



## Latest results in the Tritel-RS experiment - simultaneous passive and active measurements

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# Introduction

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- Objective: to characterise the cosmic radiation field on the ISS by a complex, 3 dimensional dosimetry system

➤ Active unit: 3D silicon detector telescope (Tritel)

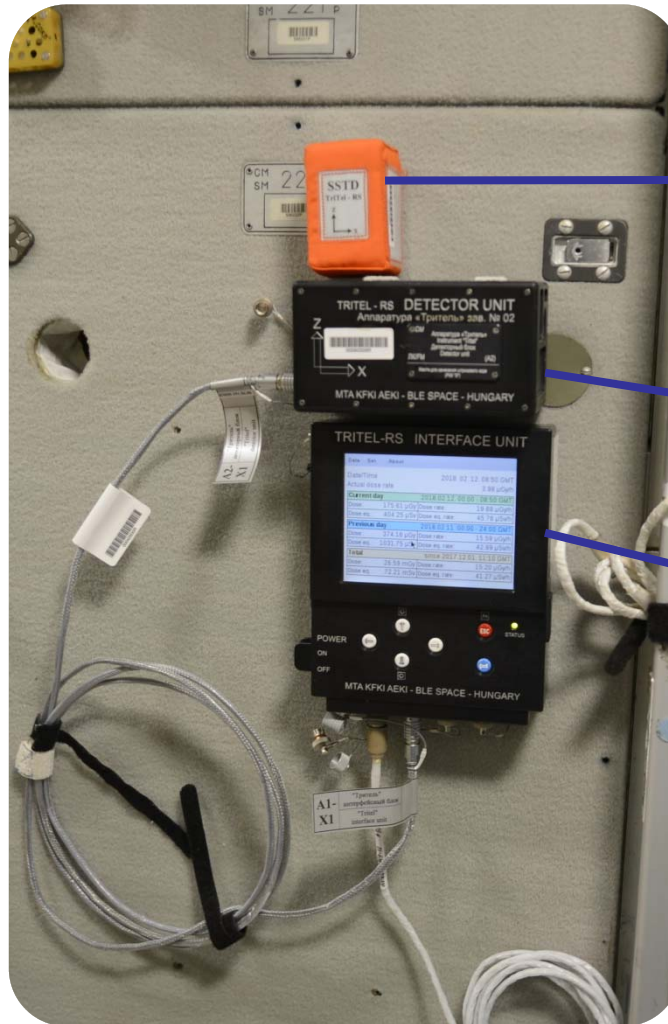
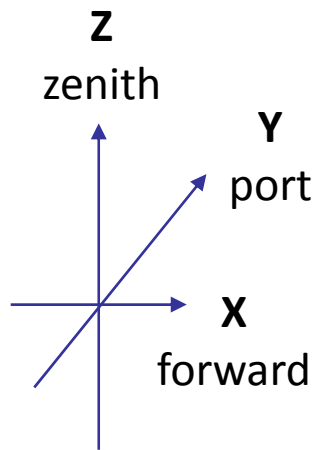


➤ Passive unit: TLDs and track detectors  
in 3D arrangement



- In operation since 2013 (once retrieved to the lab for troubleshooting)
- Exposure period to be presented:  
October 2017 - February 2018 (RS-6)

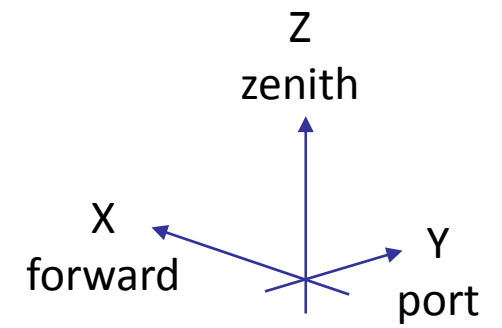
# Location: Service Module



Passive package

Tritel active detector

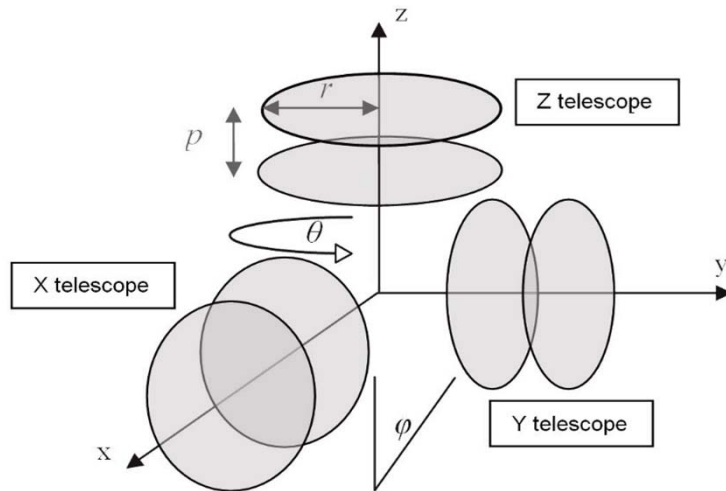
Interface



# Detectors

## Tritel Si detector telescope

- 90 min time resolution
- LET 0.2 keV/ $\mu\text{m}$  – 120 keV/ $\mu\text{m}$  (in water)

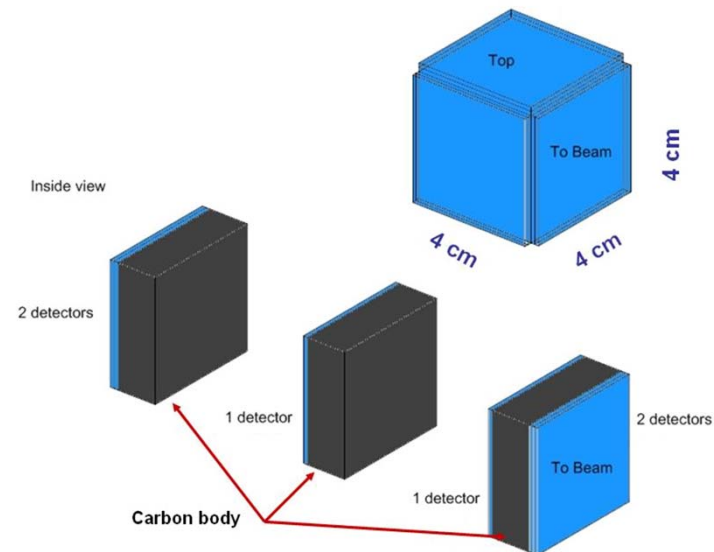


## TLDs ( $^6\text{LiF:Mg,Ti}$ and $^7\text{LiF:Mg,Ti}$ )

- mission integrated dose
- LET < 10 keV/ $\mu\text{m}$  (in water)

## Track detectors

- mission integrated dose
- LET 10 keV/ $\mu\text{m}$  – 1000 keV/ $\mu\text{m}$  (in water)



# ISS altitude and space weather conditions

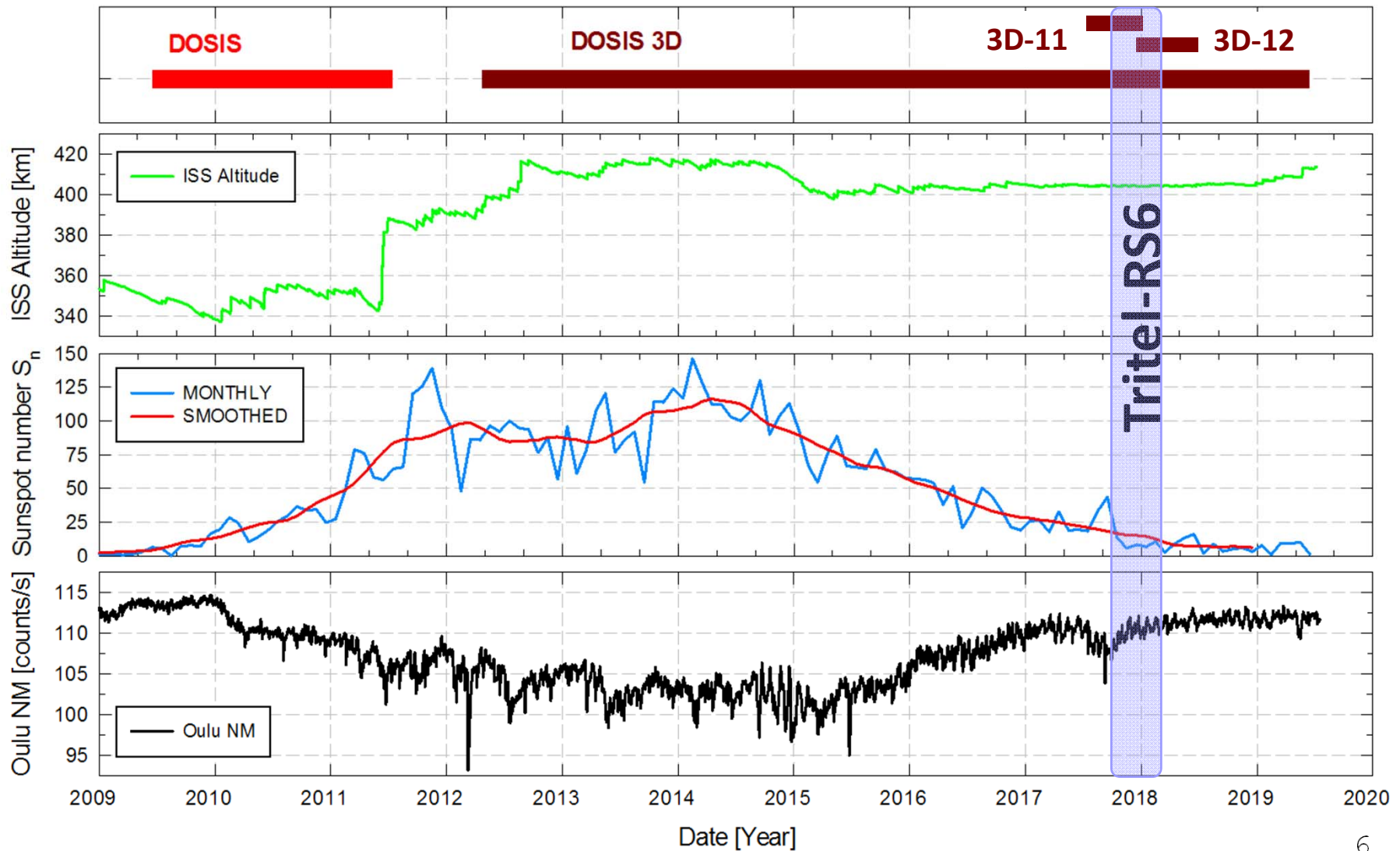


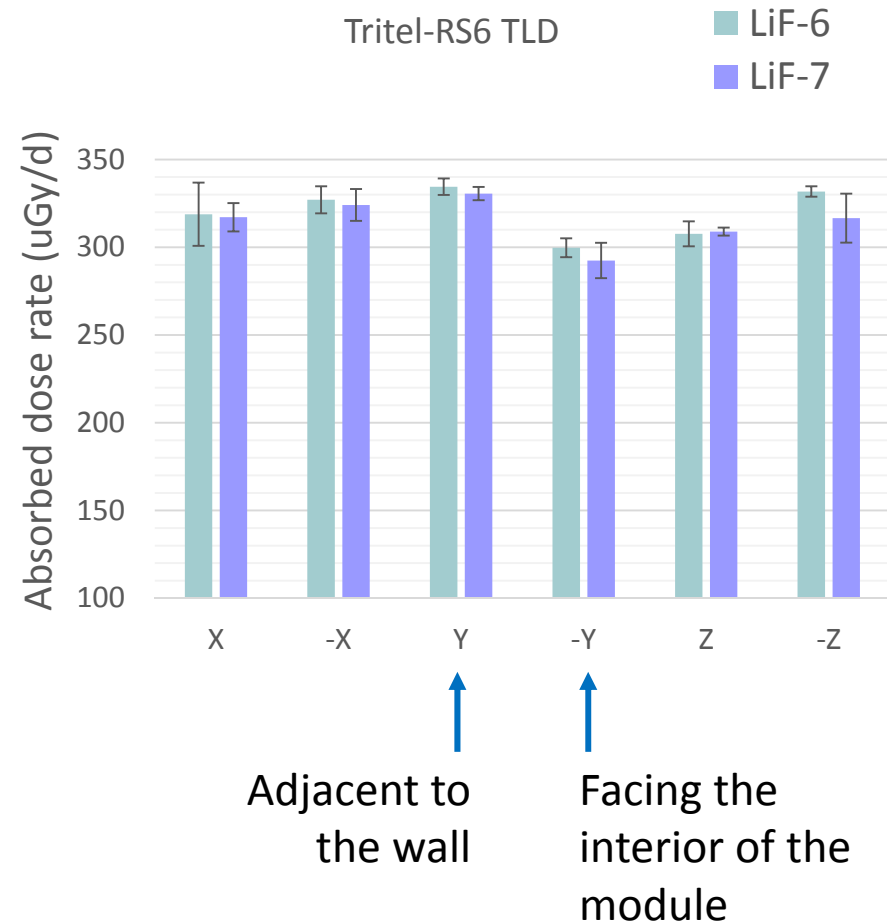
Figure borrowed from Thomas' presentation

# Results – TLD data

(October 2017 - February 2018)

LET  $\leq 10$  keV/ $\mu$ m

Direction		Absorbed dose rate ( $\mu$ Gy/d)	
		<i>MTS-6</i>	<i>MTS-7</i>
X	Forward	319 $\pm$ 2	317 $\pm$ 8
-X	Aft	327 $\pm$ 8	324 $\pm$ 9
Y	Port	334 $\pm$ 5	331 $\pm$ 4
-Y	Starboard	300 $\pm$ 5	292 $\pm$ 1
Z	Zenith	308 $\pm$ 7	309 $\pm$ 2
-Z	Nadir	332 $\pm$ 3	317 $\pm$ 1



## Results – SSNTD data (October 2017 - February 2018)

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LET 10 - 1000 keV/ $\mu\text{m}$

Direction		D ( $\mu\text{Gy/d}$ )	H ( $\mu\text{Sv/d}$ )	Q	
X	Forward	46.7	516	11.1	
-X	Aft	46.1	523	11.5	
Y	Port	50.5	639	12.7	Adjacent to the wall
-Y	Starboard	48.6	594	12.2	
Z	Zenith	43.2	517	11.9	
-Z	Nadir	46.8	549	11.7	
Z	<i>Internal 1</i>	<i>41.1</i>	<i>527</i>	<i>12.8</i>	Lowest doses (low energy protons are stopped in the 9.3mm C)
-Z	<i>Internal 2</i>	<i>40.4</i>	<i>505</i>	<i>12.5</i>	



# Results - Convolution of passive measurements

(October 2017 - February 2018)

TLD & SSNTD		D ( $\mu\text{Gy/d}$ )		H total ( $\mu\text{Sv/d}$ )	Q
Direction		LET < 10 keV/ $\mu\text{m}$	Total		
X	Forward	289	335	804	2.4
-X	Aft	296	342	826	2.4
Y	Port	302	351	896	2.6
-Y	Starboard	263	314	903	2.9
Z	Zenith	284	327	800	2.5
-Z	Nadir	289	335	837	2.5

Y direction - adjacent to the wall

