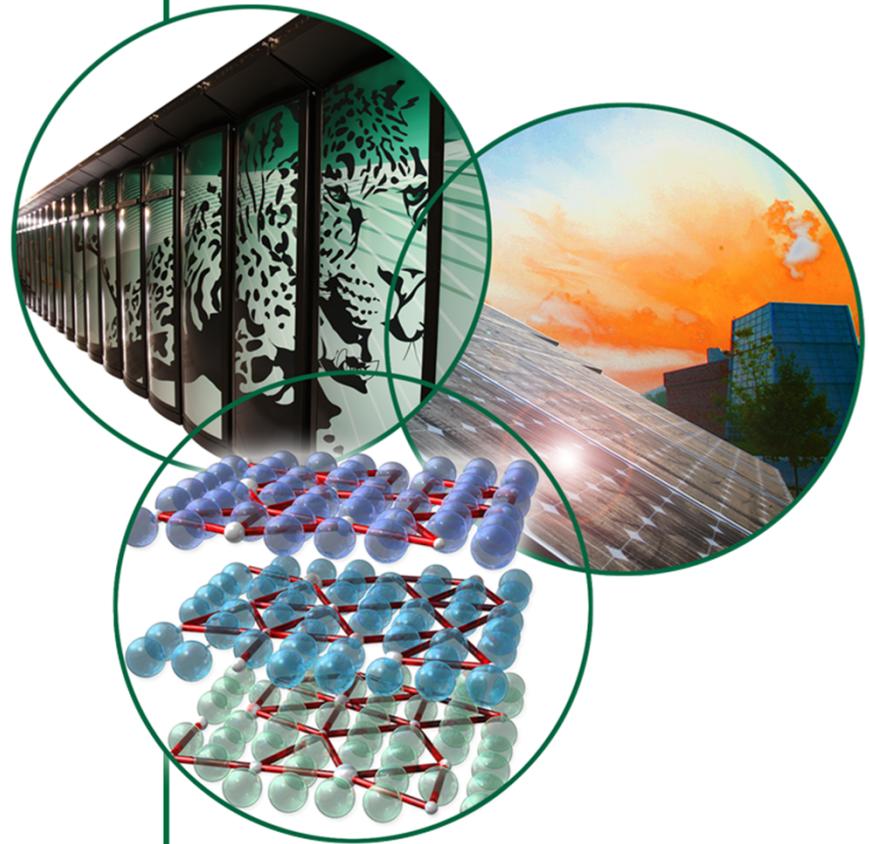
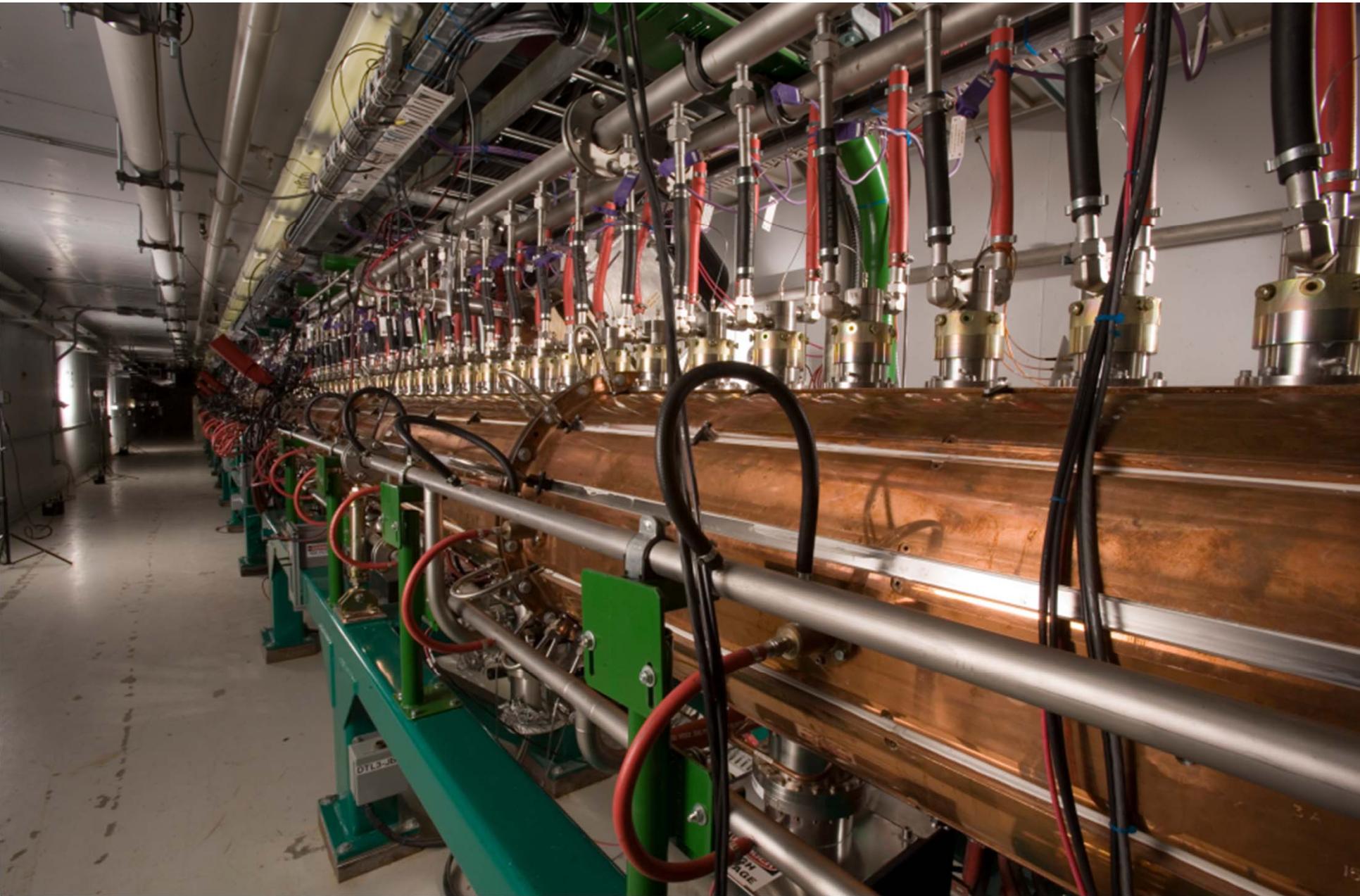


# System Design Towards Higher Availability for Large Distributed Control Systems

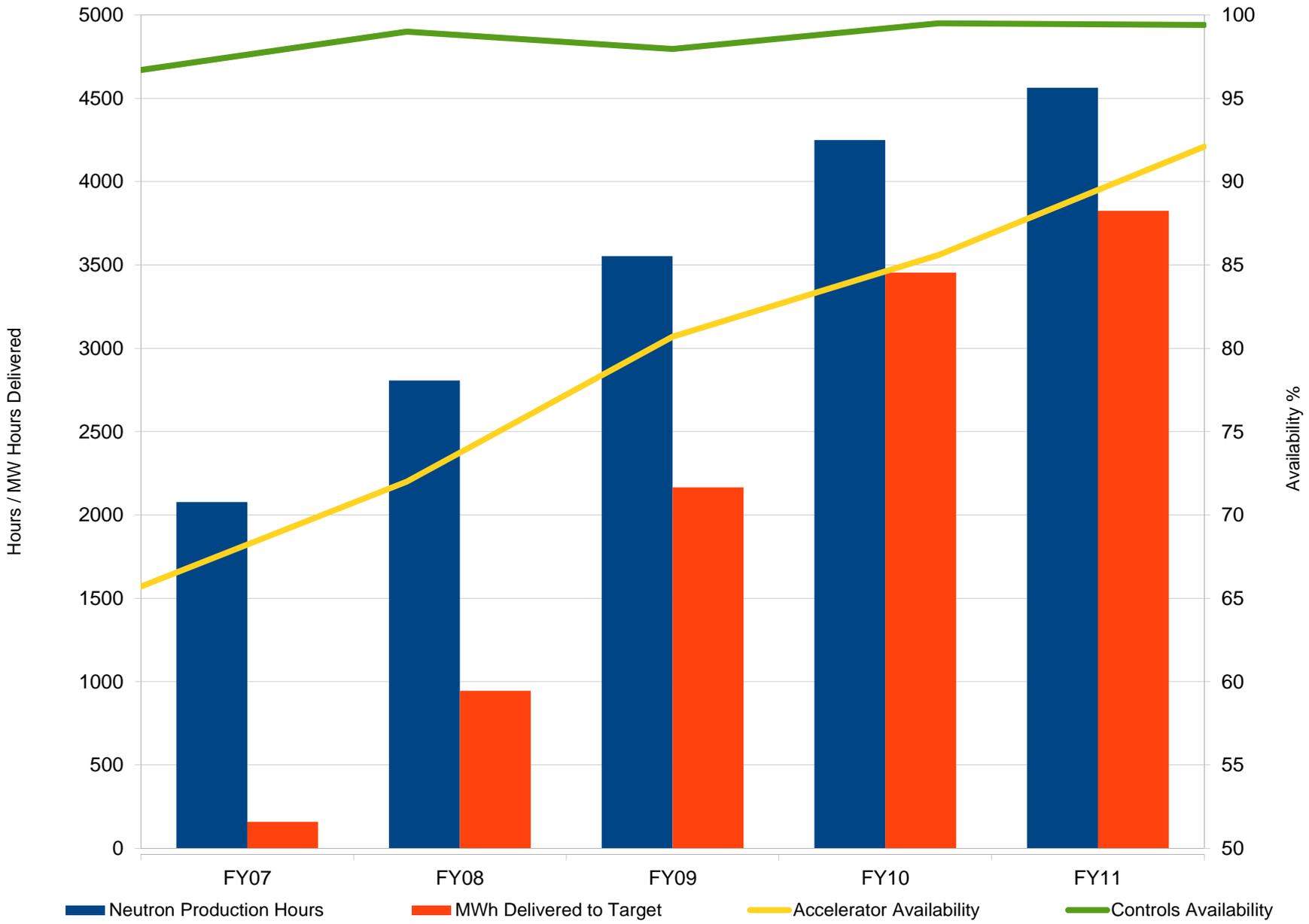
**Steven Hartman**  
Spallation Neutron Source  
Oak Ridge National Laboratory



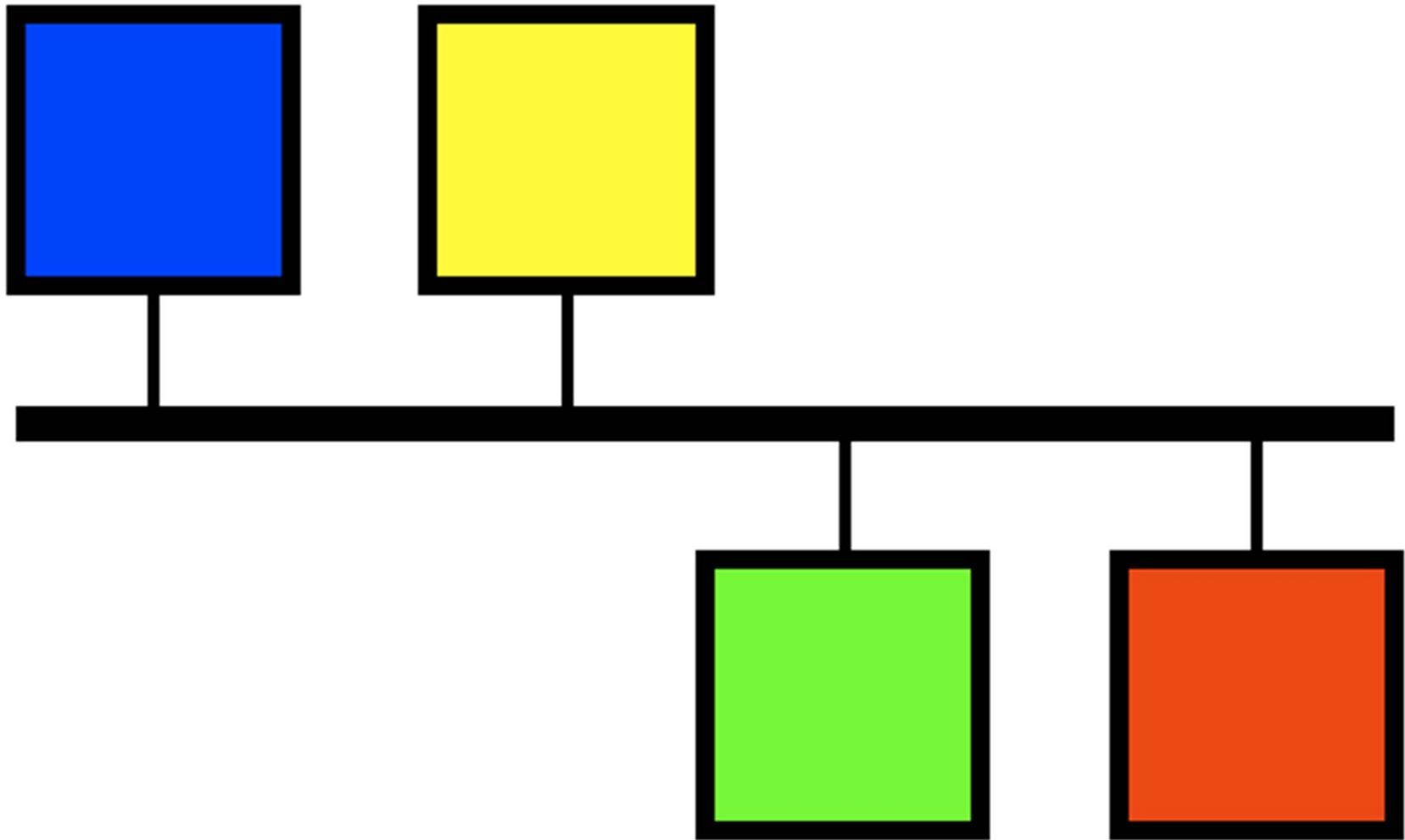
# SNS Accelerator Control System



# SNS Power and Availability Ramp-up



# Control System Toolkit with an Established Support Community



# Standardized Industrial Hardware, Buses and Protocols



# Clear Metrics

## Status

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[Operators](#)
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### Availability For The Past Week

Date	Production Beam		Accel Physics		Startup		Planned Shutdown		Availability Percentage
	Requested	Delivered	Requested	Delivered	Requested	Delivered	Requested	Delivered	
2011-10-09	12.0 h	10.0 h	-	-	-	-	-	-	83.33%
2011-10-08	24.0 h	14.6 h	-	-	-	-	-	-	60.83%
2011-10-07	24.0 h	23.7 h	-	-	-	-	-	-	98.75%
2011-10-06	24.0 h	22.5 h	-	-	-	-	-	-	93.75%
2011-10-05	24.0 h	22.1 h	-	-	-	-	-	-	92.08%
2011-10-04	24.0 h	23.8 h	-	-	-	-	-	-	99.17%
2011-10-03	24.0 h	23.5 h	-	-	-	-	-	-	97.92%
2011-10-02	24.0 h	23.7 h	-	-	-	-	-	-	98.75%

The current run started on 2011-09-28. Availability has been 88.62% over the past 12 days.

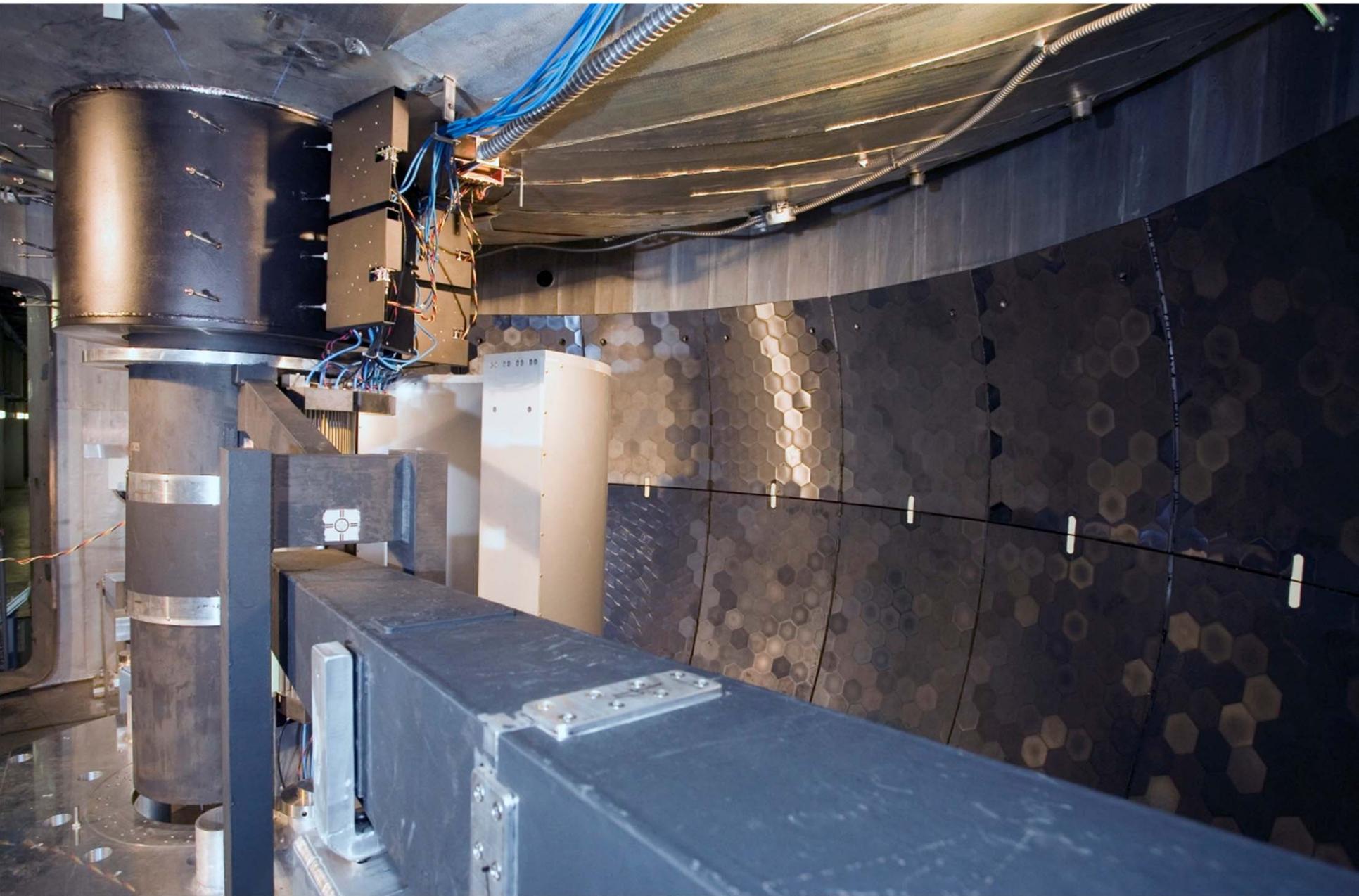
### Most Recent Downtime: Yesterday (Sunday, October 09, 2011)

Category	SubCategory	Hours Down	Notes	Date (Shift)
Ion Source	Ion Source Antenna 2.0		Ion source recovery and tune up after source replacement	2011-10-09 (D)

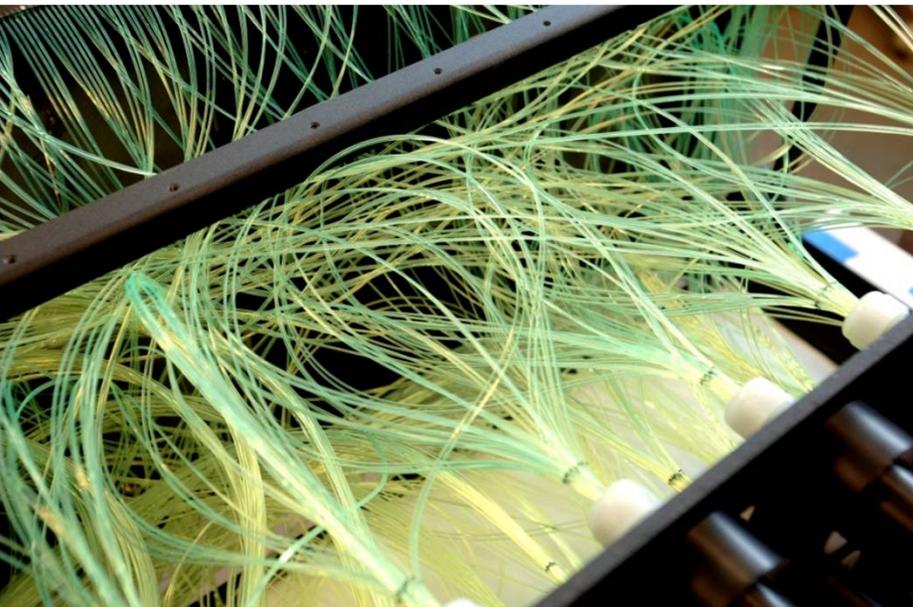
### Downtime For The Past Week Including Last Monday

Category	SubCategory	Hours Down	Notes	Date (Shift)
Controls	Accelerator	0.1	SCL LLRF IOC 15b Rebooted	2011-10-04 (D)
Controls	Accelerator	0.2	DTL 3 IP1 & 2 Controller De-energized (Unplugged-rack wiring checks in progress)	2011-10-03 (D)
Electrical	Power Supplies	0.3	Multiple Ekick faults (5-8), possible DG535 issues	2011-10-05 (D)

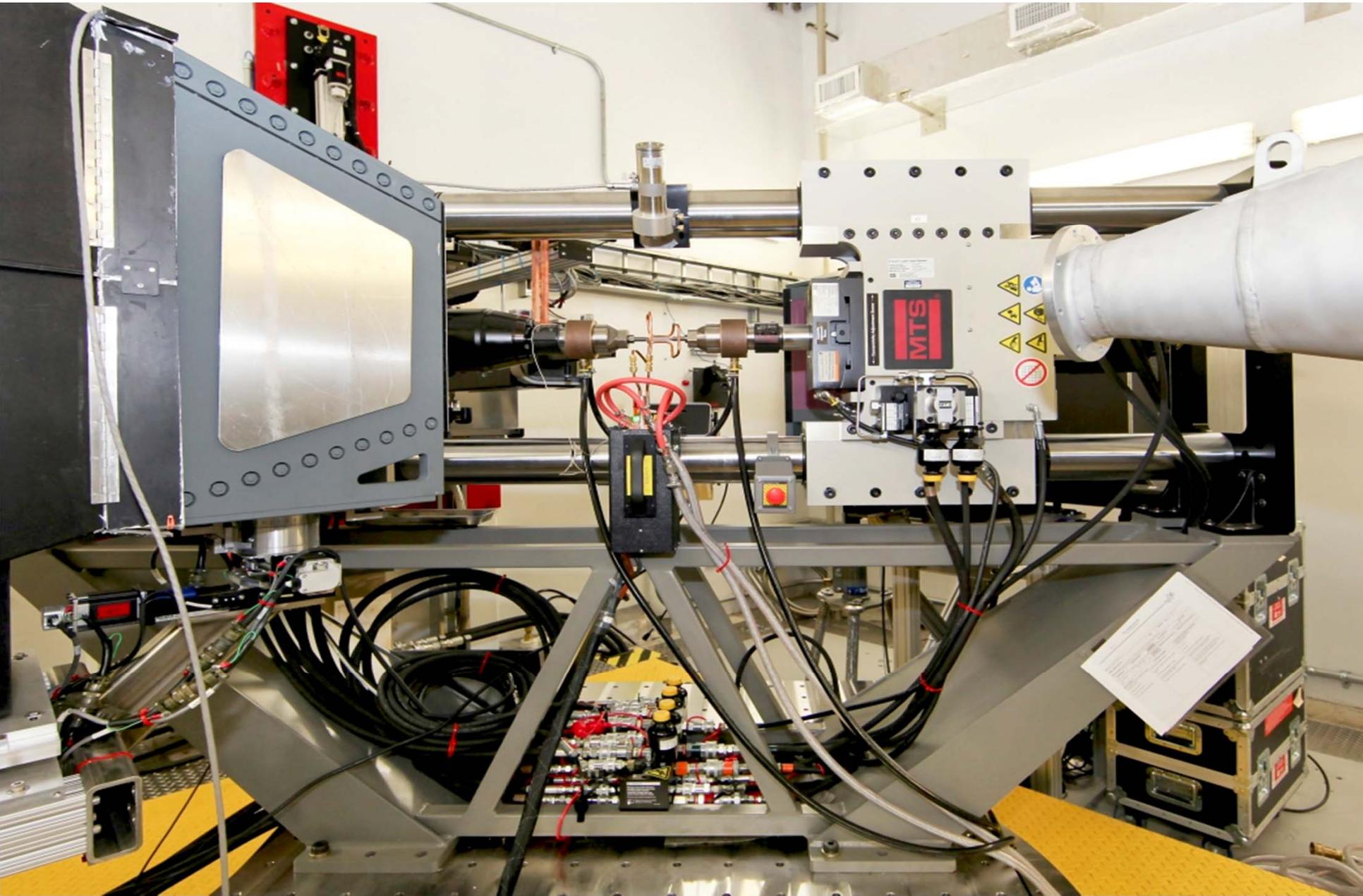
# Data Acquisition & Beam Lines Controls



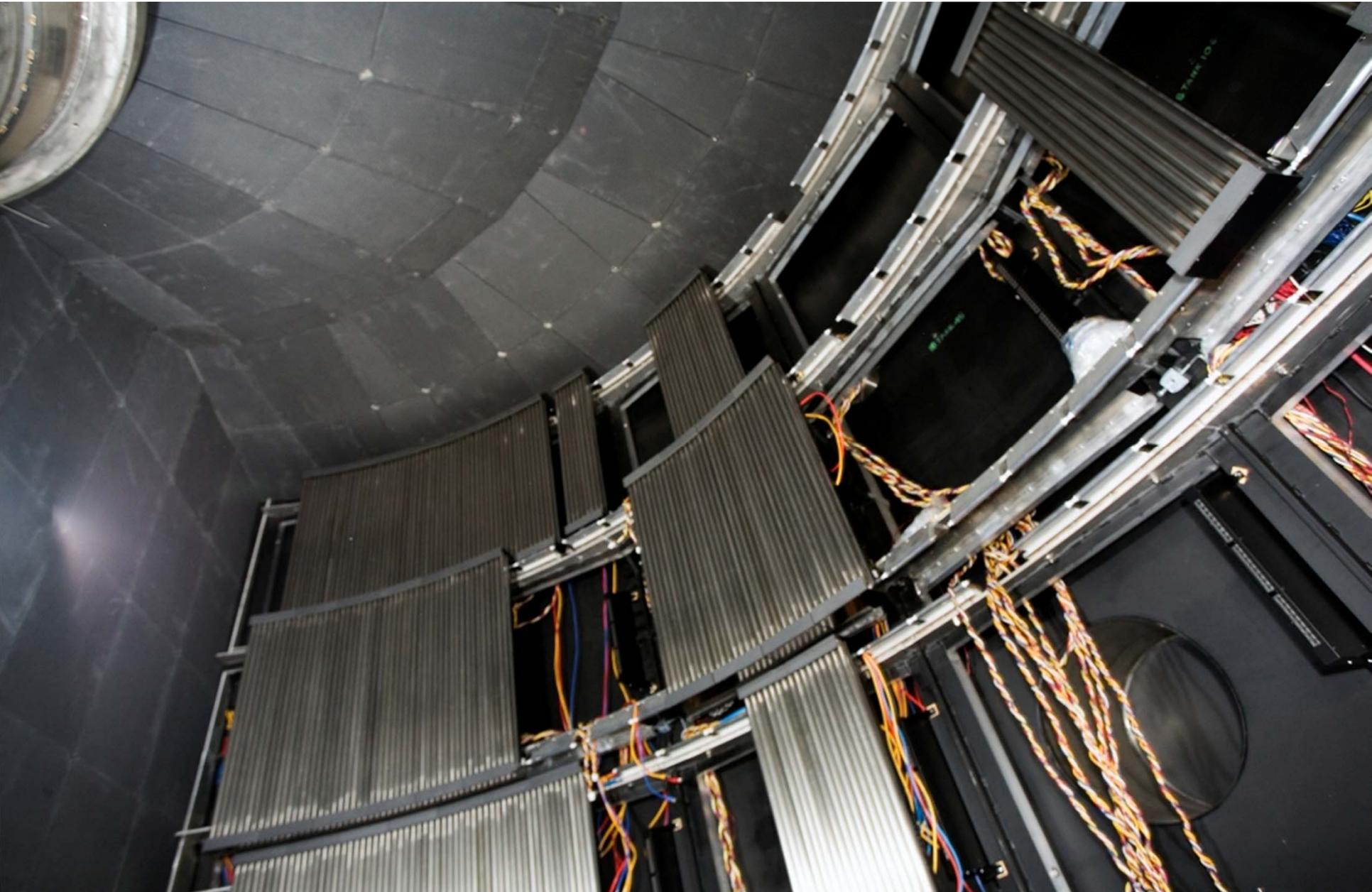
# Detectors



# Sample Environment



# Beam Line Controls



# Corelli Detector Tank Assembly to be commissioned in 2014



