



1st bilateral DLR-CSA WORKSHOP on  
On-Orbit Servicing of Space Infrastructure Elements  
via Automation & Robotics Technologies

25-26 November 2002  
DLR, Cologne Area, Germany



## Progress Meeting 2 & WS Wrap-Up 26 Nov 2002



## Breakout Group Reports & Summary

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## Breakout Groups

What & Who?

- **BG 1: The “Whigs”**
  - **Big Picture: Agencies, Industry, Leg&Reg**
  - Captain: Joerg Kreisel
- **BG 2: The “Suits”**
  - **Stakeholders & Market: Pubic & Private Goods**
  - Captain: Andy Shaw
- **BG 3: The “Boffins”**
  - **Servicer & Target: Space A&R, Sat Mans**
  - Captain: Alex Ellery
- **BG 4: The “Navvies”**
  - **Mission Architecture & Logistics**
  - Captain: Marshall Kaplan



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## Breakout Group Approach

- BG Session 1: “**Validation**” **WHAT?**
  - Why No OOS yet?
  - Status & Vision!
- BG Session 2: “**Justification**” **WHY?**
  - Routes & Reasoning
- BG Session 3: “**Trade-Offs**” **HOW?**
  - Measures & Options
  - Pros & Cons
- BG Session 4: “**Streamlining**” **WHO & WHEN?**
  - Actions Items & Timeline
  - **DEFINING A “WAY” FORWARD 4 ALL STAKEHOLDERS!**

50+ Brains ⇒ 1 “WAY”!?

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## Breakout Groups Session 1 & 2

Day 1

- BG Session 1: “Validation” **What**
  - **Why No OOS Yet?**
  - Input to the other BGs
  - Questions to the other BGs
- BG Session 2: “Justification” **Why**
  - Discussion of other BG Inputs
  - Definition of a “**Vision**” per BG
  - 4 Similar BG Visions of Day 1
- BG Captains: “Progress Reporting”

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# Breakout Groups Session 3 & 4

Day 2

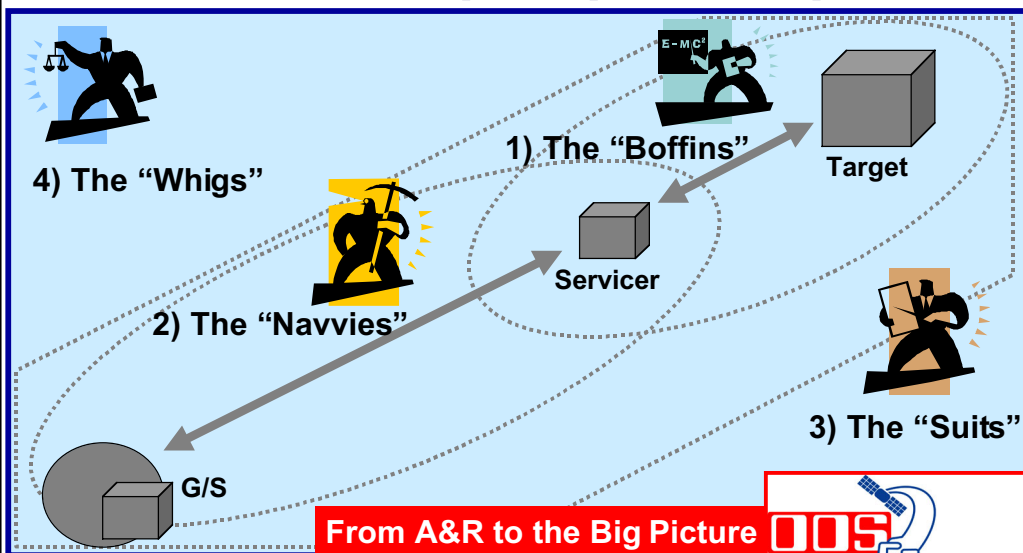
- BG Session 3: “Trade-Offs” **How?**
    - **Definition of Alternative Scenarios Based on Day 1 Visions & Day 2 Presentations**
  - BG Session 4: “Streamlining” **Who & When**
    - Actions & Schedule
    - Definition of a **“Way Forward”** per BG
- BG Captains: “Progress Reporting”
  - DLR-CSA: Workshop Wrap-Up

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# Breakout Group Report Sequence



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## BG 3: "Boffins"

Space A&R

Missions	Observation	Docking PDFS	Re-/De-Orbiting PDFS	Maintenance PDFS	Retrofit FDFS
Inspector	✓				
Aercam	✓				
Canadarm 2	✓	✓			✓
ETS VII	✓	✓		✓	✓
Orbital Express	✓	✓		✓	✓
Orbital Recovery	✓	✓	✓	✓	✓
TECSAS	✓	✓	✓		?
SPDM	??????	??????	??????		
Robonaut		✓			✓

We have Done It!

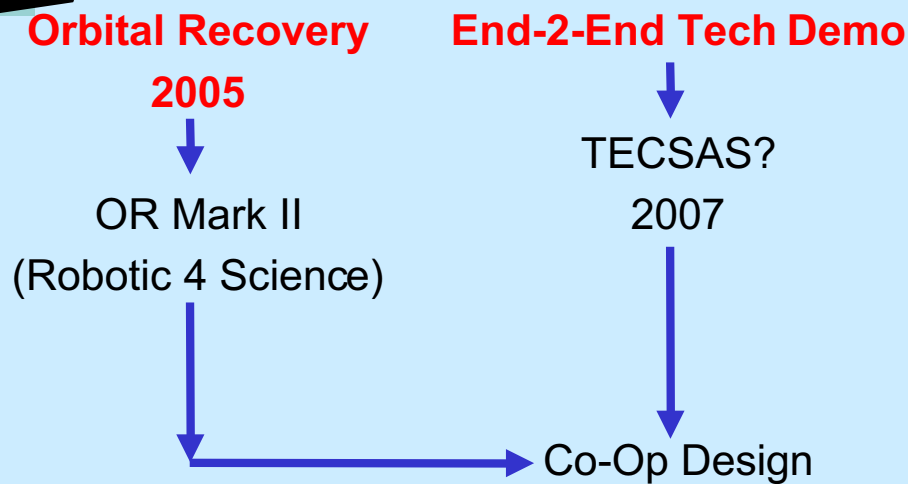
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## BG 3: "The Boffins"

More?



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## BG 4: "Navvies"

### Option 1:

**"1st Mover Flight"** (Orbital Recovery Corp.)

- What: GEO Sat Life Extension
- Objective: Demonstrate OOS Mission with Commercial Value
- Who Pays: Customer/Entrepreneur
- Time Frame: 2 Years

**Primary Option**

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## BG 4: "Navvies"

### Option 2:

**"End-2-End Tech Demo"**

- What: Fly 2 Small Sats & Execute Co-Operative & Non Co-Op Operations
- Objective: Demonstrate End-2-End Technology
- Who Pays: Gov/PPP
- Time Frame: 5 Years
- e.g. TECSAS

**Another Important Option**

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## BG 2: "Suits"

### Scenario 1:

**Realistically Achievable**

- **Objective:** Demonstrate Commercially Viable Service Mission
- **What:** Re-Orbiting
- **Public Role:** Funding Demo Mission & Seek Commercial Revenue in Case of Success
- **Short-Term:** Demo 3-5 Yrs Agencies (& Ind.)
- **Long-Term:** Investigate Business Case Orbital Assembly

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## BG 2: "Suits"

### Scenario 2:

- **Objective:** "Business as Usual"
- **What:** Focus on Private Sector
- **Public Role:** Wait & See & Cont'd Tech Dev
- **Private Role:** Make a Success Story

**Define Demand**

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# BG 1 : "The Whigs"

Agencies  
Industry  
Regulators

- 4 Breakout Groups: 1 Vision



**VISION!**

**Realization of a Full-Scale Economic Space Infrastructure Based on OOS!**

**Action Plan & Timeframe**

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# BG 1 : "The Whigs"

Years	Governments Agencies	Industry	Leg&Reg Bodies
0-5	<ul style="list-style-type: none"> <li>▪ "OOS Policy &amp; Budget Line"</li> <li>▪ Intl. Agency Coordination &amp; Collaboration</li> <li>▪ ISS-Related OOS</li> <li>▪ Technology Development Roadmap</li> </ul>	<ul style="list-style-type: none"> <li>▪ Development of Commercial Cases</li> <li>▪ OOS Demonstration</li> <li>▪ "Maintenance" (US)</li> <li>▪ "De-Orbiting"</li> <li>▪ "Re-Orbiting" (ORC)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Frequency Band for OOS</li> </ul>
5-10	<ul style="list-style-type: none"> <li>▪ Paradigm Shift to Infrastructure Availability</li> </ul>	<ul style="list-style-type: none"> <li>▪ Creation of Partnership               <ul style="list-style-type: none"> <li>• OOS-SP's</li> <li>• Sat Mans</li> <li>• Gov'ts/Agencies</li> </ul> </li> <li>▪ 1st Generation OOS Business</li> </ul>	<ul style="list-style-type: none"> <li>▪ Satellite Disposal &amp; Debris</li> </ul>
10-15	<ul style="list-style-type: none"> <li>▪ Large Space Infrastructure Assembly</li> </ul>	<ul style="list-style-type: none"> <li>▪ 2nd Generation OOS Business</li> </ul>	
15-20		<ul style="list-style-type: none"> <li>▪ Orbital Supply Platforms</li> </ul>	

**Start Today!**

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# Workshop Result Integration

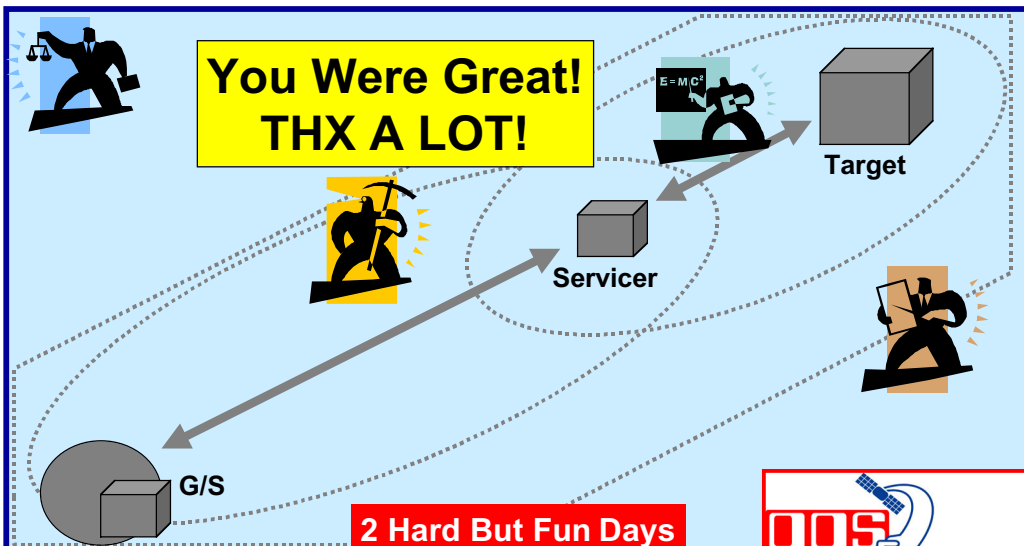


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# Workshop & BG & Integration & ...



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