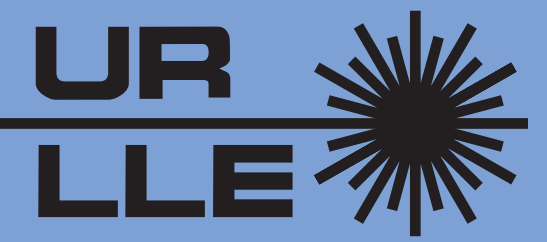


Omega Experimental Systems Performance and Improvements Since OLOG 2011



G. PIEN and J. PUTH

University of Rochester, Laboratory for Laser Energetics

The LLE Diagnostic Qualification Process Has Been Revised for FY12



- LLE INST 7700G establishes the process for the integration of new hardware into OMEGA
 - external projects are initiated through the Experimental Support Group
 - see Chuck Sorce with diagnostic requests
 - all new or modified diagnostic subsystems must complete LLE qualification a minimum of two weeks before first use
 - the project design review requirements are assessed at the beginning of the design cycle
 - major projects require a significant design effort
 - the role of Instrument Specialists is integrated into the design cycle

G9525

Average Effectiveness for OMEGA-60 Primary Diagnostics Continued to Report Above 95% for FY11



Description	2007	2008	2009	2010	2011
Number of primary diagnostics operations reported	12,950	8,872	6,315	7,592	8,794
Number of primary diagnostic types used	97	86	97	101	103
Average diagnostic effectiveness	96.8%	98.2%	96.3%	97.6%	98.46%
% diagnostics reported $\geq 95\%$ effectiveness	82.5%	86.1%	83.5%	87.1%	91.3

G9519

- 98 of every 100 primary diagnostic operations in FY11 were reported as 100% effective on OMEGA-60 by the PI

Average Effectiveness for OMEGA EP Target Diagnostics Reported Above 95% for FY11



Description	2010	2011
Number of primary diagnostics operations reported	1,475	1,408
Number of primary diagnostic types used	53	57
Average diagnostic effectiveness	97.9%	97.2%
% diagnostics reported $\geq 95\%$ effectiveness	87.8%	93.0

G9520

- 98 of every 100 primary diagnostic operations in FY11 were reported as 100% effective on OMEGA EP by the PI

Instrument Specialist/Technician (IST) Certification is now Required to Access OMEGA Technical Areas

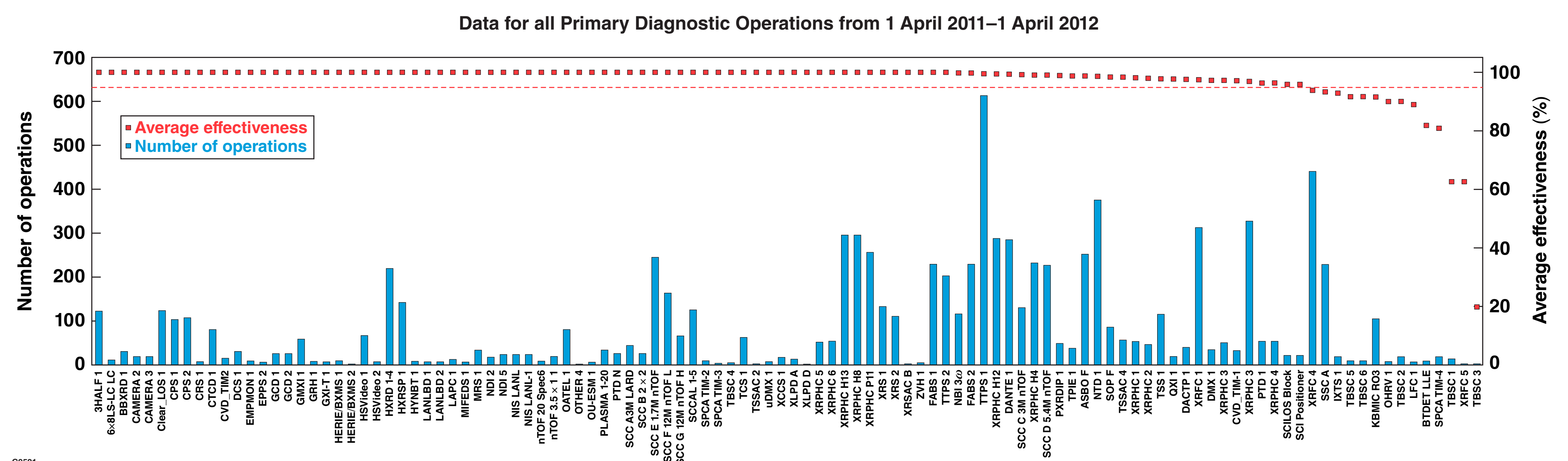


- Objectives
 - personnel safety
 - efficient, integrated operations
- IST Qualification
 - safety: current LLE safety training (online)
 - access: current OMEGA access training (online)
 - knowledge: demonstration of knowledge of the subsystem and procedures
- Authorization
 - work authorization permits specify and coordinate approved work to ensure safety and efficient system operations



G9526

OMEGA-60 Diagnostic Operations and Effectiveness Data



G9521

The OMEGA Experimental System Evolution Continues

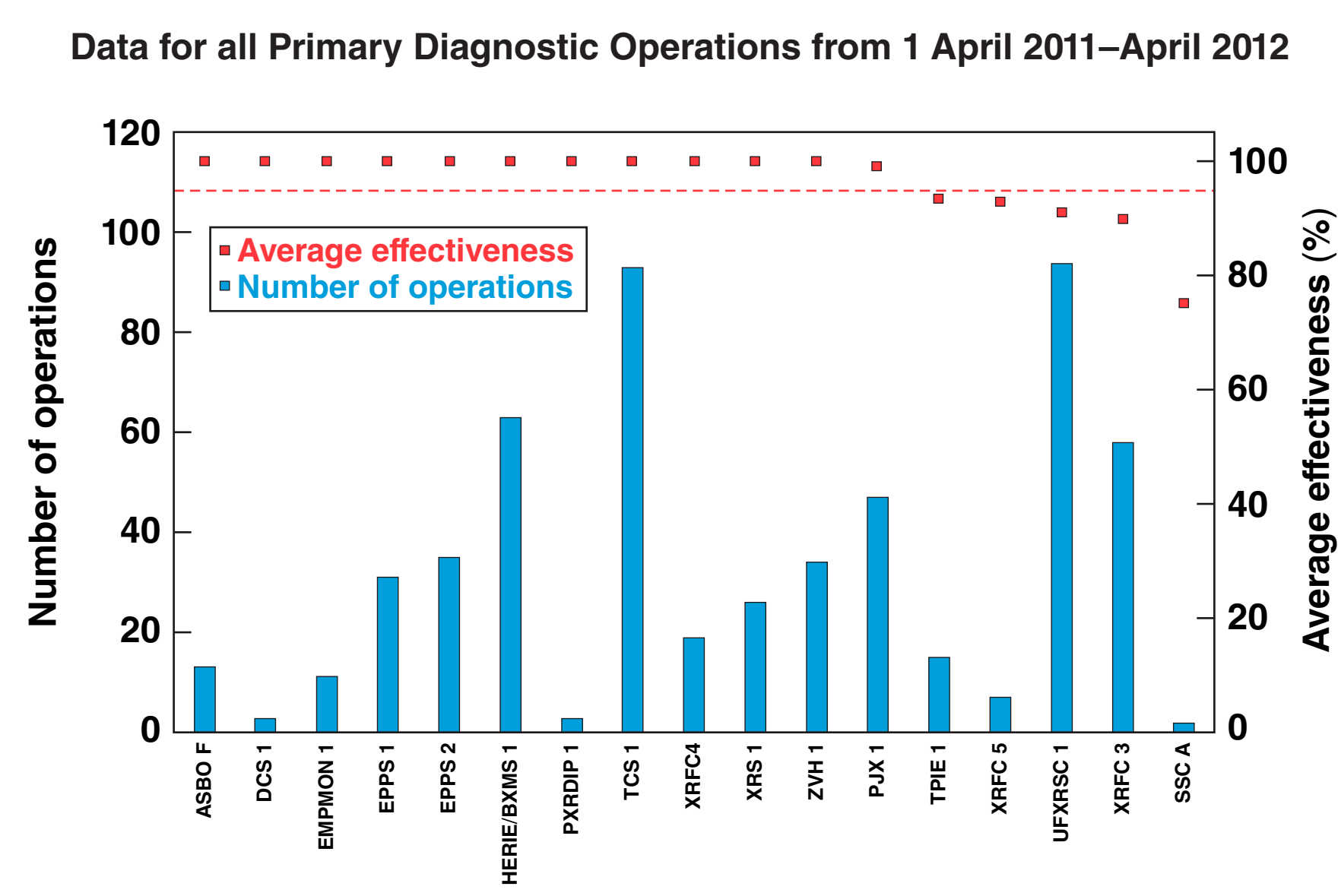


- New this year
 - a TIM-based target positioner is now available for use on OMEGA EP
 - TIM-3 control system upgraded to OMEGA EP specifications
- Coming soon
 - OMEGA Port P2 to be revised
 - new neutron diagnostic inserter
 - new x-ray pinhole camera
 - TIM-5 control system upgrade
- Decommissioned
 - OMEGA plasma calorimetry system



G9524

OMEGA EP Diagnostic Operations and Effectiveness Data



G9522

Improvements to OMEGA Target Chamber (TC) Vacuum Performance



- Issue: OMEGA TC operating pressure has risen over the lifetime of OMEGA
 - high base pressure ($>2 \times 10^{-5}$ Torr) lengthens the shot cycle and can adversely effect instrument operation
 - gas-load effect has significant leverage versus pump-speed effects
- Strategy: Reduce OMEGA TC gas load by sealing leaks, reducing surface area, and removing high gas-load materials where possible
 - enforce use of only vacuum-compatible materials
 - remove obsolete equipment from the TC
 - improve blast-window-assembly build and inspection procedures
 - implement vacuum-system data logging and improve RGA system to improve our performance measurement capability
 - refurbish TC cryogenic pumps to achieve best-possible pump speed

G9523

Average Effectiveness for OMEGA-60 Primary Diagnostics Continued to Report Above 95% for FY11



Description	2007	2008	2009	2010	2011
Number of primary diagnostics operations reported	12,950	8,872	6,315	7,592	8,794
Number of primary diagnostic types used	97	86	97	101	103
Average diagnostic effectiveness	96.8%	98.2%	96.3%	97.6%	98.46%
% diagnostics reported \geq 95% effectiveness	82.5%	86.1%	83.5%	87.1%	91.3

- 98 of every 100 primary diagnostic operations in FY11 were reported as 100% effective on OMEGA-60 by the PI

Average Effectiveness for OMEGA EP Target Diagnostics Reported Above 95% for FY11



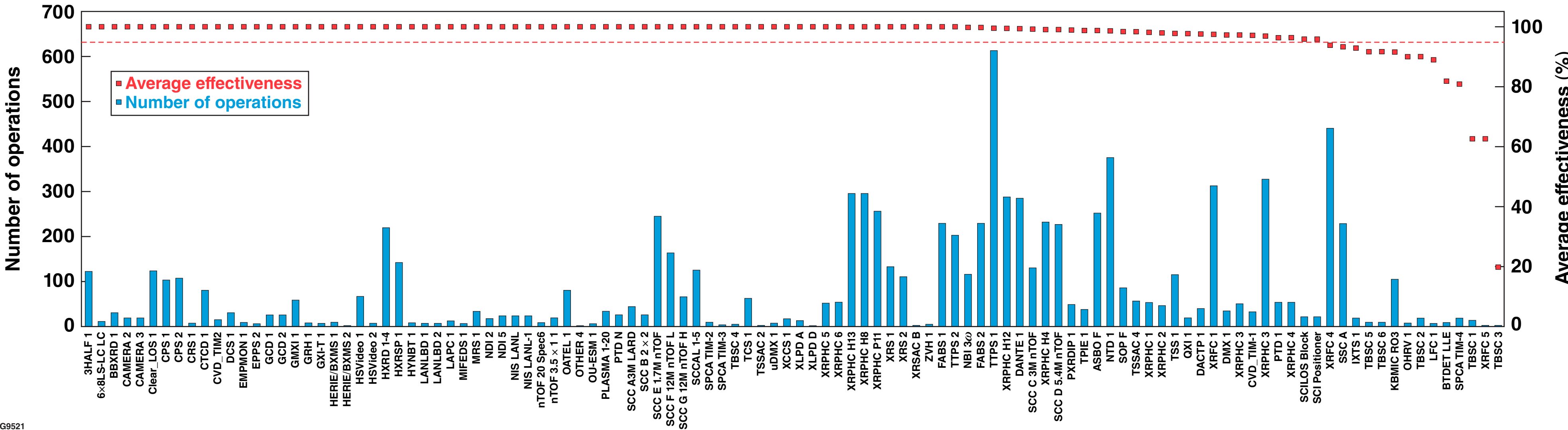
Description	2010	2011
Number of primary diagnostics operations reported	1,475	1,408
Number of primary diagnostic types used	53	57
Average diagnostic effectiveness	97.9%	97.2%
% diagnostics reported \geq 95% effectiveness	87.8%	93.0

- 98 of every 100 primary diagnostic operations in FY11 were reported as 100% effective on OMEGA EP by the PI

OMEGA-60 Diagnostic Operations and Effectiveness Data



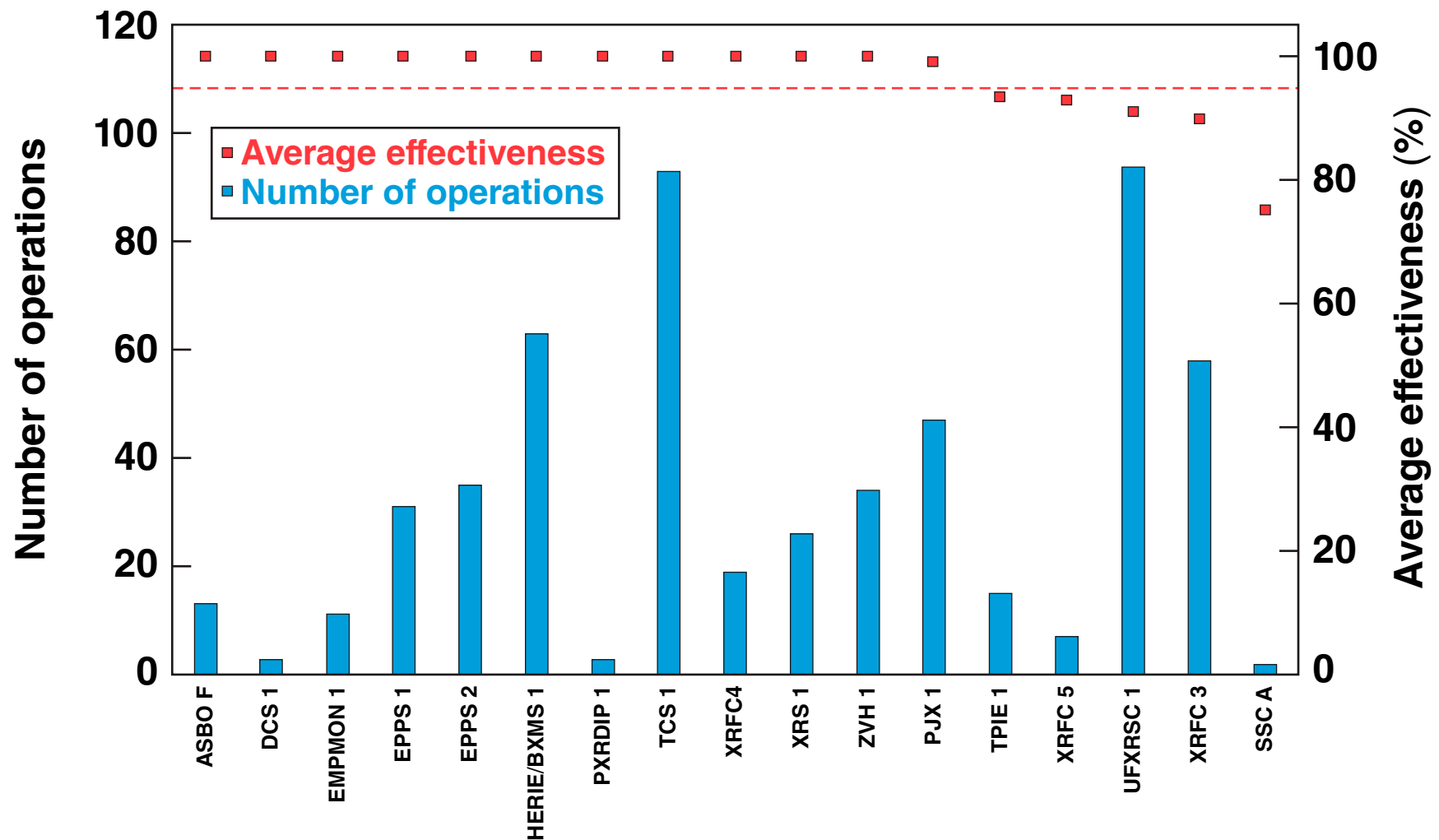
Data for all Primary Diagnostic Operations from 1 April 2011–1 April 2012



OMEGA EP Diagnostic Operations and Effectiveness Data



Data for all Primary Diagnostic Operations from 1 April 2011–April 2012



Improvements to OMEGA Target Chamber (TC) Vacuum Performance



- **Issue: OMEGA TC operating pressure has risen over the lifetime of OMEGA**
 - high base pressure ($>2 \times 10^{-5}$ Torr) lengthens the shot cycle and can adversely effect instrument operation
 - gas-load effect has significant leverage versus pump-speed effects
- **Strategy: Reduce OMEGA TC gas load by sealing leaks, reducing surface area, and removing high gas-load materials where possible**
 - enforce use of only vacuum-compatible materials
 - remove obsolete equipment from the TC
 - improve blast-window-assembly build and inspection procedures
 - implement vacuum-system data logging and improve RGA system to improve our performance measurement capability
 - refurbish TC cryogenic pumps to achieve best-possible pump speed

The OMEGA Experimental System Evolution Continues



- **New this year**
 - a TIM-based target positioner is now available for use on OMEGA EP
 - TIM-3 control system upgraded to OMEGA EP specifications
- **Coming soon**
 - OMEGA Port P2 to be revised
 - new neutron diagnostic inserter
 - new x-ray pinhole camera
 - TIM-5 control system upgrade
- **Decommissioned**
 - OMEGA plasma calorimetry system

New P2 port



The LLE Diagnostic Qualification Process Has Been Revised for FY12



- **LLE INST 7700G establishes the process for the integration of new hardware into OMEGA**
 - **external projects are initiated through the Experimental Support Group**
 - **see Chuck Sorce with diagnostic requests**
 - **all new or modified diagnostic subsystems must complete LLE qualification a minimum of two weeks before first use**
 - **the project design review requirements are assessed at the beginning of the design cycle**
 - **major projects require a significant design effort**
 - **the role of Instrument Specialists is integrated into the design cycle**

Instrument Specialist/Technician (IST) Certification is now Required to Access OMEGA Technical Areas



- **Objectives**
 - personnel safety
 - efficient, integrated operations
- **IST Qualification**
 - safety: current LLE safety training (online)
 - access: current OMEGA access training (online)
 - knowledge: demonstration of knowledge of the subsystem and procedures
- **Authorization**
 - work authorization permits specify and coordinate approved work to ensure safety and efficient system operations

