

# Requirements 2, Interviews, and Risk

Rohan Padhye and **Michael Hilton**

# Learning goals

Define and identify stakeholders.

Demonstrate basic proficiency in executing effective requirements interviews.

Evaluate risk for a product

# Administrivia

HW1 released (regrades will be open 1 week)

Participation grades released.

We plan to set a threshold above which you will get full credit. We don't know exactly what that will be, but historically it is often around 75%.

Josh Gardner

# Interview Follow-up

Observations?

Anything surprising? Unexpected?

Confirmations of existing ideas?

Generalizable knowledge?

# Requirements Elicitation

# Interviews



# Interview Tradeoffs

## Strengths

What stakeholders do, feel, prefer  
How they interact with the system  
Challenges with current systems

## Weaknesses

Subjective, inconsistencies  
Capturing domain knowledge  
Familiarity  
Technical subtlety  
Organizational issues, such as politics  
Hinges on interviewer skill

# Interview Process

Identify stakeholder of interest and target information to be gathered.

Conduct interview.

(structured/unstructured, individual/group)

Record + transcribe interview

Report important findings.

Check validity of report with interviewee.

# Example: Identifying Problems

What problems do you run into in your day-to-day work? Is there a standard way of solving it, or do you have a workaround?

Why is this a problem? How do you solve the problem today? How would you ideally like to solve the problem? Keep asking follow-up questions (“What else is a problem for you?”, “Are there other things that give you trouble?”) for as long as the interviewee has more problems to describe.

# Example: Identifying Problems

So, as I understand it, you are experiencing the following problems/needs (describe the interviewee's problems and needs in your own words – often you will discover that you do not share the same image. It is very very common to not understand each other even if at first you think you do). Just to confirm, have I correctly understood the problems you have with the current solution? Are there any other problems you're experiencing? If so, what are they?

# Capturing v. Synthesizing

Engineers acquire requirements from many sources

- Elicit from stakeholders

- Extract from policies or other documentation

- Synthesize from above + estimation and invention

Because stakeholders do not always know what they want, engineers must...

- Be faithful to stakeholder needs and expectations

- Anticipate additional needs and risks

- Validate that “additional needs” are necessary or desired

# Interview Advice

Get basic facts about the interviewee before (role, responsibilities, ...)

Review interview questions before interview

Begin concretely with specific questions, proposals; work through prototype or scenario

Relate to current system, if applicable.

Be open-minded; explore additional issues that arise naturally, but stay focused on the system.

Contrast with current system/alternatives. Explore conflicts and priorities

Plan for follow-up questions

# Bonus: Guidelines for effective interviews

Identify the right interviewee sample for full coverage of issues

different responsibilities, expertise, tasks, exposure to problems  
Come prepared, to focus on right issue at right time

background study first  
predesign a sequence of questions for this interviewee  
Centre the interview on the interviewee's work & concerns  
Keep control over the interview

Make the interviewee feel comfortable

Start: break ice, provide motivation, ask easy questions  
Consider the person too, not only the role  
Do always appear as a trustworthy partner

# Bonus: Guidelines for effective interviews

Be focused, keep open-ended questions for the end

Be open-minded, flexible in case of unexpected answers

Ask why-questions without being offending

Avoid certain types of questions ...

opinion or biased

affirmative

obvious or impossible answer for this interviewee

Edit & structure interview transcripts while still fresh in mind  
including personal reactions, attitudes, etc

Keep interviewee in the loop

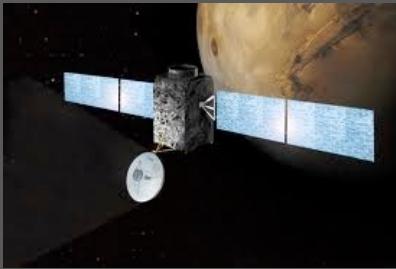
co-review interview transcript for validation & refinement

# Prototypes, Mockups, Stories

# High- vs low- fidelity mockups



# Storyboarding and scenarios



# Story

Who the players are

What happens to them

How it happens through specific episode

Why this happens

What if such and such an event occurs

What could go wrong as a consequence

**Storyboards illustrate scenarios: a typical sequence of interaction among system components that meets an implicit objective.**

Storyboards explicitly cover at least who, what, and how.

Different types:

Positive vs negative (should and should not happen)

Normal vs abnormal

As part of elicitation:

Learn about current or proposed system by walking through real-life or hypothetical sequences

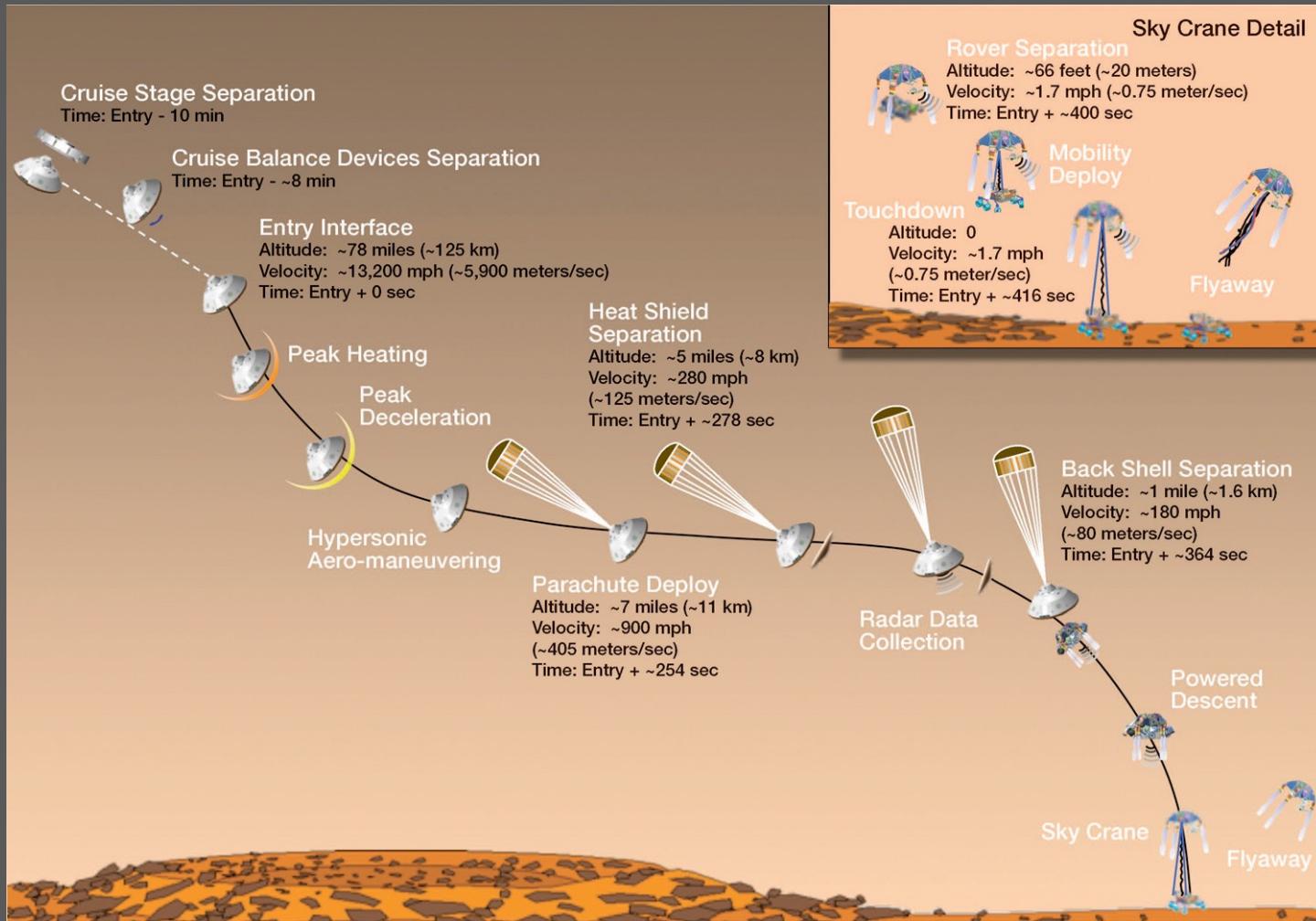
Can ask specific questions

Elicit the underlying objectives, generalize into models of desired behaviors.

Identify and resolve conflicts

Pluses: Concrete, support narrative description

Minuses: inherently partial.



# Resolving Conflicts

# Types of inconsistency

Terminology clash: same concept named differently in different statements

e.g. library management: “borrower” vs. “patron”

Designation clash: same name for different concepts in different statements

e.g. “user” for “library user” vs. “library software user”

Structure clash: same concept structured differently in different statements

e.g. “latest return date” as time point (e.g. Fri 5pm)  
vs. time interval (e.g. Friday)

# Types of inconsistency, 2

Strong conflict: statements not satisfiable together

e.g. “participant constraints may not be disclosed to anyone else” vs. “the meeting initiator should know participant constraints”

Weak conflict (divergence): statements not satisfiable together under some boundary condition

“patrons shall return borrowed copies within X weeks”  
vs “patrons shall keep borrowed copies as long as needed” contradict only if “needed>x weeks”

# Handling inconsistencies

Terminology, designation, structure: Build glossary

Weak, strong conflicts: Negotiation required

Cause: different objectives of stakeholders => resolve outside of requirements

Cause: quality tradeoffs => explore preferences

# Requirements Traceability

Keep connections between requirements

What follows from what

# Requirements prioritization

Cost, time, and other limits

Dependencies among requirements

Nice to have

Strategies to base on value contribution

# Summary

Many solicitation strategies, including document analysis, interviews, and ethnography

Do not underestimate the challenge of interviews

Resolving conflicts

Using prototypes to enhance discussions and decision making

Many documentation strategies; our focus is on *user stories*

# Risk

# Risk



# What are risks?

A **risk** is an uncertain factor that may result in a loss of satisfaction of a corresponding objective

For example...

System delivers a radiation overdose to patients  
(Therac-25, Theratron-780)

Medication administration record (MAR) knockout

Premier Election Solutions vote-dropping “glitch”

# How to assess the level of risk?

Risks consist of multiple parts:

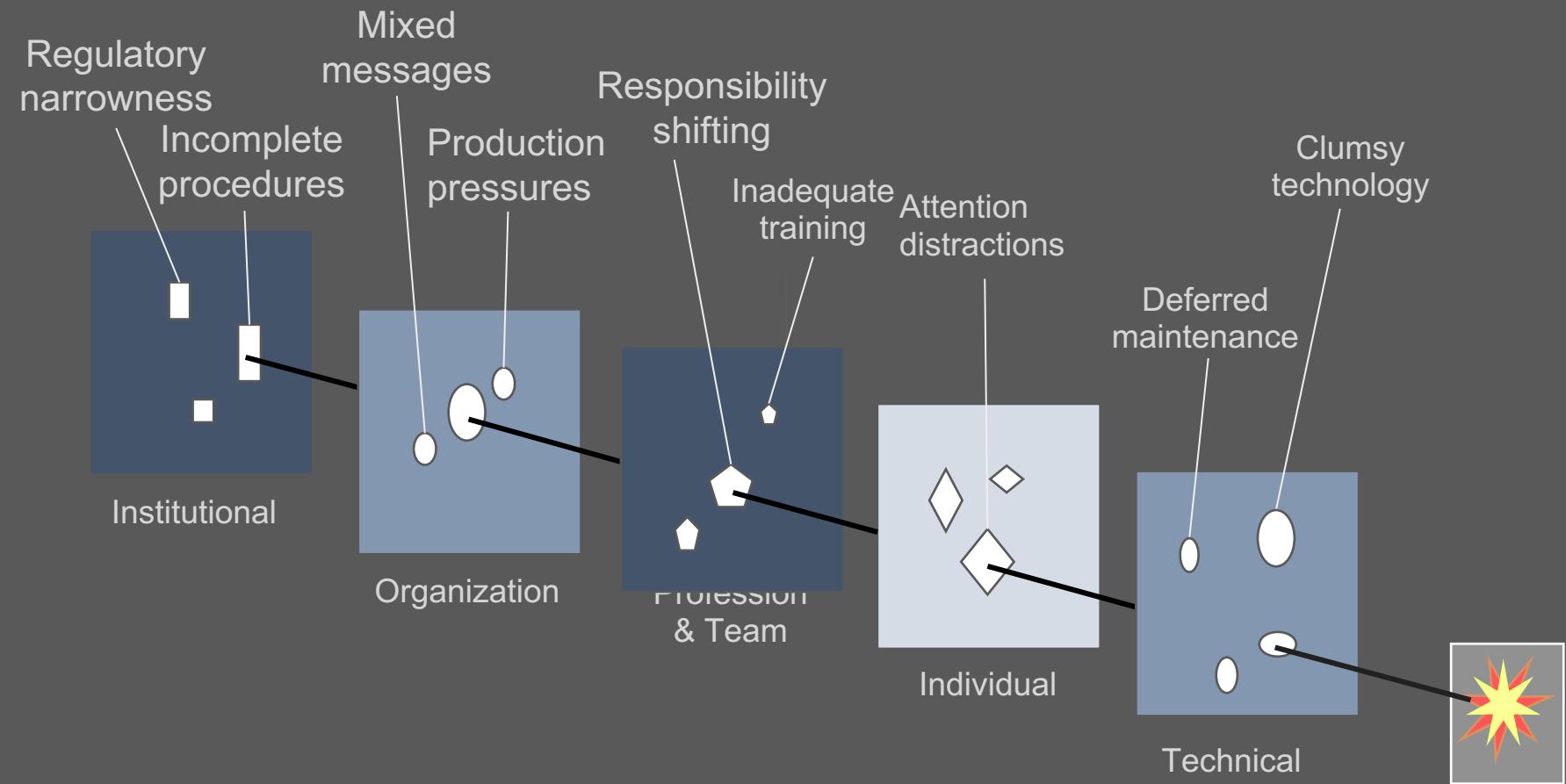
- Likelihood of failure

- Negative consequences or impact of failure

- Causal agent and weakness (in advanced models)

$\text{Risk} = \text{Likelihood} \times \text{Impact}$

# The Swiss cheese model



# Aviation failure impact categories

No effect – failure has no impact on safety, aircraft operation, or crew workload

Minor – failure is noticeable, causing passenger inconvenience or flight plan change

Major – failure is significant, causing passenger discomfort and slight workload increase

Hazardous – high workload, serious or fatal injuries

Catastrophic – loss of critical function to safely fly and land



# Risk assessment matrix

TABLE III. Risk assessment matrix

RISK ASSESSMENT MATRIX					
SEVERITY PROBABILITY	Catastrophic (1)	Critical (2)	Marginal (3)	Negligible (4)	
Frequent (A)	High	High	Serious	Medium	
Probable (B)	High	High	Serious	Medium	
Occasional (C)	High	Serious	Medium	Low	
Remote (D)	Serious	Medium	Medium	Low	
Improbable (E)	Medium	Medium	Medium	Low	
Eliminated (F)	Eliminated				

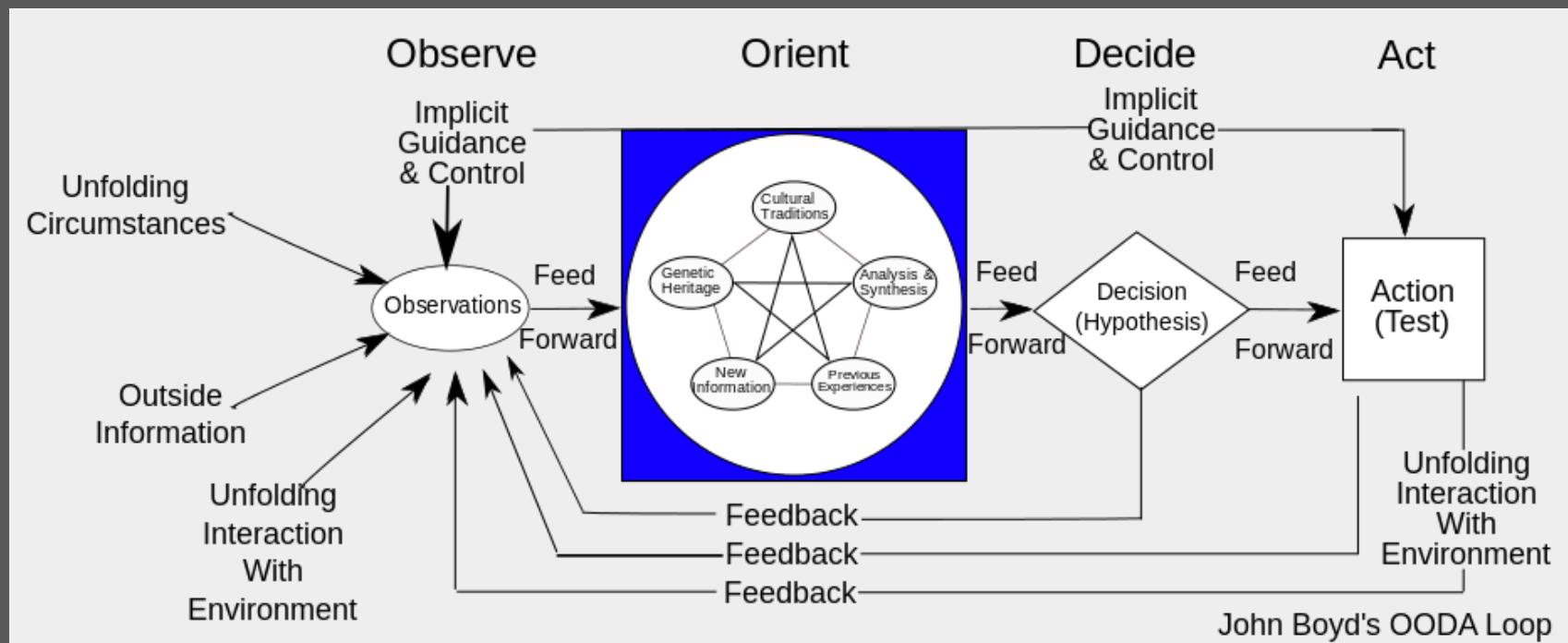
# DECIDE Model



Detect that the action necessary  
Estimate the significance of the action  
Choose a desirable outcome  
Identify actions needed in order to achieve the chosen option  
Do the necessary action to achieve change  
Evaluate the effects of the action

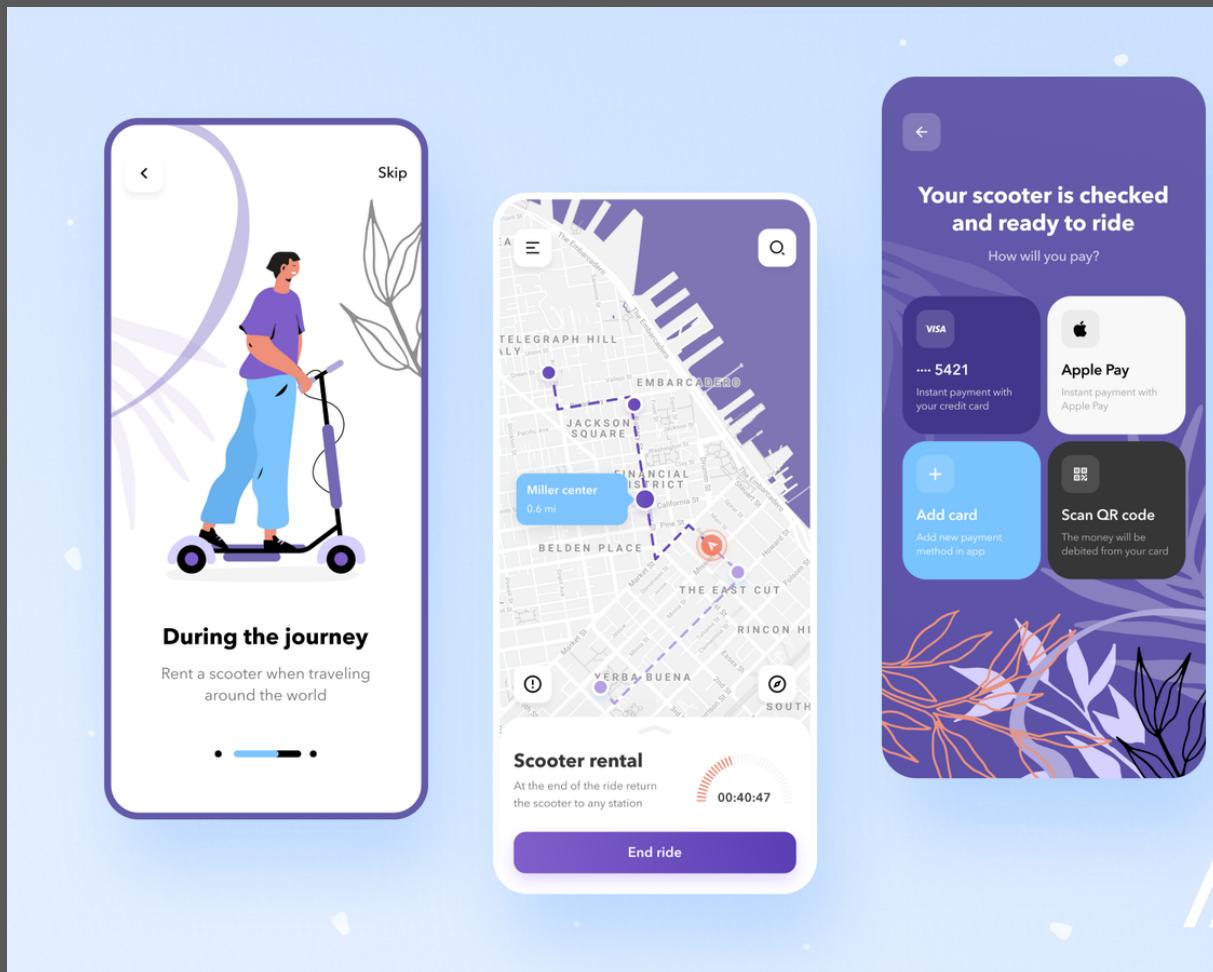
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# OODA Loop



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# Exercise



# Bird Risks

