

OOS 2004 - Workshop Synthesis



Based on Knowledge Café Sessions

by Joerg Kreisel (JKIC)

OOS 2004 IN BRIEF

The OOS 2004 Workshop was the **second** international event entirely dedicated to on-orbit servicing (OOS) and attracted **75 participants from 11 countries**. The 2-day workshop was held in Vancouver (Canada) prior to the IAC congress. As OOS 2002, the OOS 2004 workshop was organized in an **innovative format**, composed of plenary **presentations** and a **Knowledge Café** followed by **social dinners** and **networking opportunities**. OOS 2004 was another **real workshop** and **again very successful** as for its **results**, the creation of an **OOS community** and an outstanding **spirit and atmosphere** during the event.

During the **Knowledge Café** sessions the participants tackled the following areas with regards to OOS:

- **Technology Capabilities**
- **Satellite Servicing**
- **Large Space Structure**

For each of these areas **Roadmaps** were developed as well as two **Emerging Themes**. Members of the organizing committee summarized the Knowledge Café results and elaborated a **Workshop Synthesis**.

WORKSHOP RESULTS

The various presentations, Knowledge Café sessions and networking activities brought up clearly, that **OOS (and OOA) will be key to new space missions**, however will have to be addressed in more detail in the future taking into account experiences from current activities. According to the OOS 2004 workshop theme "Developing A Roadmap" the following **roadmaps** have been developed:

Technology Capabilities

Update in progress

Satellite Servicing

ROADMAP OOS & SATELLITE SERVICING			
SUMMARY			
TOPIC	TIMEFRAME (as of 2004)		
	0-5 YEARS	5-10 YEARS	10-20 YEARS
GENERAL	Paving the way for OOS Grass-roots private sector	Paving the way for OOS Grass-roots private sector More complex missions Decreasing cost Trade for programs and advocacy	Focus on increasing mission availability, flexibility and efficiency. 3 classes of space infrastructure elements: ∞ Non-cooperative ∞ Partly cooperative ∞ Fully cooperative Corresponding OOS will be available to all classes.
BUSINESS DEVELOPMENT	Generating economic benefits from on-orbit servicing OOS is an emerging business that needs to establish its credibility through demonstration/operational missions. The first operational mission will likely be the Hubble Servicing Mission. The space community will start to consider OOS as part of future programs.	Entrepreneurial/commercial successes. Link to private equity	OOS will evolve as an integral part of space industry and business landscape.
DEMONSTRATION MISSIONS	Missions for which the main objective is to demonstrate and verify the capabilities of on-orbit servicing. The level of complexity of the mission will increase from rendez-vous without contact to capturing and docking of non-cooperative satellites. Manipulations, refuelling and component exchange will be done only for satellites/spacecrafts designed to be serviceable (e.g. Hubble, Orbital Express).		
OPERATIONAL MISSIONS	Missions that are responding to a need expressed by a customer.	Missions that are responding to a need expressed by a customer.	OOS will be established as part of operational missions.
CONCOMITANT ACTIVITIES	Activities beyond the technical development to create the proper environment for the development of on-orbit servicing. We could expect a series of developments that will impact OOS.	Activities beyond the technical development to create the proper environment for the development of on-orbit servicing. We could expect a series of developments that will impact OOS.	Proper environment established for OOS & OOA.

The detailed roadmap for satellite servicing can be downloaded here:

Large Space Structure

The following tables show large space structure projects and their relationships to timeframe and OOS/OOA needs:

LARGE SPACEC STRUCTURE	Where			When			Needs		
	Orbit	Base	Beyond	Short	Medium	Long	Demo	OOA	OOS
Large Aperture	x			x	x		x	x	L
Solar Power Satellite	x				x		x	x	H
Space Hotel	x	x				x		x	H
Warehouse	x	x			x			x	H
Lunar/Mars Exploration Vehicle			x		x			x	L
Lunar/Mars Base		x				x		x	H
Jupiter Icy Moon			x		x			x	L
Space Mirror	x				x		x	x	L
Orbiting Lab	x				x			x	M
Commercial Platform (Condo Sat)	x	x				x		x	M
Artificial Moon	x					x	x	x	L
Space Colony	Orbit Lunar Mars					x		x	L
		x					x	x	L
		x					x	x	L
Space Factory	x	x				x	x	x	H
Space Elevator	x		x			x	x	x	M
Mag Lift		x	x			x	x	x	M
Solar Sail	x		x			x	x	x	L

L: Low
M: Medium
H: High

LARGE SPACEC STRUCTURE	0-5 yrs Short-Term	5-10 yrs Mid-Term	10-20 yrs Long-Term
Technology Demonstration	Large Aperture	Solar Power Satellite	Space Elevator Mag Lift
Low Servicing (OOS)		Space Mirror JIMO Lunar/Mars Exploration	Solar Sail Space Colony Artificial Moon
Medium Servicing (OOS)		Orbital Labs	Space Elevator Mag Lift Commercial Platform (Condo Sat)
High Servicing (OOS)		Warehouse Solar Power Satellite	Space Factory Lunar/Mars Base Space Hotel Operational Solar Power

Update in progress This page will be updated gradually as more insights become available.

 OOS2004-Synth-LSS1graphs.pdf

The presentations referred to above can be downloaded under *Program & Documents* .

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