SODI-DCMIX3 Operations

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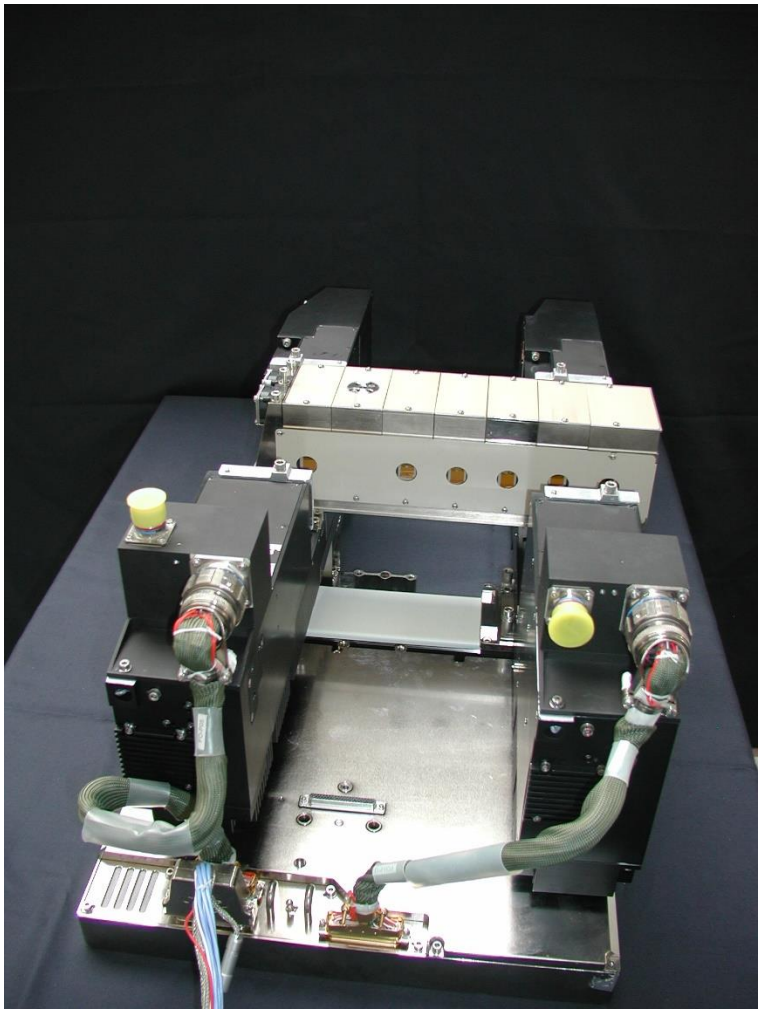
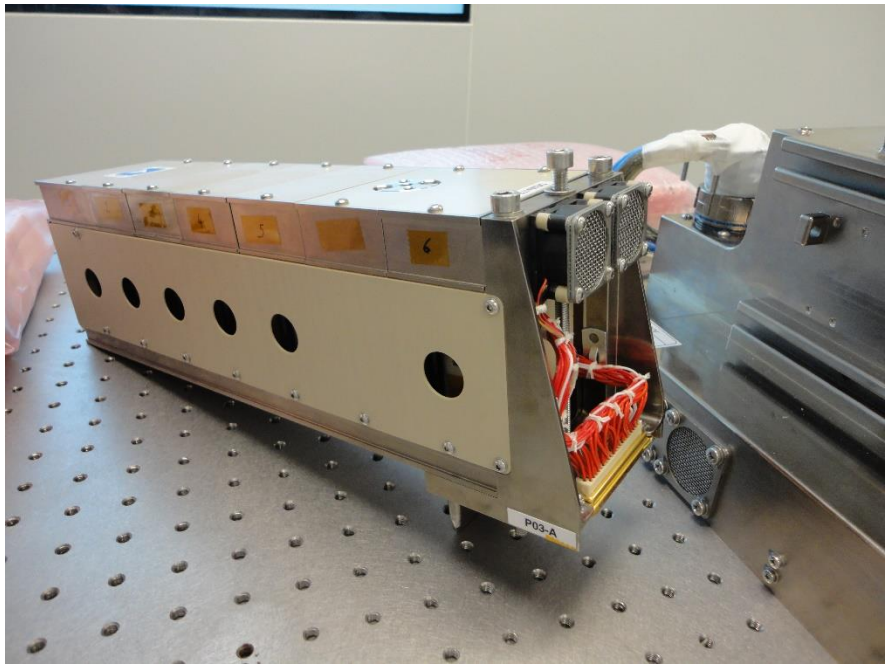
POIWG face-to-face meeting #39

SODI DCMIX3: Overview

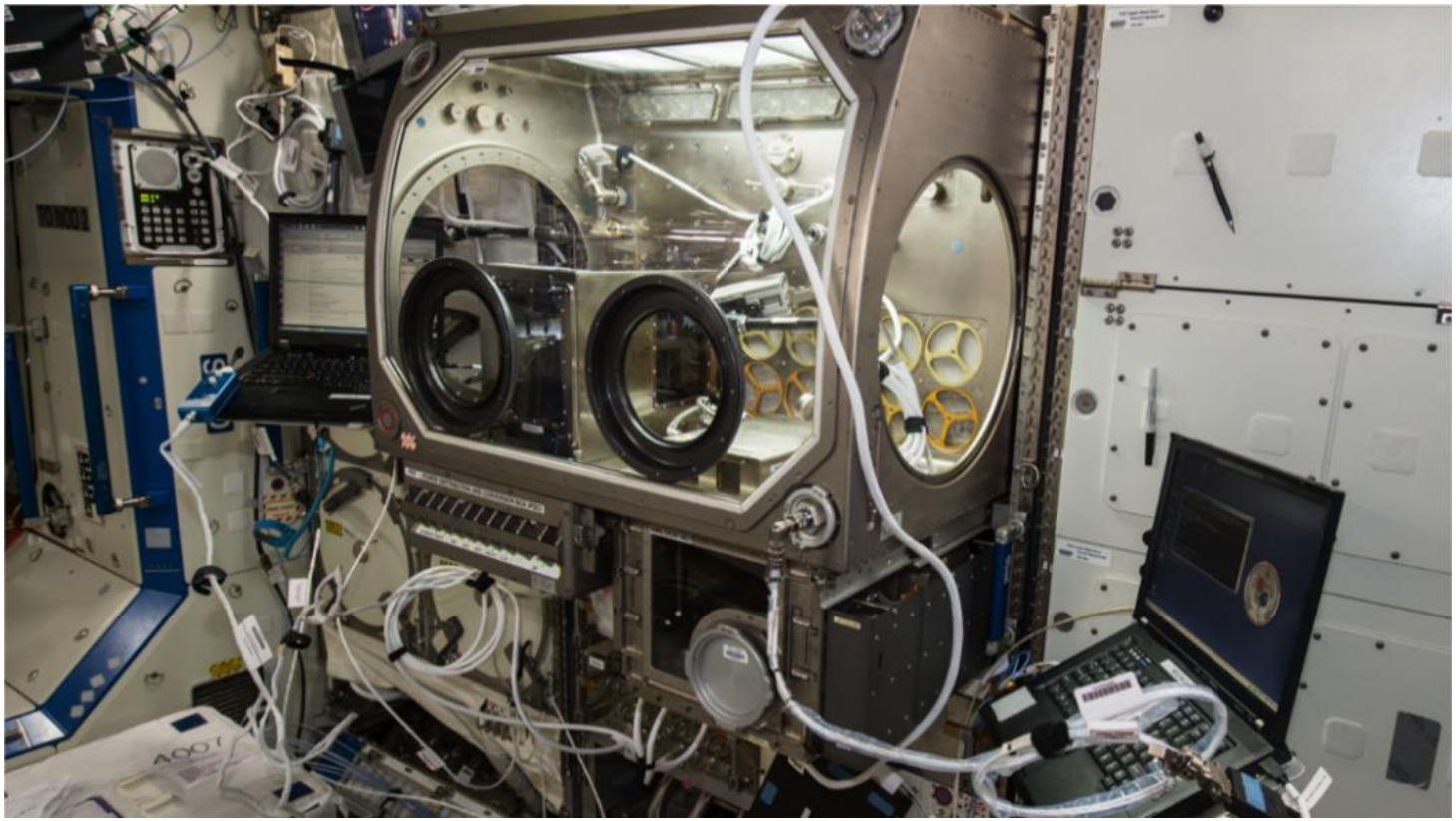




Study of Soret and Difussion coefficients: how the concentration in different liquids containing water, ethanol and triethylene-glycol varies under a thermal gradient.

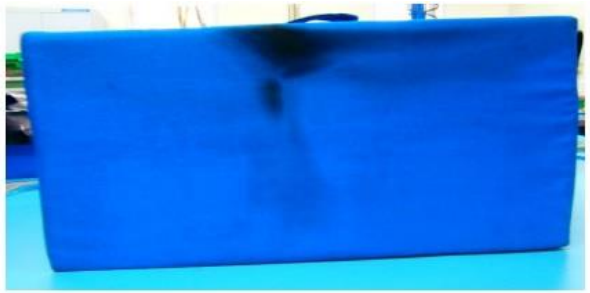
SODI DCMIX3: Overview

- Experiment performed in MSG.



SODI DCMIX3 in Orb3

- SODI DCMIX3 – Orb-3 (October 2014)



SODI DCMIX3 in Orb3

SODI DCMIX3 in Inc. 47&48

- Current flight baseline:
  - Launch in Spx-10 - August 2016 (TBC)
  - Start of ops after Rodent Research

- Possible change to Spx-9:
  - Launch in May 2016 (TBC)
  - Start of ops June-July 2016 (TBC)

DCMIX3 Science

	Nominal	Nice-to-have	Total
Operations duration (weeks)	**8**	**4**	**12**
Number of science runs	20	5	25
Hours per run	22	41	N/A
Compressed data (GB)	233	127	360
Number of 256-GB Flash Disks needed	1	1	2
Near r/t downlink (GB)	21	9	30

DCMIX3 Operations

	Activity	GND / Crew	Time
1	HW setup (SODI + DCMIX3 CA in MSG)	Crew	4:20 h
2	Checkout and calibration	GND	5 days
3	Science runs	GND	8 / 12 weeks
4	Flash Disk exchange if needed	Crew	0:15 h
5	Data backup in the EHD (640 GB)	GND + crew (EHD connection)	1-2 days ground 0:10 h crew
6	HW stowage	Crew	2:55 h
7	FDs preparation for return	Crew	0:30 h

DCMIX3 Operations

- 24/5 ops
  - 3rd shift monitoring by PRO
  - MSG powered on continuously
  - SODI powered on continuously
    - » Avoids thermalisation times: 20 hours after each power up

- Nominal ground commanding:
  - ASW update, DCMIX3 checkout and calibration (SODI)
  - SODI reboot and initialization (SODI)
  - Script and files control (SODI)
  - Files uplink/downlink/compression (SODI and MSG OPS)
  - SODI power on/off (MSG OPS)
  - Data backup (MSG OPS)

DCMIX3 Operations

Crew required for	Time
SODI DCMIX setup	4:20 hrs
SODI DCMIX stow	2:55 hrs
Data backup	0:10 hrs
FDs preparation for return	0:30 hrs
Total nominal science	**7:55 hrs**
FD Exchange for nice-to-have runs	0:15 hrs
Total nominal + nice-to-have science	**8:10 hrs**

Challenges

- Flights schedule
  - Upload flight
  - Ops duration
- Cell array lifetime limited
  - min. 4 months
  - expected >6 months
- Images quality → optical checkout
  - Starting point: DCMIX2 configuration (verified in the EM with the new fluids).

Readiness

- All operations products were prepared for Orb3
- Minor updates for Inc. 47&48:
  - Crew procedures (new HW items)
  - Planning
  - Implementation of OCR changes withdrawn due to Orb3 mishap
- Uplink files ready since Orb3 (no updates)

Thank you

Backup slides: Acronyms

ASW	Application Software
CA	Cell Array
DCMIX	Diffusion Coefficients in ternary Mixtures
ECR	Engineering Change Request
EHD	External Hard Disk
EM	Engineering Model
E-USOC	Spanish User Support and Operations Centre
FD	Flash Disk
GCP	Ground Command Procedure
GND	Ground
HW	Hardware
MLC	MSG Laptop Computer
MSG	Microgravity Science Glovebox
OCR	Operations Change Request
P/L	Payload
r/t	Real time
SODI	Selectable Optical Diagnostics Instrument