CONCEPT DEVELOPMENT ASSESSMENT GAMES

Description, use and some examples | Nicole van Elst

TNO innovation for life

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CONCEPT DEVELOPMENT & EXPERIMENTATION

› Method for solving complex problems

> › where a clear way to the solution is not obvious
>
> › where broad support of stakeholders needs to be developed
>
> › where a solution is created using iterative steps
>
> › where ideas are to be tested in an experimentation

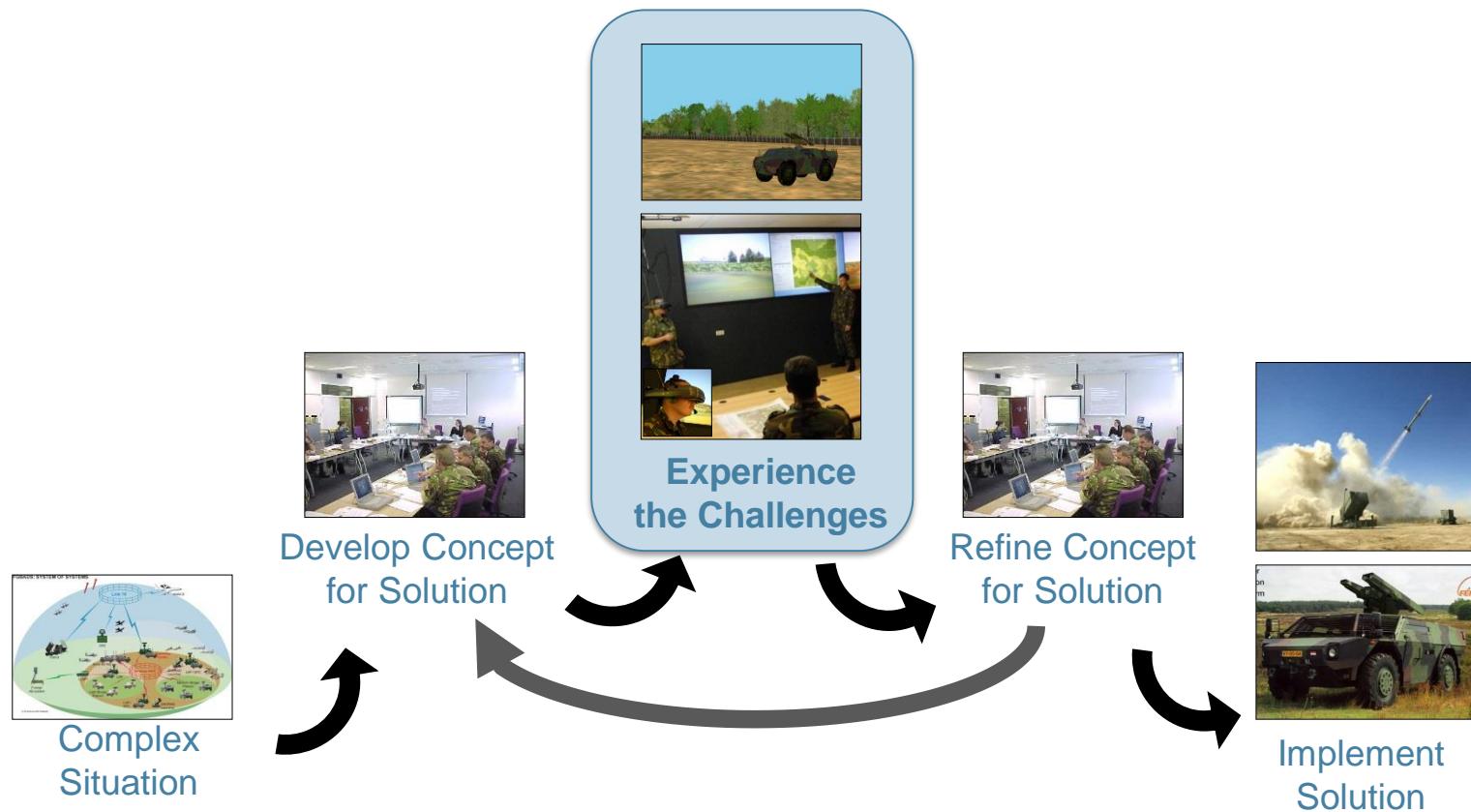*Prevent saying : "If we had known this beforehand we would have done it differently"*

CAPABILITY DEVELOPMENT

New or Improved Capability

Capability Gap or Problem

Opportunity or New Technology

CD&E Assists Development and Transformation
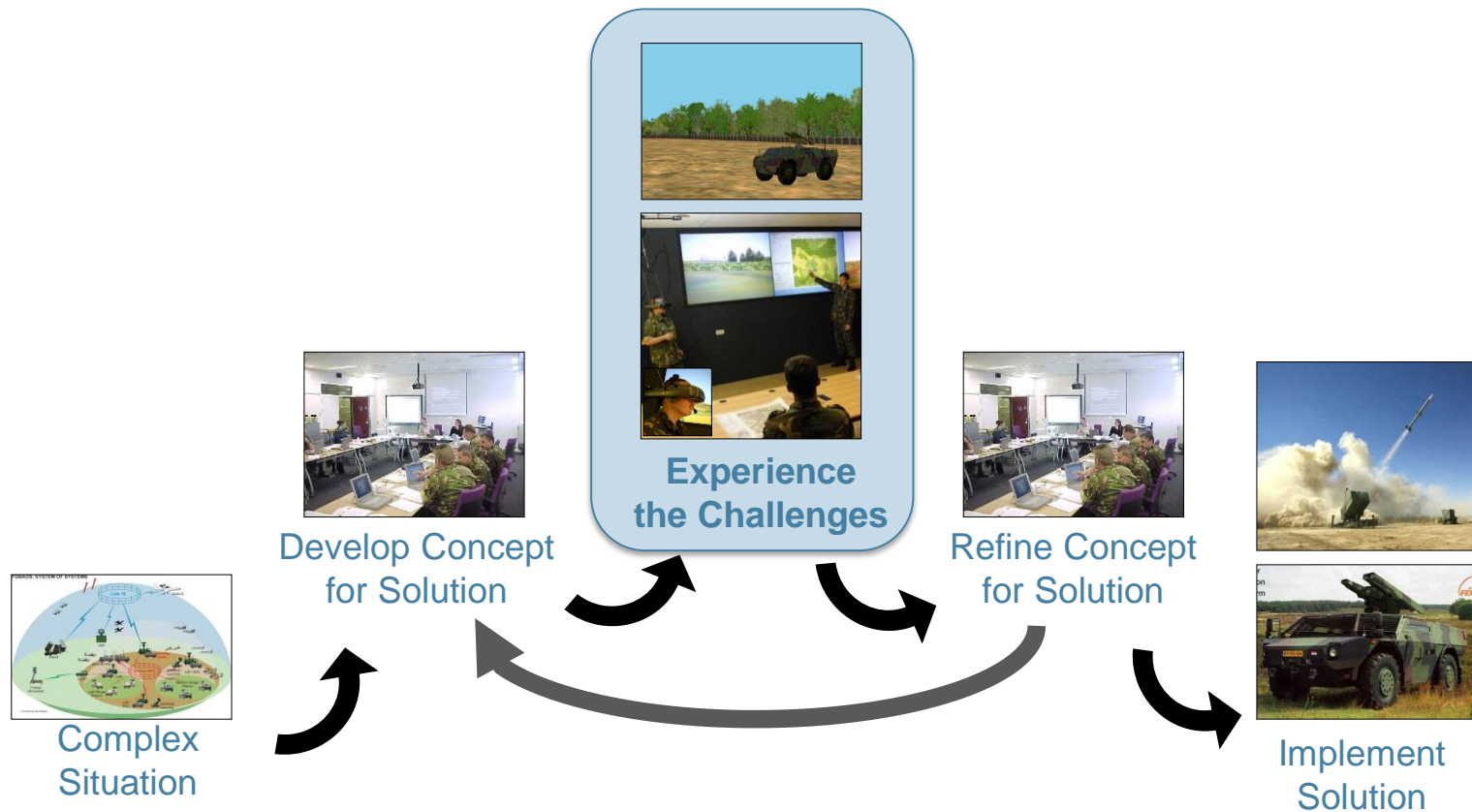
NATO CD&E Policy [MC-0583] (2009):
CD&E is one of the tools that drives NATO's transformation by enabling the structured development of creative and innovative ideas into viable solutions for capability development.

CD&E: EXPERIENCE THE CHALLENGES

Experience
the Challenges

Complex
Situation

Develop Concept
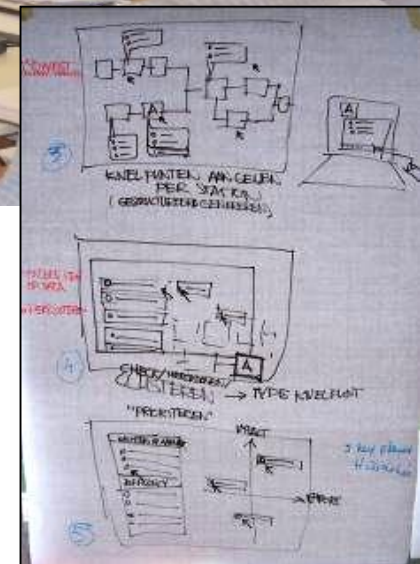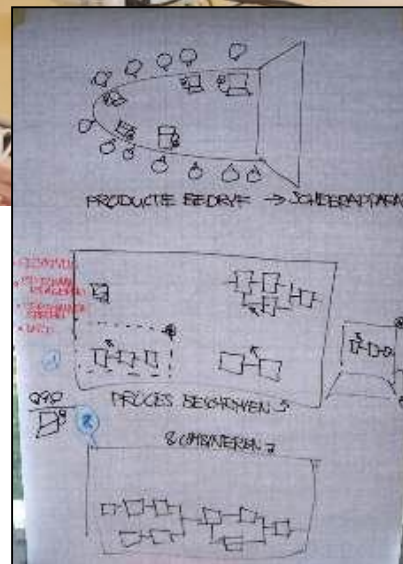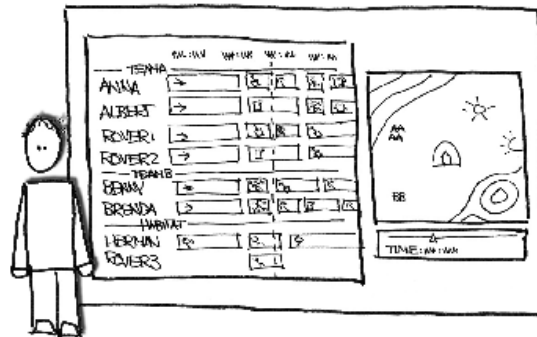for Solution

Refine Concept
for Solution

Implement
Solution

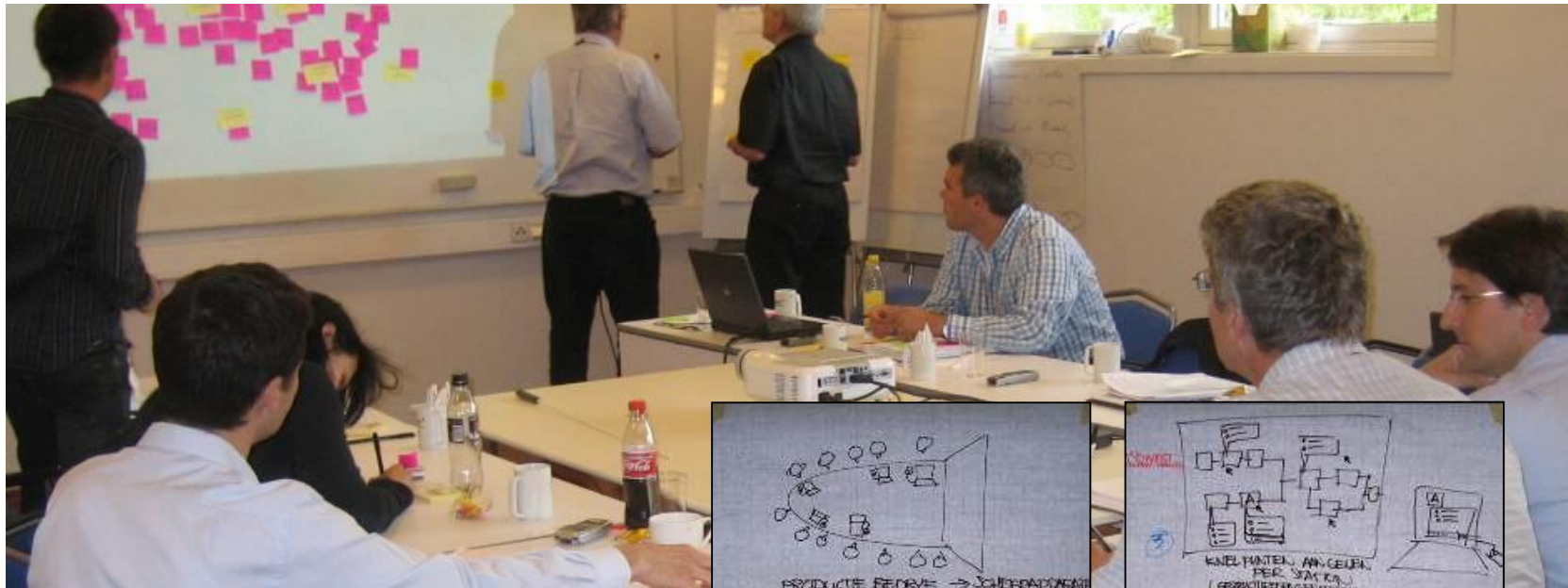**Experience brings change of mindset**
Change of mindset brings a better solution faster

CD&E: EXPERIENCE THE CHALLENGES

Experience the Challenges

Complex Situation → Develop Concept for Solution → Experience the Challenges → Refine Concept for Solution → Implement Solution

HOW

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CONCEPT DESIGN WORKSHOPS

SIMULATION

TABLE TOP GAMING

National Cyber Defence

TABLE TOP GAMING: (DTAG) CDAG

> **DTAG:** Disruptive Technology Assessment Game

> **CDAG:** Concept Development & Assessment Games

The CDAG methodology is very similar to the DTAG but the focus, scope and goal is different:

❏ DTAG focuses on new technologies and systems

    CDAG focuses on the development of specific concepts

❏ DTAG goal is technology assessment

    CDAG goal is concept assessment and concept development

CDAG...

> ...is a taylor made analytical table top wargame methodology for CD&E

> ...assesses the usefulness and added value of innovative concepts relatively early on in their development

> ... offers a method that supports the creative discussion between developers, future users and other stakeholders

> ...is a flexible, low cost, high value methodology for CD&E

Concept Push
What is possible?

CDAG
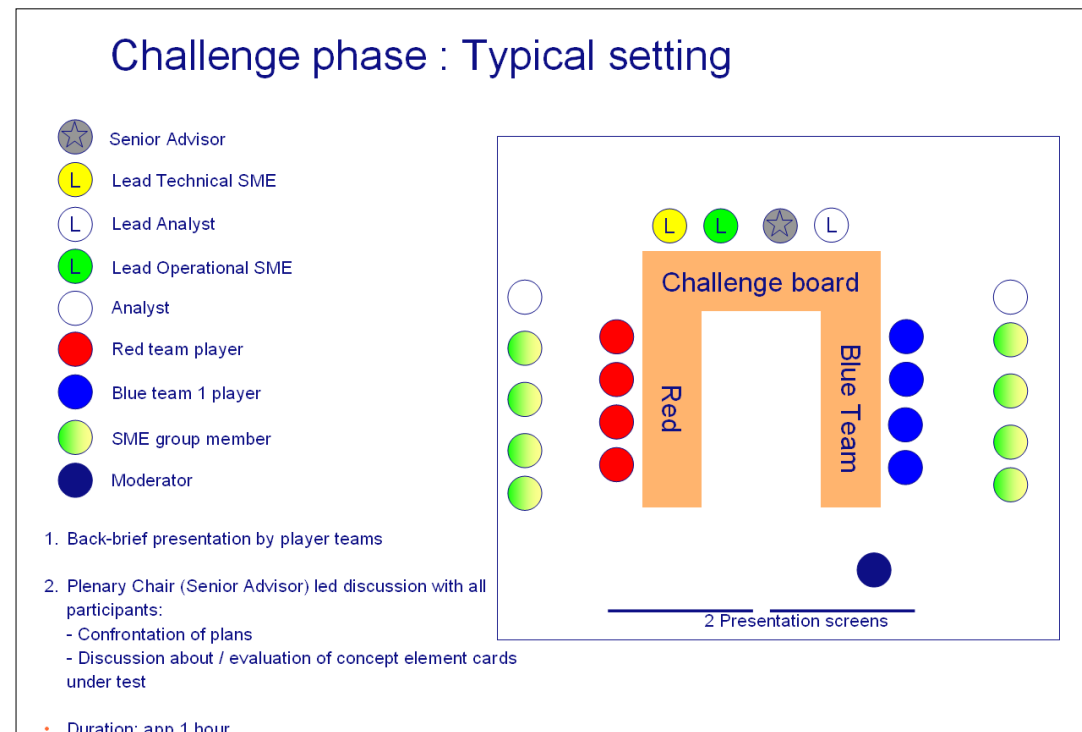
Concept Pull
What is needed?

GOALS OF A CDAG

1. Evaluate concept alternatives on usefulness and usability (in the early stages of their development)

2. Further development of existing concepts

3. Generate new concepts or concept variations

CDAG: METHOD

› Taylored *table top wargame*

› Two **teams** Blue (own) and Red (adversary)

› Both teams consist of "**operational experts**" often military and "**technical experts**"

› **Board Team/Challenge board**: confrontation and discussion

› Extensive **data collection, evaluation and analysis**

Challenge phase : Typical setting

⭐ Senior Advisor
Ⓛ Lead Technical SME
Ⓛ Lead Analyst
Ⓛ Lead Operational SME
○ Analyst
● Red team player
● Blue team 1 player
● SME group member
● Moderator

Challenge board

Red   Blue Team

1. Back-brief presentation by player teams

2. Plenary Chair (Senior Advisor) led discussion with all participants:
   - Confrontation of plans
   - Discussion about / evaluation of concept element cards under test

• Duration: app 1 hour

2 Presentation screens

THE CDAG GAME PROCES

› Player teams of 'technical' SME's (concept developers) and Operational SME's (end users) of the concept

› Teams are assigned a planning task within a number of scripted scenario's

› Concept-cards on which (elements of) the concepts are described DTAG: Ideas of Systems Cards

› A selection of these cards can be used (played) in the planning task

› Challenge board to lead confrontation of plans and discussion on concepts

› Data collection, evaluation and analysis

CDAG: GENERAL SETUP

Operational scenarios/ vignettes

'Concept Cards'

What is needed?

What is possible?

Planning task (Course of action plan)

Assessment and/or Concept Development
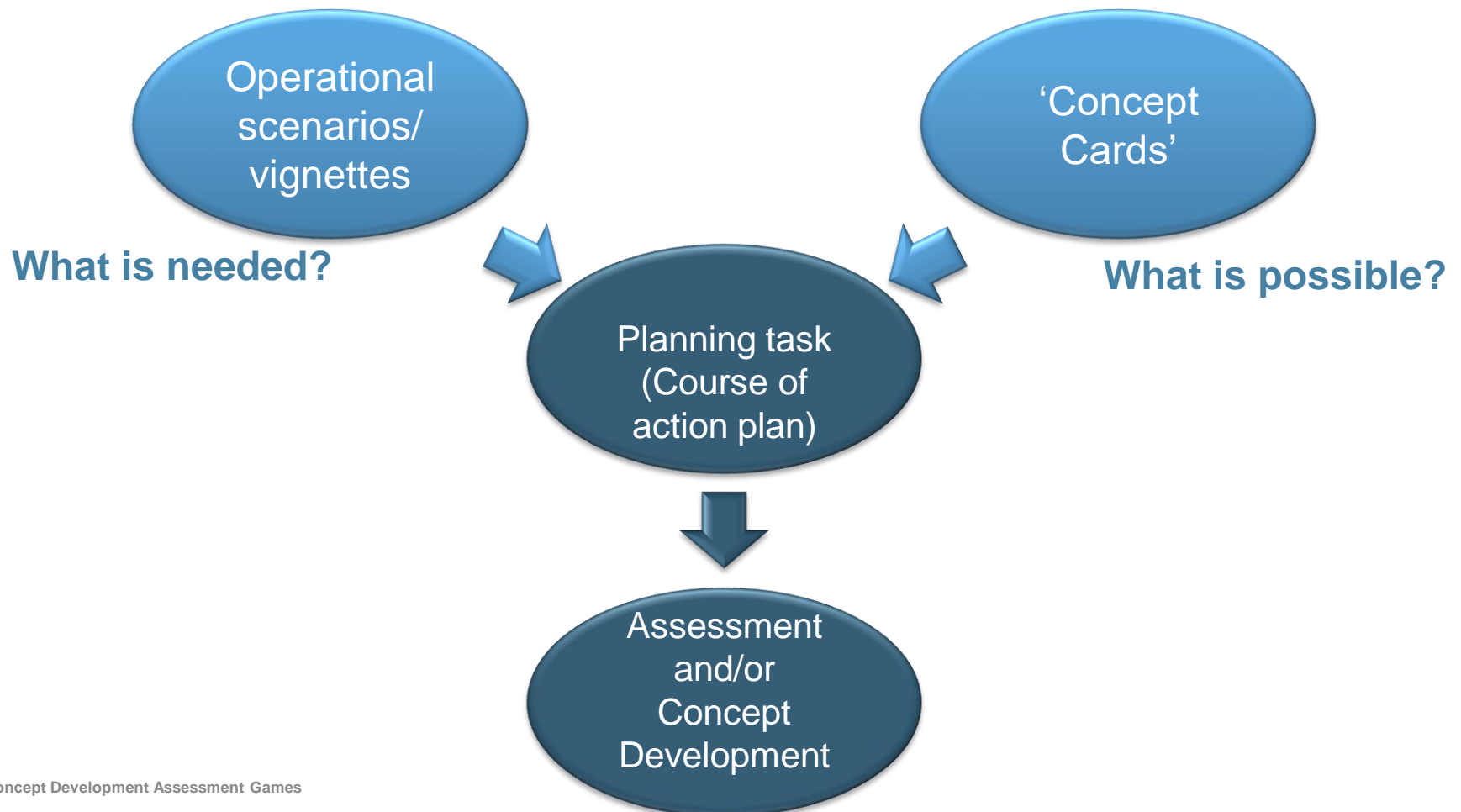
GOLDEN RULES/PREPARATION

›Scenario defining the context, including the specific vignettes to be played

›Prepare the data analysis

  ›What data is required

  ›How to collect data

›Experts

  ›Blue team/red team

    ›Operational experience

    ›Out-of-the box thinking

    ›SMEs

  ›Challenge Board

GOLDEN RULES/CDAG

› Moderator:
  › focus on facilitating the process and time management
› Players:
  › It is not about competition! No winners, no losers
  › It is not to justify but to discuss!
  › It is to collect facts, new ideas or appreciation of the use of technology or concepts to "effect" military actions
› Goal:
  › Collect the data, e.g. notes and/or surveys

GOLDEN RULES/ANALYSIS

› Analyse the data

› It is important to keep an unbiased and objective perspective and not jump to hasty conclusions!

› Be aware that the military/operational point of view is a major input.

TNO CDAG EXPERIENCES

› NATO Maritime Situational Awareness Concept

› Reconfigurable sensor Concepts

› **Tactical UAV Payload Concepts**

› National Cyber Defence Capability

› **Counter IED Concepts**

› Non Lethal Weapons

› **Capability gap Leopard tank**

EXAMPLE 1: CDAG UAV PAYLOAD CONCEPTS

Goal

› Based upon the operational requirement document for a new Tactical Unmanned Aerial Vehicle (UAV), determine the optimal sensor suite

Proces/design

› TNO Sensor Experts produced 9 possible payload concepts
› 4 scenario's based upon requirement documents
› 2 day CDAG, played by operational end users and TNO sensor experts

Result

› The results of the CDAG were used to define the technical requirements document

Payload concept 7

Laser illuminator EO/IR camera Akoestisch

- Payload waarmee artilleriegeschut gelokaliseerd kan worden en vervolgens beelden verkregen kunnen worden

- Beperkingen / Mogelijkheden
  – Lokaliseren van artilleriegeschut
  – Plaatsbepaling 30 m op 1 km afstand
  – Detectie met akoestische sensor is windrichting gevoelig

Real-time video	✔	Doelaanwijzing	✔
Tracking	✔	Damage Assessment	✔
Detecteren/lokaliseren van: auto's, individuen, obstakels, artilleriegeschut			
Classificeren van: auto's, individuen, artilleriegeschut			

Payload	☀	☽	🦅
Laser illuminator	✔	✔	✖
EO/IR camera	✔	✔	✖
Akoestisch sensor	✔	✔	✔

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EXAMPLE 2: COUNTER IED CONCEPTS

Goal
  › List expected IED threats
  › Explore possible countermeasures

Process
  › Morphological analysis (Threats)
  › (Scenario) Workshops (Counter measures)
  › CDAG with operational experts to evaluate counter measures

Results
  › The results of the CDAG were use to create the roadmap for Route Clearance Detection and Neutralization

EXAMPLE 3: LEOPARD TANK

Goal
- In 2011 it was decided to The Leopard Battle Tank. As a result the following questions had to be answered:
  - What capability gap(s) result (if any)?
  - In what operational conditions and with what operational risks
  - How can these gaps be filled
    - Existing military materiel (+ operational concept)
    - Additional military materiel (+ operational concept)

Process/design
- 2 workshops
- Multiple scenarios & vignettes
- Military people from both the army and the airforce
- SMEs on protection and weapons

Results
- Insight into the gaps and possible solutions

"There are times you want a tank and nothing else will do."

Major General Binns CBE DSO MC

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THANK YOU FOR YOUR ATTENTION

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