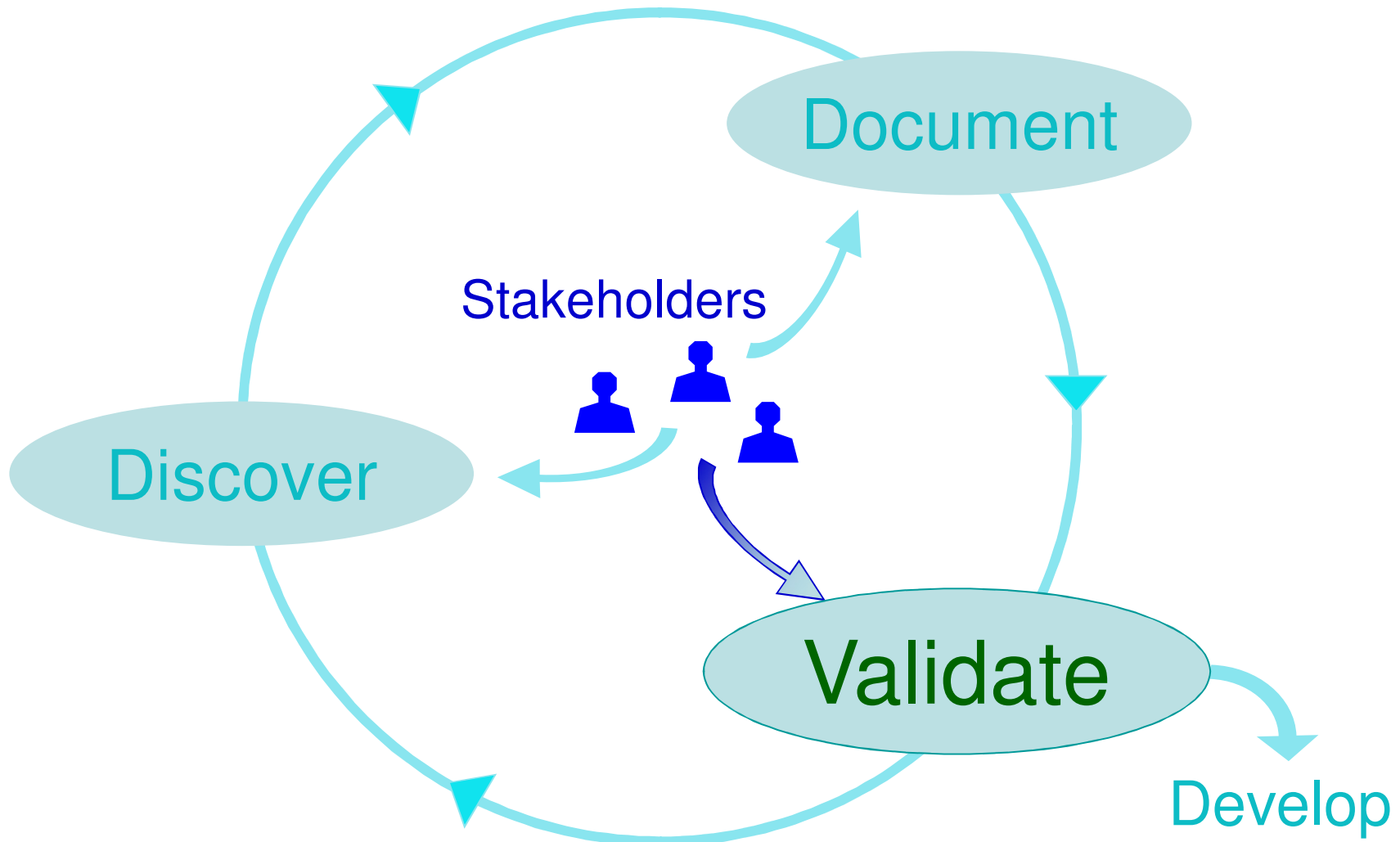
Do you validate requirements :

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

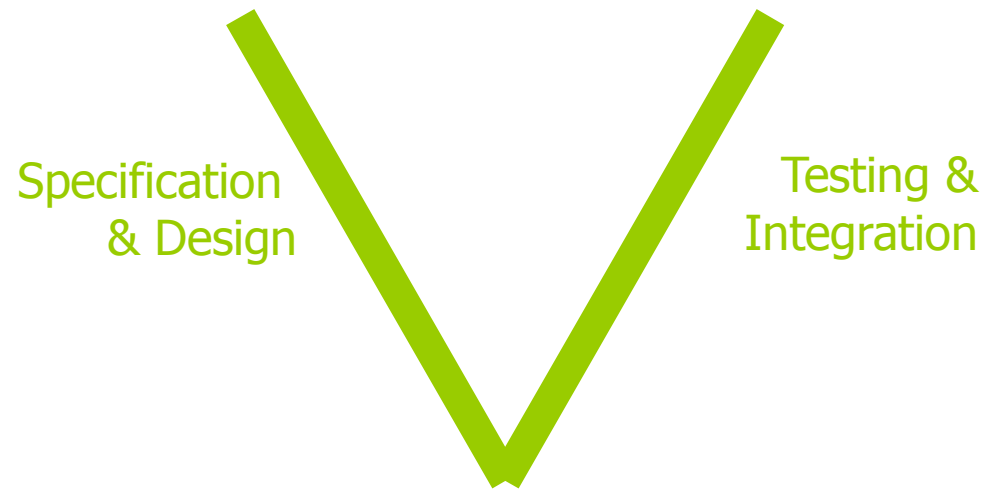
# Creating Requirements



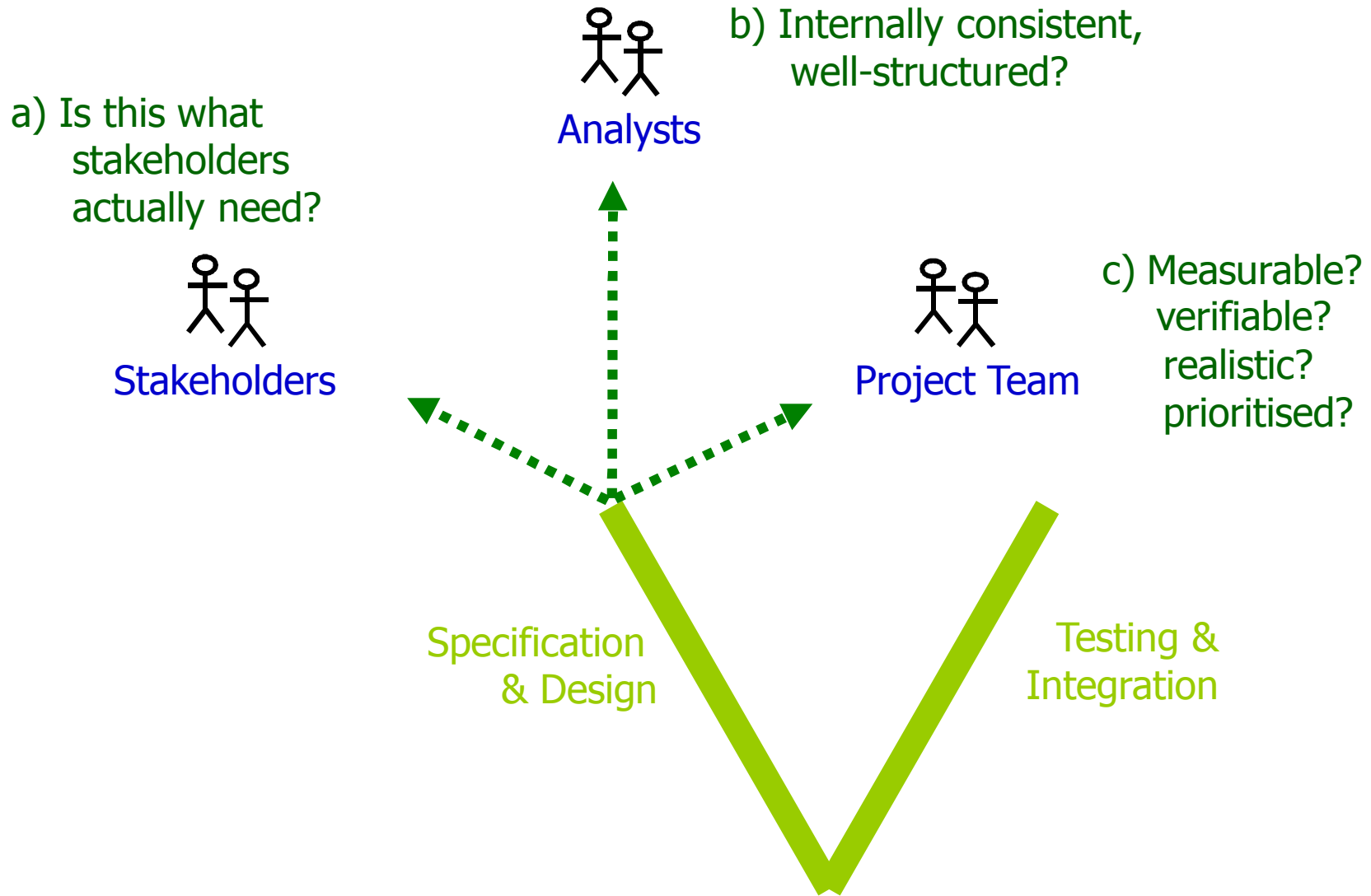
# Validating Requirements



# Validation

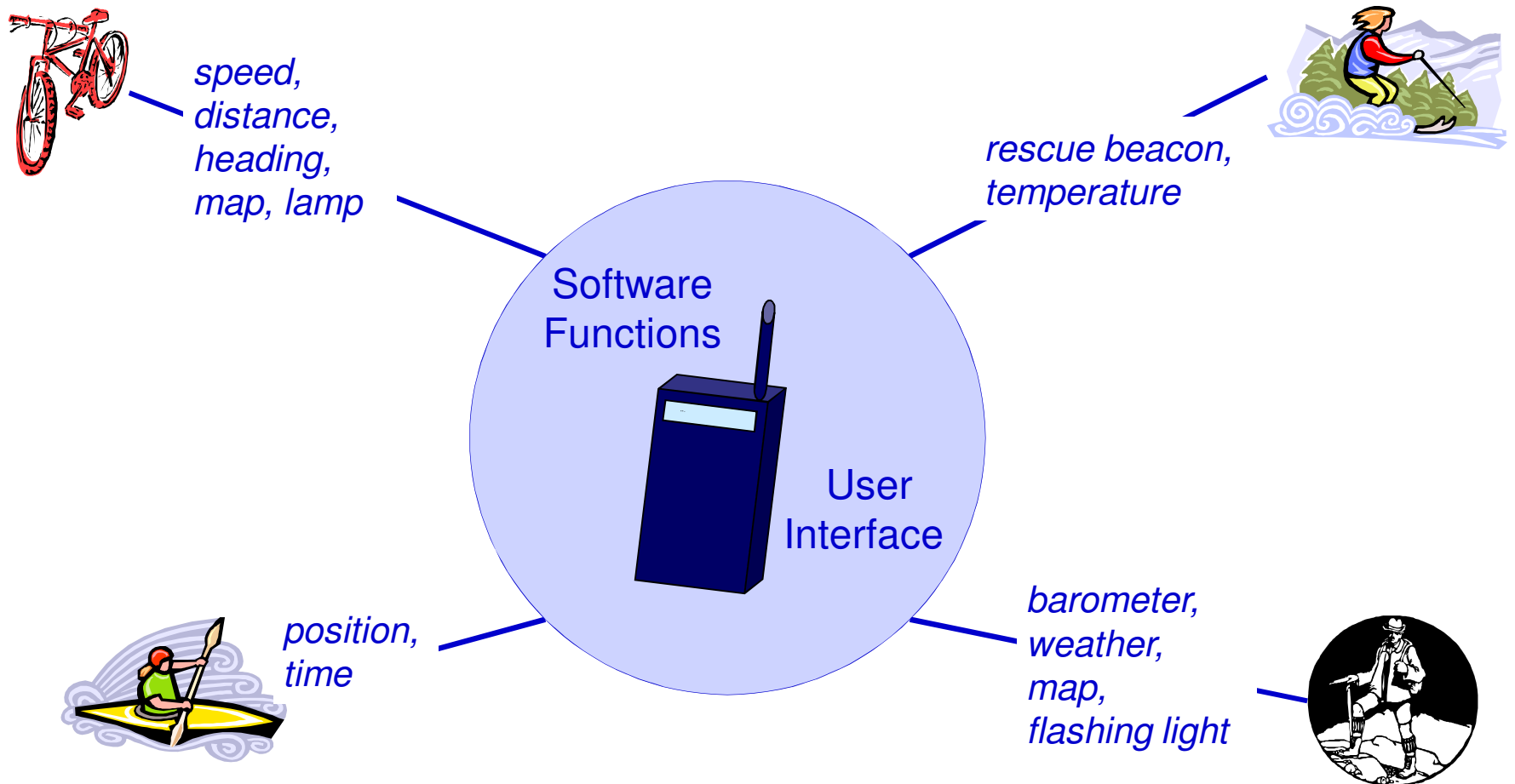


# Validation



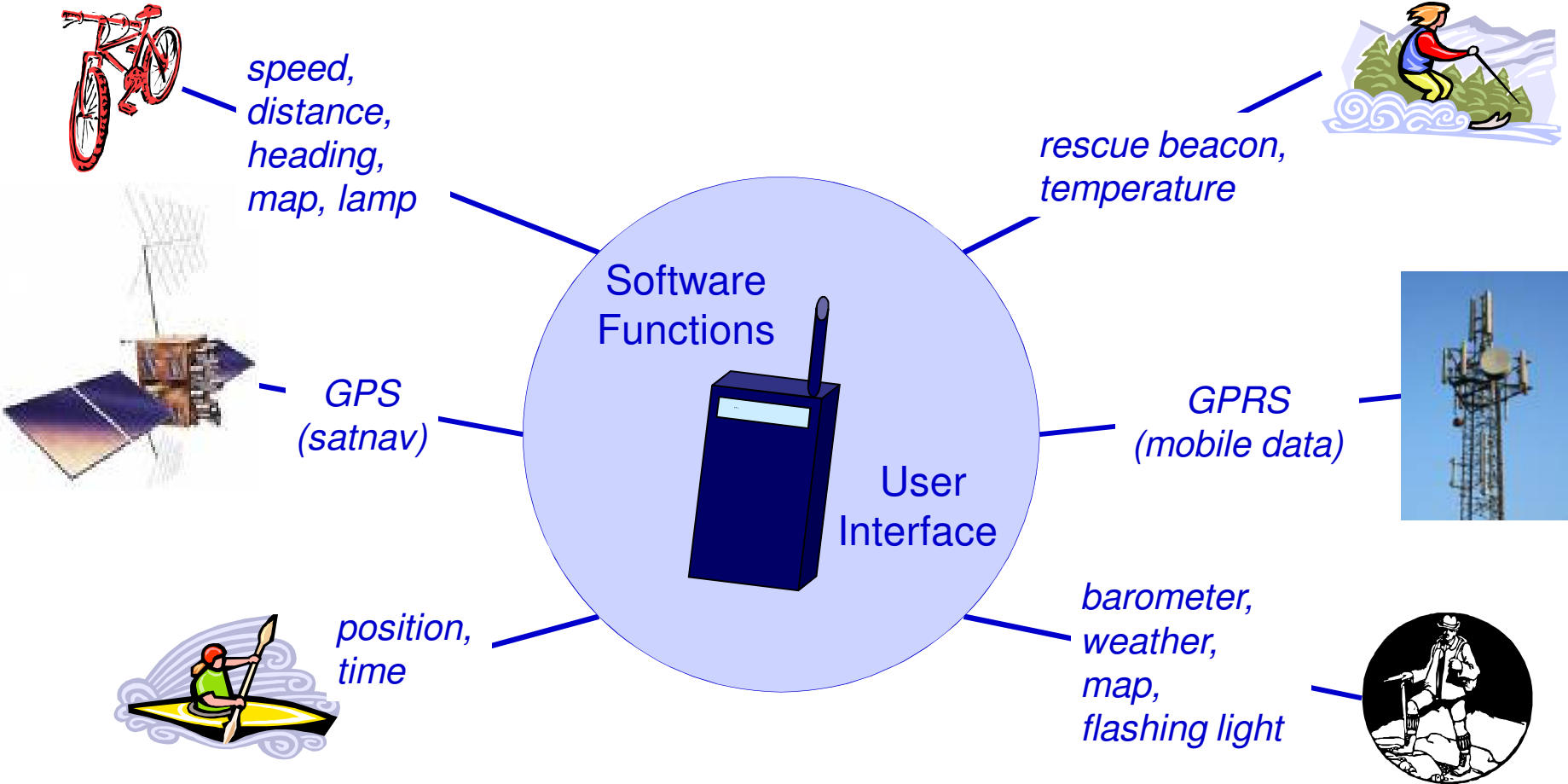
# Context

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



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# 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.

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## **Functions**

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

## **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.

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.

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.

# 1. Grammar & Syntax

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

*provide* is vague.  
What should it do?

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

Get out clause,  
so, not necessary?

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

*etc* = for example!  
so, not necessary?

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

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

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

## 2. Missing Measurements

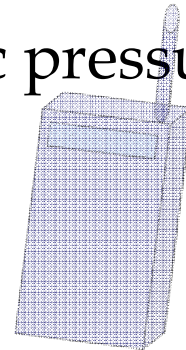
MFD shall **display** barometric pressure.

MFD shall be **waterproof**.

MFD must be **light to carry**.

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.

# 3. One-off Terms

MFD shall display **barometric pressure**.

These terms each occur only once

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

Should they be in Goals?

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

Should they be in Scenarios?

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

Should they be in Project Dictionary?

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

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

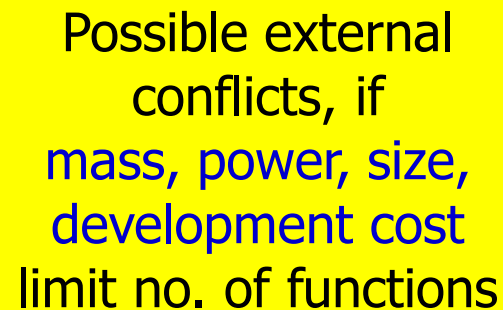
MFD **shall** display barometric pressure.

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

MFD shall provide a barometric pressure display.

MFD shall be able to issue weather warnings.

# 5. CRUD check

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

Retrieve data  
to display it

So where is it Created?  
When is it Deleted?

MFD shall provide a barometric pressure display.

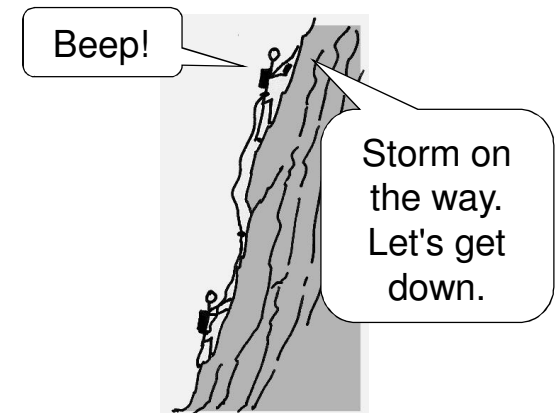
Retrieve data  
to issue warnings

So warnings Created how?  
From barometric data only?

MFD shall be able to issue weather warnings.

# CRUD Scenario\*

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



# 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

Beep!

Storm on  
the way.  
Let's get  
down.

# 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

## 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.

## Qualities & Constraints

### Qualities

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

### Physical Constraints

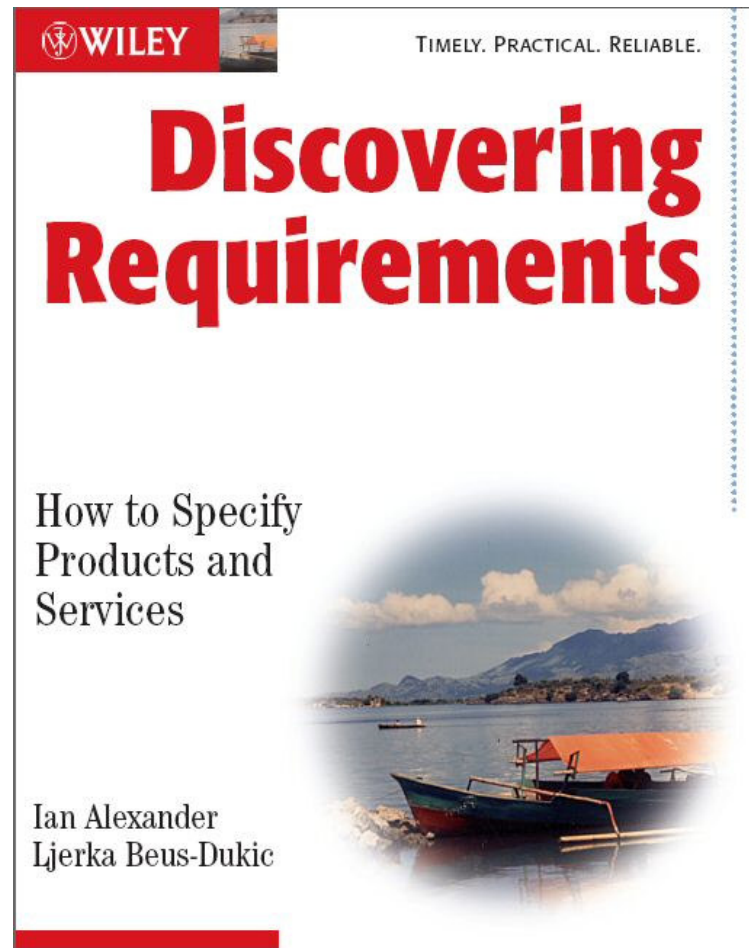
- MFD shall weigh no more than 400 grams.
- MFD's dimensions shall be no more than 15cm x 10cm x 4 cm.

### Usability

- MFD shall be operable with thermally-gloved hands.



# Finding out more...



<http://www.scenarioplus.org.uk>

## 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

## 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:

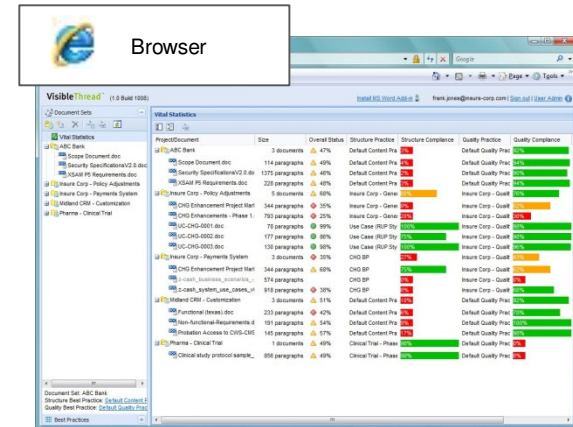
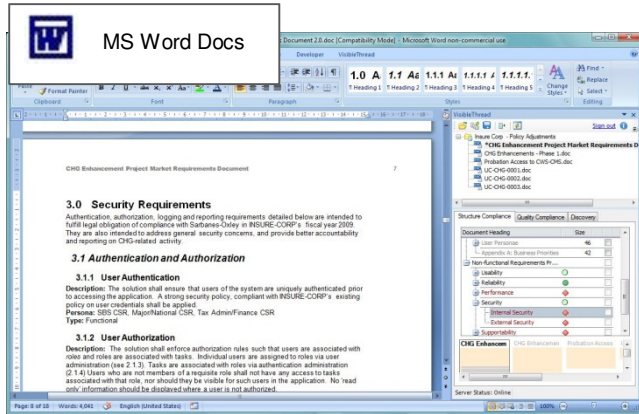
- Document Quality: ambiguous language ('appropriate')
- Document Structure: ensuring what is required is actually present
- Document Quantity/Size: appropriate amounts of content by sections
- Document Change over time: degree of change appropriate for phase in lifecycle
- Document Term Frequency: CRUD-able?,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

## Authoring

## Oversight & Review

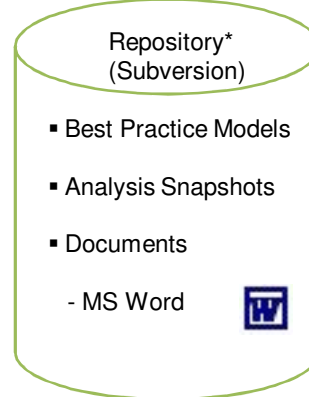


- Spot defects and quality issues within documents
- Provide guidance on Best Practice – ‘soft guidance’
- Update document and save back to VT Server

HTTPS

HTTPS

VisibleThread Server



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

## But how...? - Demo Time

### 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

- 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

## More Resources

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

THANKS