Equity Investors &

European Conference on On-Orbit Satellite Servicing and Active Debris Removal: Exploring Commercial, Legal, and Policy Implications
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by

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“JKIC” in Brief ...

- Focus on Space Commercialization Since 1987
- Space & Venture Capital Background
- Activities & Services
  - Advice & Consultancy & Intermediary Services
    - Space Commercialization
    - Strategy Development
    - International Collaboration
    - Education & Training
  - Hands-On Coaching of Commercial Ventures
  - Financial Services (Early-Stage Focus)
- Partners & Customers Worldwide
  - Space Agencies & International Organizations
  - Space & Non-Space Industry & Entrepreneurs
  - Selected Investors
- Proprietary Global Network of Leading Expertise
- Independent, Different, Special ... Partner!

Partners & Customers Worldwide:
- Space Ventures
- Equity Finance
- Business Partners
- Global Links

Featured in "The Faces of Space"
"On-Orbit Servicing" (OOS)

- OOS Is NOT an End Itself
- OOS ≠ Only One Solution
- Too Early to Judge

- What for?
  - Fix Problems
  - Upgrade Systems
  - Increase Mission Flexibility
  - Enable for Entirely New Missions

- On-Orbit Assembly (OOA)
- Active Debris Removal (ADR)

Is there a Market for OOS? YES, Near-Term: Life Extension!
A Decade Ago: International Workshops & More

Focus: Commerce
- 150 Participants
- 20 Countries

Lots of Hope!

DLR licensed Its Capture Tool to Orbital Recovery

see: www.on-orbit-servicing.com
The “OOS Eco-System”

Environment
- Political
- Legal
- Regulatory
- …

Mission Architecture & Logistics
- Staging Orbits
- OOS
- OOA
- …

In-Orbit Infrastructure
- A&R
- IP
- Wireless
- Nano
- …

Servicers, etc.

Business & Economics
- Value Proposition
- Business Model
- Partnerships
- Jurisdictions
- Risk Management
- Finance

A System & “Business Engineering” Challenge
# OOS Stakeholder Benefits (Simplified)

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Benefits</th>
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<tbody>
<tr>
<td><strong>Commercial Satellite Operators</strong></td>
<td>• Profit (Revenues!) – Seamlessness</td>
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<td>• Deferred CAPEX</td>
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<td><strong>Insurance Companies</strong></td>
<td>• Risk Reduction</td>
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<tr>
<td></td>
<td>• <em>Premium Policy &amp; Market</em></td>
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<tr>
<td><strong>Satellite Manufacturers</strong></td>
<td>• Design Feedback</td>
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<td></td>
<td>• Servicer Production/Economy of Scale</td>
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<td></td>
<td>• Co-Operative Satellite Design</td>
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<td><strong>Space Agencies</strong></td>
<td>• Demonstration in Space</td>
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<tr>
<td></td>
<td>• <em>Space Infrastructure Development</em></td>
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<tr>
<td></td>
<td>• Commercialization</td>
</tr>
<tr>
<td><strong>Governments</strong></td>
<td>• Knowledge Base</td>
</tr>
<tr>
<td></td>
<td>• Budget Efficiency &amp; Economic Growth</td>
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<tr>
<td><strong>Science Community</strong></td>
<td>• Safeguarding Projects</td>
</tr>
<tr>
<td><strong>Launch Service Providers</strong></td>
<td>• No. &amp; Frequency of Launches</td>
</tr>
<tr>
<td><strong>Space A&amp;R Community</strong></td>
<td>• Various</td>
</tr>
<tr>
<td><strong>Intl. &amp; Regulatory Bodies</strong></td>
<td>• Debris, Orbital Clean-Up, Frequency</td>
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<tr>
<td><strong>Suppliers</strong></td>
<td>• Innovation &amp; Standardization</td>
</tr>
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<td></td>
<td>• Economy of Scale</td>
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**Hard Factors**
- Market
- Budget/Profit
- Cost-Benefit
- Structures
- Processes
- Technology
- Demonstration

**Soft Factors**
- Culture
- Mindset
- Psychology
Trust Building: “Realism vs. Dreams”

New Aircraft

Mars Landing

Investors: “Often Just 2 Good 2B True!”
Status Quo & Where Are We Heading?

„Riding the Waves“
On-Orbit Servicing (OOS) & Active Space Debris Removal (ADR) 2004-2012

What to Tell Investors?
Investors See Many Naive Propositions ... &

- Ignorance
- Arrogance
- Wrong Focus
- Over-Doing
- One-Shot Routes
- ...

But Mostly Great Tech!

Less (But Right) Can Be More!

Most Commercial OOS Business Ventures Failed to Raise Funds!
Investment in Commercial OOS?

- **Facts**
  - OOS = a Virgin Market
  - All OOS Biz = NewCos/Startups
  - Life-Cycle-Based Financing: (Early-Stage) “Equity”
  - Value-Adding Needs (via Investors)

- **What Investors?**
  - Government (-)
  - Strategic (+/?)
  - Financial (+)
  - Private (?)

- **What Makes Investors Tick?**
  - Proper Business Environment
  - Clear Value Proposition & Business Model
  - Trust & Confidence
  - Upside Potential & Timing
    - “Exit”!!! ⇒ Capital Gain (Financial Investors)
    - Long-Term Synergies (Strategic Investors)

Excess Liquidity in the International Investment Industry!
Message (Building Blocks)

- OOS Has Game-Changing Potential
- **A Market in the Making** (Some Sat Ops Signed Up Already)
- Economics & Finance Issues Not Yet Fully Understood
- OOS Biz to Be Geared Around the Mission (Not Vice Versa)
- Proper Structuring Is Key
- Actors to Fit & Play in the Right Box
- In-Orbit Demonstration Mandatory
- Government Agencies to Pave the Way
- Careful Build-Up of OOS Range
- First-Mover Danger Potential (e.g. Accident)
- Investors Ready to GO, IF …

Case Compatibility with Investment Industry!
Hence, ... Where Is the Profit?

Thank You!