




“Houston, we have a problem”

SofTec Asia 2011, Bangalore

T Ashok

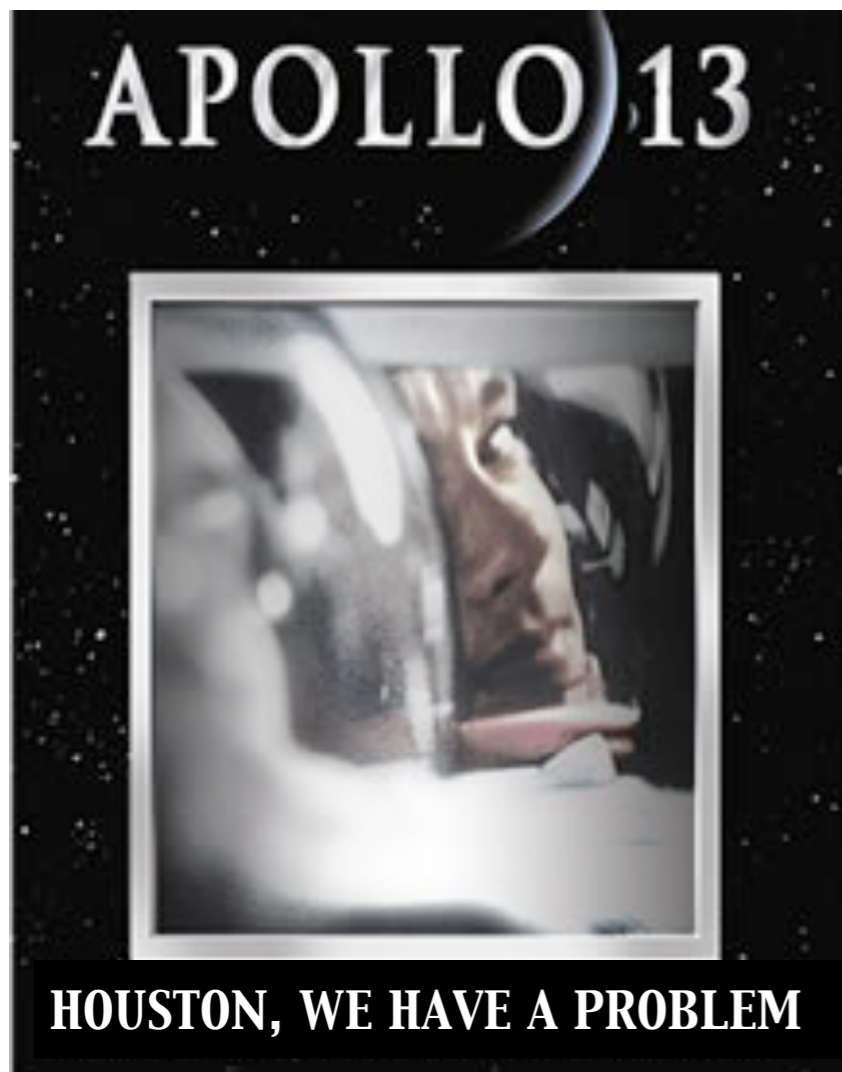
Founder & CEO, STAG Software

 in.linkedin.com/in/AshokSTAG

 [ash_thiru](https://twitter.com/ash_thiru)

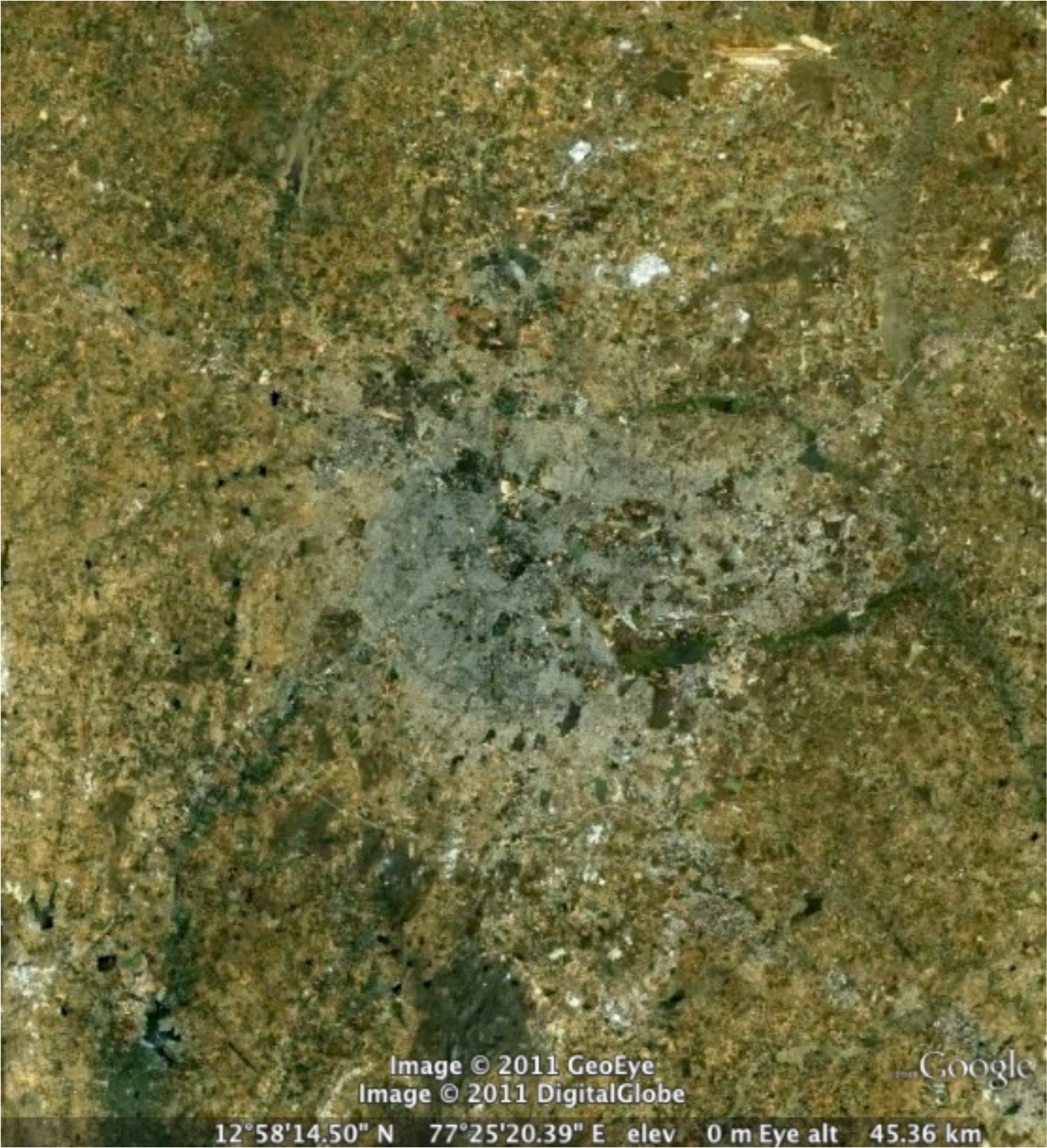


A radio transmission by Lovell, "Houston, we've had a problem", has become widely misquoted in popular culture as, "Houston, we have a problem".



Apollo 13 was the third manned mission by NASA intended to land on the moon, but experienced a mid-mission technical malfunction that forced the lunar landing to be aborted. The crew was Commander James A. Lovell, Command Module pilot John L. "Jack" Swigert, and Lunar Module pilot Fred W. Haise.

WHAT IS THIS PICTURE?



Bengaluru
Level -1



WHAT IS THIS PICTURE?



Ulsoor lake
Level 2



MOVING TO NEXT LEVEL OF DETAIL...

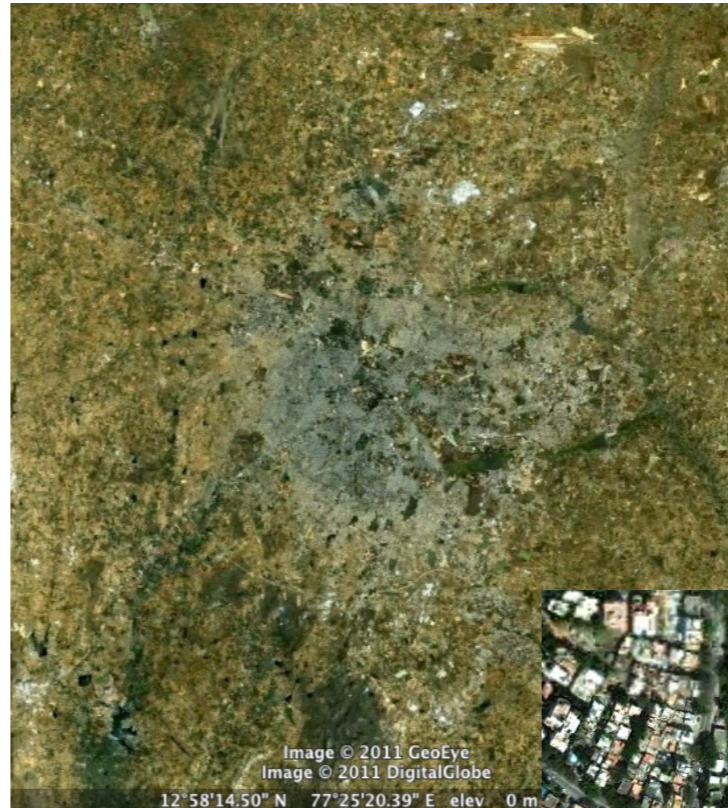


Dirty water in
part of
Ulsoor lake
Level 3



WHAT DO WE LEARN FROM THIS?

Higher the elevation,
the **more we see**.



At lower levels,
we see more.



Hmm. Common sensical.

WHAT ELSE?

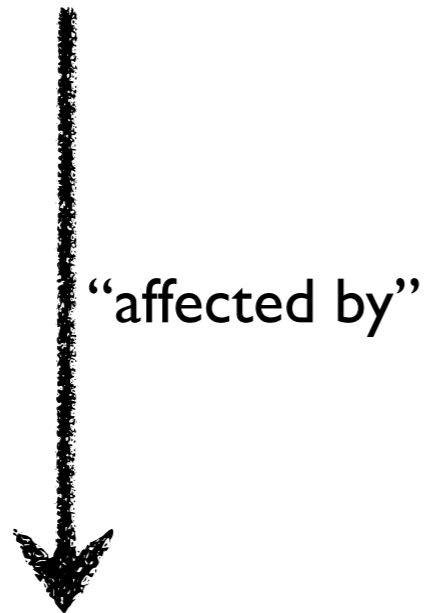
We see different problems at different levels!

Receding green cover seen at higher altitude.
High density population seen at next level.
Dirty water seen at the lower level.



SO WHAT DOES THIS MEAN FOR “TESTING?”

“Properties of the system”
Cleanliness criteria



Potential Defect Types (PDT)

HIGH ALTITUDE

End user expectations

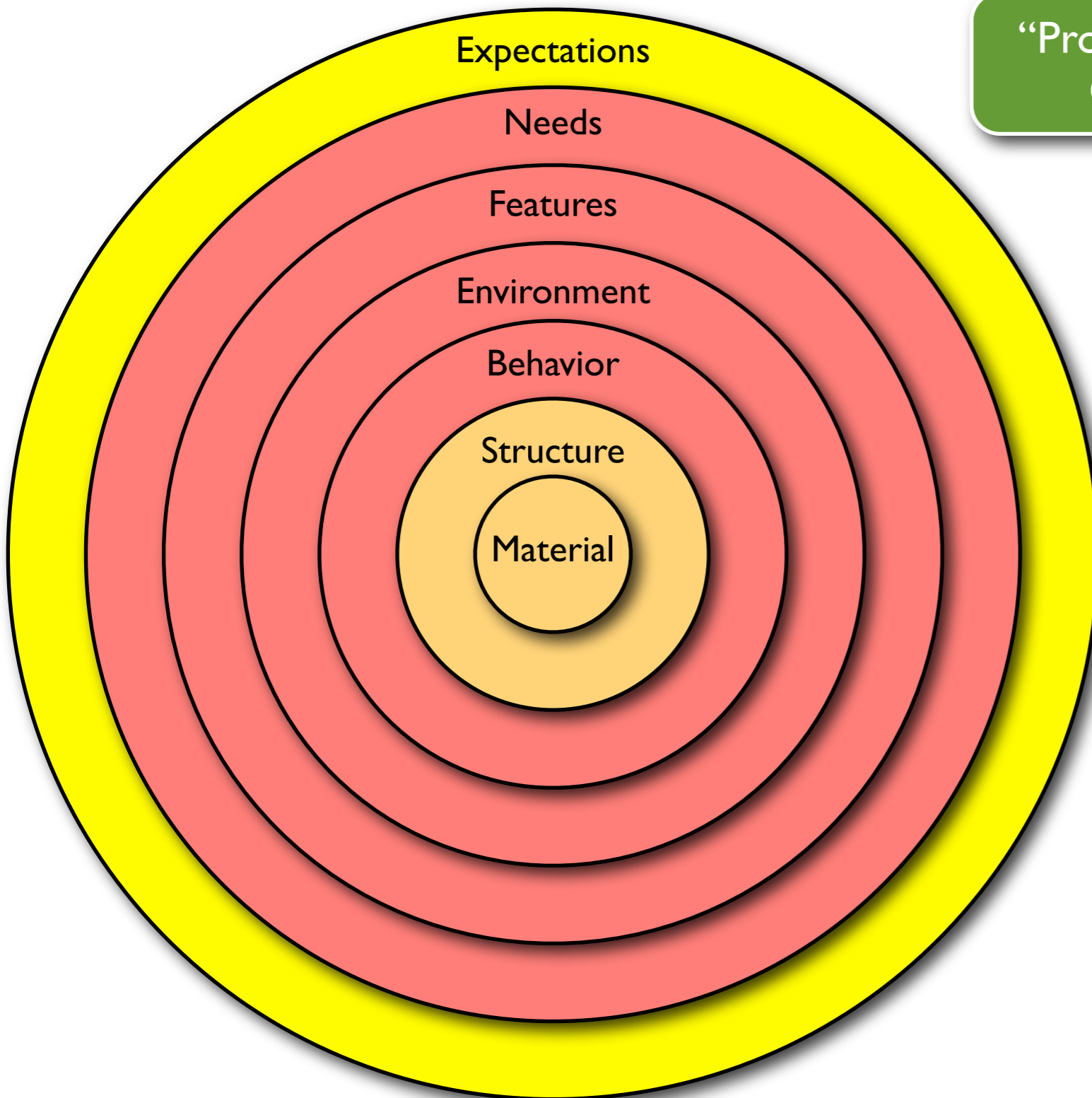
LOW ALTITUDE

Issues in specifications,
structure, environment
and behavior



Different types of defects at Different levels

Need different granularity of information.



“Properties of the system”
Cleanliness criteria



“impedes”

Potential Defect Types (PDT)

Expectations delivered
by **Needs** (Requirements)
via **Features**
that display **Behavior**
constructed from **Materials**
in accordance to a **Structure**
in a given **Environment**

HOW DO WE UNCOVER THE DIFFERENT DEFECT TYPES

Identify the different types
Classify them
Separate them

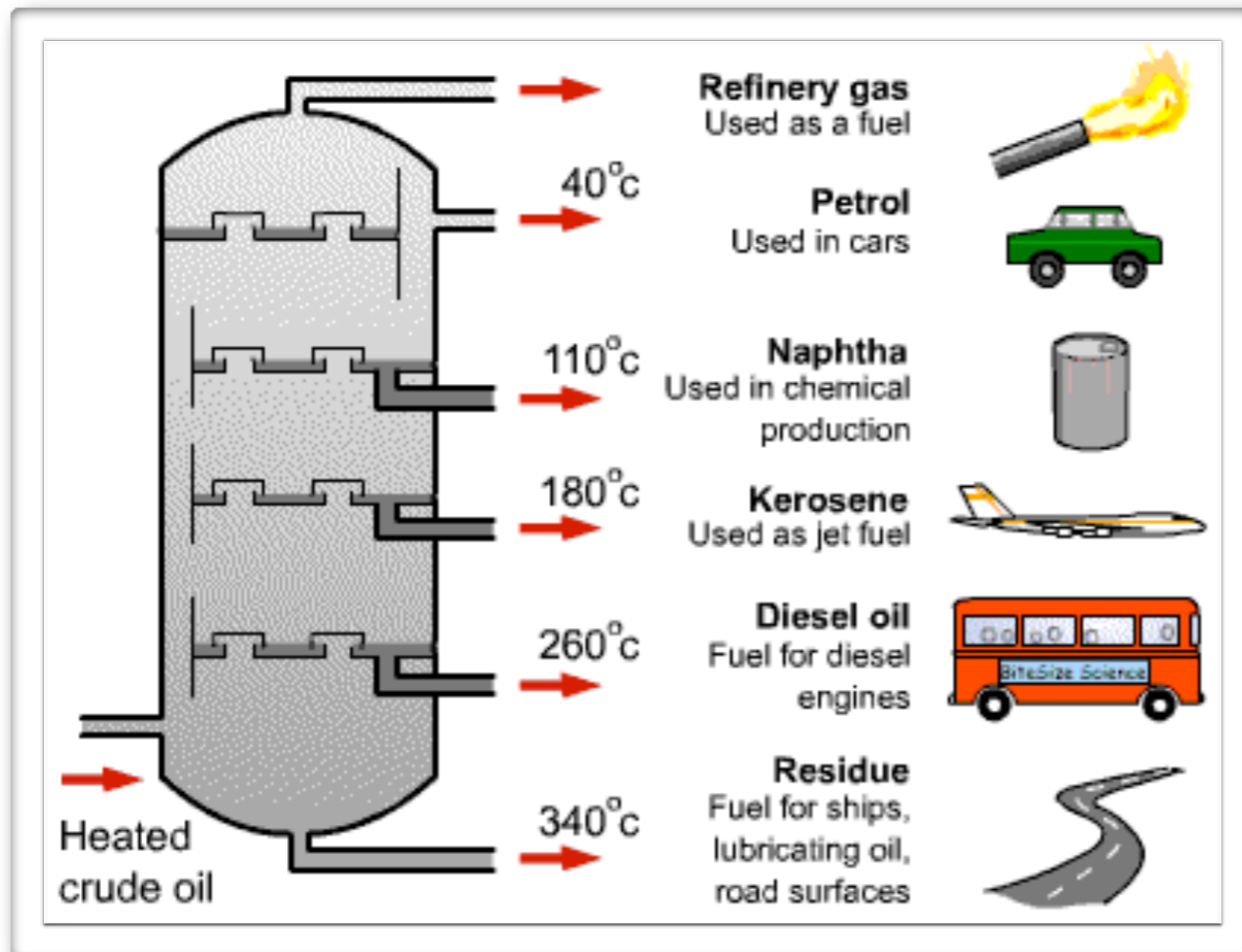
Hmmm.

This means that the system under test is “mixture” of defects.

How can we separate these?



FRACTIONAL DISTILLATION - REMEMBER THIS?



From : <http://withfriendship.com>

A technique to separate mixtures that have components of different boiling points

THINK!

There are a variety of defect types that may be present in the system.

To optimally uncover the defects, can we separate these types of defects on the basis of certain properties and optimally uncover the defects?

SO, HOW DO WE IDENTIFY THE VARIOUS TYPES OF DEFECTS?

Seems like it requires experience.

WHAT IF I DO NOT HAVE PRIOR EXPERIENCE?

Well, you can logically deduce this.



SHERLOCK HOLMES - THE MASTER LOGICIAN



Focus on intellectual power to solve mysteries.

Strong application of deductive logic.

THINK!

Can we hypothesize as to what can go wrong and prove/disprove?

Hypothesize potential defect types and prove presence of instances. If they are not present, can we reason their absence?

QUALITY LEVELS, ASPECTS & ISSUES

● **Aspect** ● **Issues**

L9	END USER VALUE
L8	CLEAN DEPLOYMENT
L7	ATTRIBUTES MET
L6	ENVIRONMENT CLEANLINESS
L5	ROBUSTNESS
L4	BEHAVIOR CORRECTNESS
L3	STRUCTURAL INTEGRITY
L2	INPUT INTERFACE CLEANLINESS
L1	INPUT CLEANLINESS

Usage

User flows, experience

Environment, Data, Logic

Compatibility, migration

Structure, Logic, Usage

Performance, security, volume, load...

Environment

Resource leaks, Compatibility...

Logic, Environment

Error handling

Data, Logic

Functionality

Structure

Internal structural issues

Structure, Usage

UI issues

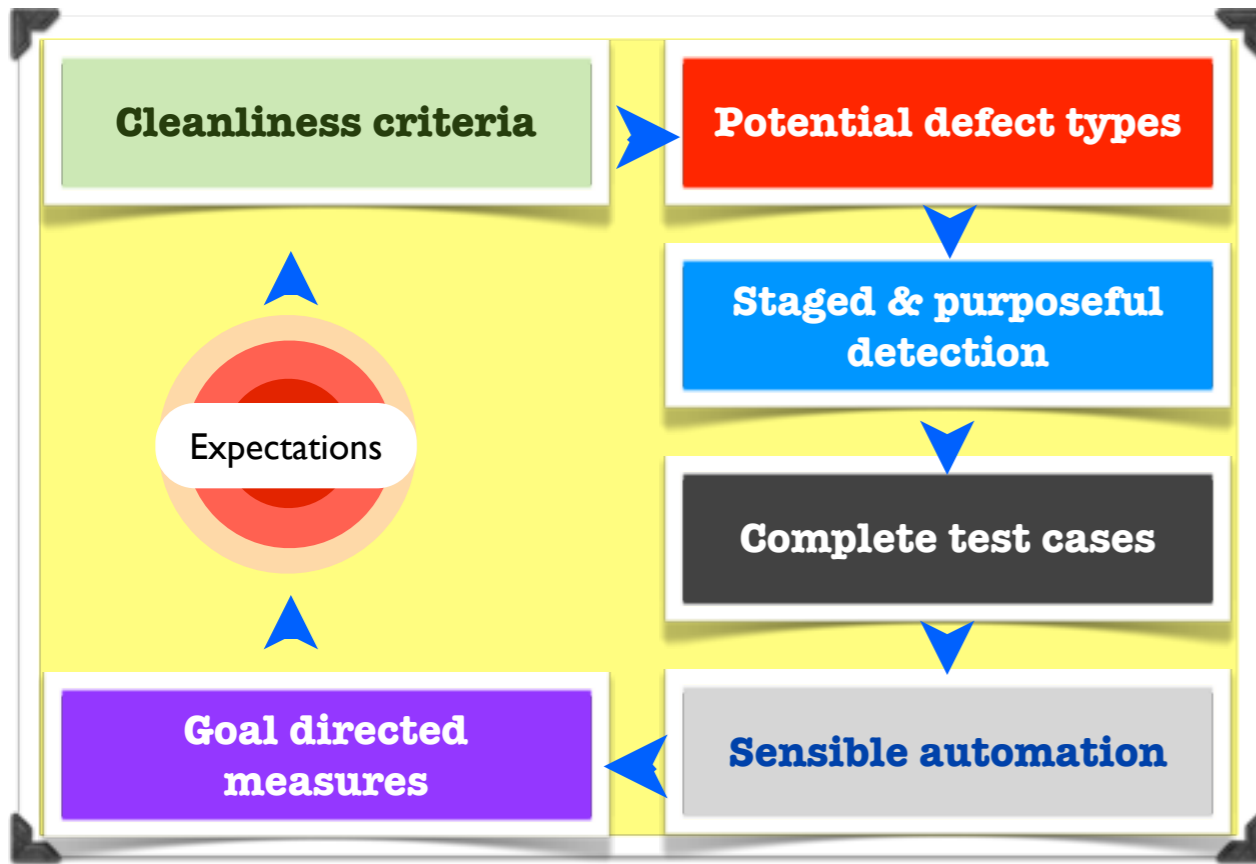
Data

Input data handling



Source: HBT: Hypothesis Based Testing

HBT - HYPOTHESIS BASED TESTING



Personal scientific test methodology powered by STEM™ the defect detection technology.

Six stages to clean software, powered by EIGHT scientific thinking disciplines enabled by 32 core concepts.

Consists of a 9-stage filter to remove defects Each stage different “levels” of information to identify defects.

APOLLO 13: “SUCCESSFUL FAILURE”

Cause of the problem

Oxygen tank exploded.

Cause of explosion was an exposed electrical wiring.

When switch to stir the cryo-tank was flipped to stir the tank, fans turned, wires short-circuited and teflon insulation caught fire.

The fire spread and blew the Oxygen tank.

Ground controllers had asked cryo-tank to be stirred, as they had noticed some issues before take-off.



“HOUSTON, WE HAVE A PROBLEM”

Concluding...

1

Small problems noticed pre-launch were “patched” leading to a propagation that culminated in a near catastrophe.

2

Controllers at Houston came up with makeshift adapter from materials that astronauts had on board, to enable lowering CO₂. The solution was possible due to years of serious engineering, practice and experience. It was not luck!

3

We are on test professionals on ground and the our customers far away from us in the business space. Remember the risk we put them into!



THANK YOU. HAVE A GREAT CONFERENCE.

Follow us  @stagsoft

Landscaping is covered in the HBT Series workshop “Rapid understanding of customer expectations” offered by CleanSoft Academy (A division of STAG Software) www.cleansoft.in

