



Environment, Health,  
& Safety Manual

# 2015 Annual Report



# THE STEWARD OBSERVATORY ANNUAL SAFETY REPORT

## 2015





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# 2015 Annual Report



The Steward Observatory Safety Committee membership includes representation from research and operation units within Steward Observatory. Other collaborating partners are the Large Binocular Telescope Organization (LBTO) and MMT Observatory (MMTO). Together, these three separate organizations participate in a joint safety committee.

The Executive Safety Committee members met in December 2014 to define the Steward Observatory Safety Management System goals for 2015.

The goals defined were to:

- Significantly increase management participation with the Steward Observatory Safety Management System and to be more involved in safety decisions
- Assure adequate safety training and record keeping for each department of Steward Observatory and the LBTO
- Assure the implementation of the Global Harmonization System

We believe these goals were mostly fulfilled as we had more Vice Presidents, Directors, Assistant Directors, and Managers attending safety functions, as well as participation in other “behind the scenes” activities in 2015.

The committee did quite well in providing training for our employees. Currently there are four training and record keeping systems: UA/UITs; D2L; SO System; and the Radiation, Chemical and Biological Safety used by Steward Observatory. Each system offers different types of training and documentation with various advantages, and all are in different stages of development and capability. Three of the training and documentation systems are controlled by UA, one by Steward Observatory. The committee’s long-term goal is to get a single UA central system that provides adequate safety training and record keeping.

We began seriously working on the Global Harmonization System in October 2015, and as of the start of the 2016, year we are well on our way to implementation.

Our first Trimester meeting was held on Tuesday, May 5, 2015, at which time we had some very distinguished speakers.

- Our keynote speaker, Dr. Kimberly Andrews Espy, Senior Vice President for Research, delivered her message “Never Settle – Safety”. Her message enhanced education and innovation for the Department of Astronomy and Steward Observatory Research Projects and the value of Safety in the University’s Never Settle Campaign.
- Steve Holland, Assistant Vice President of Risk Management Services, provided insight to the changes within his department.





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- Mark Norton, MAOM, RSP, Norton Safety Services, presented a very motivating message with his theme of “Safety Pays in More Ways Than One”.
- Shannon Hartsuck, Assistant Director, Employment-Employee Relations and Human Resources, encouraged leaders to take research to a new level with safety and resources and avoid the pitfalls of mediocrity.
- Cory Knop from the MMTO provided an overview of the Steward Observatory Safety Training Website in an effort to increase participation and use.

The second Trimester meeting was held on December 3, 2015. Topics encompassed training on Workplace Violence and Policy on UA Campus, a new injury reporting system and the comprehensive Chemical Safety Program, now available for Steward Observatory:

- Leslie Porter, Sr. Director Human Resources who presented on Workplace Violence.
- Richard Wagner, Research Laboratory and Safety Service who presented on the turn-key Chemical Safety Program.
- Julia Rosen, MS, CIH, Risk Management Services who gave an update on the release of the new UA Injury Reporting System to be released in March 2016.

**2015 proved to be a very successful year for safety training. Some of the mandatory and essential safety training was completed throughout the year at the various telescope and Steward Observatory sites included:**

- Arc Flash
- CPR/AED and First Aid Training
- Boom Lift Training
- Defensive Driving Training
- Forklift Training
- NFPA 70 E Training
- Preventing Discrimination and Harassment for Nonsupervisory Employees, Supervisors and Faculty
- Scissor Lift Training
- State Risk Training on Fuel Tank Programs and Underground Tank Programs
- Wildland Fire Fighter Training was completed by MGIO employees

- Crane and Rigging Training was also completed by MGIO and other employees
- Wheeled Crane training and Arc Flash training was completed by many Mountain Operation employees from each of the telescope sites
- LBTO conducted Basic Laser Training

### **Some notable individual training included:**

Jim Grantham, Mount Lemmon General Maintenance Services Supervisor, received training and obtained his Grade 1 Water Treatment Plant Operator and water Distribution License.

John Dimiceli, MMTTO Safety Coordinator on site, recently completed an 80 hour Wilderness First Responder Class.

**The second half of 2015 was just as productive for conducting safety training. All Mirror Lab, ETS, and OSC Large Optic shop employees participate in monthly training classes on a variety of topics taught by Mark Norton, of Norton Safety Services. The series included:**

- Controlling Hazardous Energy, a review of OSHA's Lockout /Tagout Regulation
- Understanding OSHA's Multi-employer Policies
- Personal Protective Equipment
- Safety Training....Why?
- Scaffolding
- Situational Awareness
- Walking, Working Surfaces Ladder Safety
- Who Me? Safety Role

In addition to all the training that took place in 2015, MMTTO employees John Dimiceli, Mechanical Support, on-site Safety Coordinator, Cory Knop, Electronic Support, Safety Coordinator, and Richard Ortiz, Mountain Operations Manager, attended the National Safety Council 2015 Congress & Expo, September 26<sup>th</sup> – October 2<sup>nd</sup> in Atlanta, GA. They all displayed a very enthusiastic and "let's get to it" attitude toward safety concerns.

Several employees attended safety training at the Safety Works Expo held in Tucson, AZ on September 29<sup>th</sup> at Loews Ventana Canyon Resort and on October 20<sup>th</sup> at the Desert Willow Conference Center in Phoenix, AZ. Employees also attended monthly American Society of Safety Engineers Meetings.



**There have been a number of safety improvements this year at various laboratories and telescope sites:**

## **Steward Observatory**

Perhaps the most important and expensive project, in terms of both time and money, has been improving the air quality in the Steward Observatory building, particularly the first floor basement.

For years, the smell of oil permeated the basement near the machine shop. Then, after the Cherry Avenue repaving project was completed, the smell of sewage gas was apparent as well from time to time. Since then, there have been continuous efforts to improve the air quality in the Steward Observatory building.

First, the first floor sewage systems were completely rebuilt and made air tight. Second, the maintenance room air handling system was rebuilt and vented properly, and third, a new ventilation system was installed in the machine shop. Facilities Management and Risk Management Services were consistently very responsive to the concerns of employees throughout this maintenance process. Although much was accomplished this year, further testing, evaluations, and repairs will carry into 2016 in order to resolve the issue. A building 65 Task Force was created whose members include building occupants, Risk Management Services, Facilities Management, and Joaquin Ruiz, Executive Dean, College of Letters, Arts and Science. The goal is to ensure that remaining issues with air quality and environmental conditions in the building are resolved.

## **Vatican Advanced Technology Telescope (VATT)**

An easily-breakable plastic tube used for carrying liquid nitrogen has been replaced with a new stainless steel one to prevent the potentially harmful chemical from splashing onto employees. Also, new vent covers are being added to the telescope dome to prevent disruptive substances, such as water from a rainstorm and embers from a fire, from entering.

## **Imaging Technology Laboratory (ITL)**

In December 2014, ITL began its own improvements by installing an acid spinner. Rietta Wagoner, Mirror Lab Industrial Hygienist Safety Intern, and Teresa Lappin, ITL Research Specialist Senior, reviewed the unit and developed procedures for safe use. The acid spinner has been used for research purposes since early 2015.

More recently, ITL installed a new, more versatile and hi-tech sink and eye wash station in its Chemistry Lab.

## MMT Observatory (MMTO)

The steep road leading to the observatory poses many safety concerns but measures were implemented this year to reduce them. First, a number of new guardrails were installed along the road and plans are being developed to install more soon. Second, the road is being repaved with electrical heaters for increased safety during the winter.

## Mount Lemmon Sky Center

New wide angle cameras have been installed to help astronomers see the telescopes when they are operating from a remote location. Rope lights have also been installed on Sky Center walkways to make them more visible for visitors.

## Large Binocular Telescope Observatory (LBTO)

Several major projects were completed at LBTO this year. New attachments were added to the dome seams to prevent water leaks. The existing observation deck was removed to make room for new telescope equipment. A test fit of the new LINK NIRVANA instrument was completed, and a proper system for dealing with hazardous waste was developed after a glycol leak was discovered and contained. No injuries occurred during any of these projects.

Additionally, LBTO management approved the hiring of a full time Safety Engineer who will be stationed in Safford, AZ.

## RFC Mirror Lab

In 2015, the Mirror Lab rebuilt the Large Optical Grinder (LOG) equipment for generating mirrors. The scope of work included a new platform on the west end of the LOG, new electronic hardware and new operating software. The platform is equipped with guardrails for fall prevention for tool operations. Ergonomics for tool handling and a new mist containment system improvements have benefited the health and safety of personnel operating the LOG. Engineer written procedures, as well as a *training qualification matrix* was applied to all LOG operations.

One of the Mirror Lab's most important safety improvements was the design and construction of a Personnel Containment System which can be installed around both 6.5m and 8.4m mirrors in the Test Tower. Although not yet deployed, this system will provide safe access and fall restraint protection to employees working on top of the mirror, which is 10 feet off the ground.

Another important improvement was the implementation of "Bi-Weekly Safety Huddles". Every two weeks, all employees gather for 15 minutes to discuss a safety concern that someone recently witnessed or experienced firsthand either in the Mirror Lab, or out in the world. The most recent safety huddle addressed the need for scaffolding training. Started by Mirror Lab Manager Stuart Weinberger, these safety huddles were designed to enhance employees' abilities to recognize and manage risk, which has quickly proven to be a very effective tool for raising awareness of safety issues within the work place.





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*During 2015, there were 25 safety inspections at various sites and offices which resulted in the discovery 67 safety infractions. 60 of these infractions were corrected. Since we began our Safety Management System nine years ago, we have corrected 1,008 safety infractions in total.*

## Injury Report - Statistics According to Official U of A Data:

**OSHA Recordable Accidents = O**

**Injuries = I**

**Illnesses = IL**

**Lost Time Accidents = L**

**Total Lost Work Days = T**

	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
<b>O</b>	04	04	06	07	08	08	04	08	13	14
<b>I</b>	05	06	05	14	13	12	11	23	25	06
<b>IL</b>	00	02	01	00	01	03	01	01	02	04
<b>L</b>	00	00	00	01	01	01	00	00	01	03
<b>T</b>	<b>00</b>	<b>00</b>	<b>00</b>	<b>10</b>	<b>33</b>	<b>06</b>	<b>00</b>	<b>00</b>	<b>07</b>	<b>164</b>

According to the official OSHA Form 300A Report, we had a total of five injuries in 2015. None of the five injuries included a skin disorder, respiratory condition, poisoning, hearing loss, or other illness.

Although our OSHA recordable injuries remained at four, this is the fourth year in a row we have had an improvement in our accident rate. Since we began our Safety Management System we have shown a major reduction in Lost Work Days as well as OSHA Recordable Accidents. It should also be noted, statistics reported for 2006 to 2012 include all of Steward Observatory, Mirror Lab, LBTO, and Vatican Observatory, but not MMT0. For the second year now, the MMT0 is included in the above statistics, which results in an even larger improvement in our Safety Record.



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## Steward Observatory Site Inspections

Site	Inspected	Found	Inspected	Rem.	+	New	Inspected	Rem.	+	New	Inspected	Rem.	+	New	Inspected	Rem.	+	New
Mt Lemmon	03/30/06	24	08/09/06	6	+	2	03/15/07	3	+	4	07/05/07	3		8	12/05/07	2		9
KP & Sunny	04/25/06	24	08/17/06	7	+	0	01/25/07	2	+	0	07/06/07	1		7	11/28/07	0		0
MGIO	05/03/06	2	08/22/06	0	+	0	04/04/07	0	+	0	08/29/07	0		0	01/16/08	0		1
VATT	05/03/06	28	08/14/06	24	+	1	04/04/07	13	+	7	08/29/07	14		2	01/16/08	2		1
LBTO	05/04/06	9	08/22/06	0	+	3	04/04/07	0	+	0	08/29/07	0		8	01/16/08	2		1
SO & Tele	05/25/06	72	11/28/06	38	+	10	05/03/07	27	+	21	09/05/07	22		5	02/04/08	13		15
Imaging Tech	05/31/06	9	11/29/06	0	+	1	04/16/07	0	+	0	09/11/07	0		3	02/04/08	1		0
SMP	06/02/06	5	11/29/06	4	+	6	05/24/07	3	+	2	09/20/07	1		2	02/06/08	0		3
Tumamoc Hill	-	-	08/23/06	3		-	02/20/07	0	+	0	mothballed							
12-Meter	04/25/06	9	08/07/06	0	+	6	01/25/07	4	+	5	08/07/07	5		2	11/28/07	1		2
SMT	05/03/06	15	08/22/06	9	+	12	04/04/07	3	+	4	08/29/07	4		3	01/16/08	2		1
RFC Mirror Lab	05/23/06	23	12/07/06	10	+	10	05/24/07	6	+	17	09/20/07	14		12	02/06/08	10		5
<b>Totals</b>		<b>220</b>		<b>101</b>	<b>+</b>	<b>51</b>		<b>61</b>	<b>60</b>		<b>64</b>	<b>52</b>		<b>33</b>	<b>38</b>			
<b>Total items fixed</b>				119				210			267			350				
<b>Total infractions</b>		220				271			331			383						421





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previous:

Site	Inspected	Rem.	+	New	Inspected	Rem.	+	New	Inspected	Rem.	+	New	Inspected	Rem.	+	New
MT Lem & C-Tele	03/31/08	4	+	13	09/04/08	8	+	5	01/21/09	3		3	07/07/09	1		3
KP & Sunny	05/08/08	0	+	4	08/07/08	1	+	1	12/16/08	2		0	06/04/09	2		7
MGIO	06/16/08	0	+	0	10/01/08	0	+	0	03/11/09	0		0	07/13/09	0		0
VATT	06/16/08	0	+	0	10/01/08	0	+	0	03/11/09	0		0	07/13/09	0		0
LBTO	06/16/08	0	+	4	10/01/08	0	+	1	03/11/09	0		1	07/13/09	0		0
SO Office & Labs	06/19/08	17	+	11	11/05/08	10	+	10	04/02/09	8		30	07/28/09	10		6
Imaging Tech		0	+	0	11/06/08	0	+	2	05/18/09	0		1	08/25/09	0		0
LBTI Lab & So Te	06/17/08	0	+	2	11/20/08	0	+	11	04/9&5/6	1		4	08/19/09	0		2
Tumamoc Hill	mothballed		+		mothballed		+		mothballed				07/07/09	0		0
12-Meter	05/08/08	2	+	2	08/07/08	0	+	0	12/16/08	0		3	06/04/09	0		3
SMT	06/16/08	1	+	4	10/01/08	1	+	2	03/11/09	1		2	07/13/09	3		2
RFC Mirror Lab	06/17/08	8	+	7	11/20/08	3	+	2	04/15/09	0		29	07/28/09	6		2

**Totals** **32 + 47** **23 34** **15 73** **22 25**

**Total items fixed**

Total infractions

389 468 445 502 487 575 553 600

Continued  
from previous:

Site	Inspected	Rem.	+	New	Inspected	Rem.	+	New	Inspected	Rem.	+	New	Inspected	Rem.	+	New
MT Lem & C_Tele	11/09/09	1	+	0	04/29/10	0	+	2	12/08/10	1		0	04/28/11	1		1
KP & Sunny	11/18/09	0	+	1	04/14/10	0	+	4	11/30/10	0		2	03/08/11	0		0
MGIO	11/10/09	0	+	0	05/12/10	0	+	1	09/21/10	0		0	05/26/11	0		0
VATT	11/10/09	0	+	0	05/12/10	0	+	0	09/21/10	0		1	05/26/11	0		0
LBTO	11/10/09	0	+	0	05/12/10	0	+	0	09/21/10	0		3	05/26/11	1		2
SO & Annex	02/04/10	7	+	12	06/22/10	5	+	6	01/06/11	6		14	07/19/11	5		18
Imaging Tech	03/02/10	0	+	0	07/21/10	0	+	2	01/06/11	0		0	07/12/11	0		0
LBTI & Solar Tra	02/08/10	1		1	06/23/10	0	+	5	12/14/10	0		2	07/12/11	0		2
Tumamoc Hill	mothballed		+		mothballed		+		mothballed				mothballed			
12-Meter	11/18/09	0	+	1	04/14/10	1	+	3	11/30/10	1		2	03/08/11	0		1
SMT	11/10/09	2	+	1	05/12/10	0	+	4	09/21/10	2		0	05/26/11	2		2
RFC Mirror Lab	03/05/10	1	+	28	07/15/10	3	+	4	11/22/10	0		7	08/02/11	0		4

**Totals** **12 + 44** **9 31** **10 31** **9 30**

**Total items fixed**

Total Infractions

588 644 635 675 665 706 697 736



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Continued  
from previous:

Site	Inspected	Rem.	+	New	Inspected	Rem.	+	New	Inspected	Rem.	+	New	Inspected	Rem.	+	New
MT Lem & C Tele	11/17/11	0	+	2	05/16/12	0	+	7	11/19/12	5		2	05/28/13	3		2
KP & Sunny	11/22/11	0	+	2	05/29/12	0	+	0	11/15/12	0		0	05/21/13	0		6
MGIO	09/19/11	0	+	1	05/09/12	0	+	1	11/08/12	0		0	05/02/13	0		0
VATT	09/19/11	0	+	0	05/09/12	0	+	0	11/08/12	0		0	05/02/13	0		0
LBTO	09/19/11	0	+	4	05/09/12	1	+	0	11/08/12	0		1	05/02/13	0		3
SO & Annex	02/27/12	8	+	18	09/17/12	8	+	6	04/09/13	9		11	11/20/13	12		14
Imaging Tech	05/01/12	0	+	1	01/14/13	0	+	0	06/10/13	0		2	11/04/13	0		0
Solar Tracker	03/20/12	0	+	1	08/14/12	1	+	1	03/26/13	0		2	11/25/13	0		0
Optics Shop				+				+	12/18/12	0		18	05/23/13	2		4
12-Meter	11/22/11	0	+	0	05/29/12	0	+	1	11/15/12	0		0	05/21/13	0		0
SMT	09/19/11	1	+	0	05/09/12	0		0	11/15/12	0		0	05/02/13	0		3
RFC Mirror Lab	02/29/12	0	+	11	10/04/12	0	+	5	04/09/13	0		11	11/27/13	0		8

Total items fixed  
Total infractions

<b>Totals</b>		<b>9</b>	<b>+</b>	<b>40</b>		<b>10</b>		<b>21</b>		<b>14</b>		<b>47</b>		<b>17</b>		<b>40</b>
		<b>727</b>				<b>766</b>				<b>783</b>				<b>827</b>		
				<b>776</b>				<b>797</b>				<b>844</b>				<b>884</b>

Continued  
from previous:

Site	Inspected	Rem.	+	New	Inspected	Rem.	+	New	Inspected	Rem.	+	New	Inspected	Rem.	+	New
MT Lem & C Tele	11/05/13	3	+	3	04/08/14	4	+	2	10/01/14	2		2	04/14/15	1		3
KP & Sunny	11/12/13	1	+	3	04/01/14	2	+	2	11/12/14	2		1	04/08/15	0		2
MGIO	09/25/13	0	+	4	05/13/14	0	+	1	09/18/14	0		0	05/19/15	0		0
VATT	09/25/13	0	+	0	05/13/14	0	+	1	09/18/14	0		1	05/19/15	0		0
LBTO	09/25/13	0	+	0	05/13/14	0	+	0	09/18/14	0		0	05/19/15	0		2
MMTO	10/24/13	0	+	32	06/11/14	0	+			0				0		
SO & Annex		0	+		05/21/14	14	+	6	11/24/14	6		15	05/18/15	3		12
Imaging Tech		0	+		05/20/14	0	+	0	12/02/14	0		3	05/11/15	0		2
Solar Tracker		0	+		05/19/14	0	+	0	11/20/14	0		4	05/20/15	1		0
Optics Shop	11/26/13	0	+	12	06/03/14	2	+	6	11/19/14	2		0	05/12/15	1		0
12-Meter	11/22/13	0	+	0	04/01/14	0	+	0	11/12/14	0		7	04/08/15	4		3
SMT	09/25/13	2	+	3	05/13/14	3		0	09/18/14	0		1	05/19/15	1		1
RFC Mirror Lab		0	+		05/22/14	0	+	1		0			02/09/15	0		4

Total items fixed

<b>Totals</b>		<b>6</b>	<b>+</b>	<b>57</b>		<b>25</b>		<b>19</b>		<b>12</b>		<b>34</b>		<b>11</b>		<b>29</b>
		<b>878</b>				<b>916</b>				<b>948</b>				<b>983</b>		





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Total infractions 941 960 994 1023

	Site	Inspected	Rem.	+	New	Inspected	Rem.	+	New	Inspected	Rem.	+	New	Inspected	Rem.	+	New
Continued from previous:	MT Lem & C Tele	09/30/15	1	+	6		0	+			0				0		
	KP & Sunny	11/10/15	1	+	0		0	+			0				0		
	MGIO	09/16/15	0	+	0		0	+			0				0		
	VATT	09/16/15	0	+	1		0	+			0				0		
	LBTO	09/16/15	0	+	1		0	+			0				0		
	MMTO	10/20/15	0	+	6		0	+			0				0		
	SO & Annex	11/09/15	7	+	9		0	+			0						
	Imaging Tech	11/23/15	0	+	0		0	+			0						
	Solar Tracker	12/09/15	0	+	1		0	+			0						
	Optics Shop	10/19/15	1	+	2		0	+			0				0		
	12-Meter	11/10/15	5	+	5		0	+			0				0		
	SMT	09/16/15	0	+	0		0				0				0		
	RFC Mirror Lab	12/14/15	0	+	7		0	+			0						
	<b>Totals</b>		<b>15</b>	<b>+</b>	<b>38</b>		<b>0</b>	<b>+</b>	<b>0</b>		<b>0</b>	<b>+</b>	<b>0</b>		<b>0</b>	<b>+</b>	<b>0</b>
<b>Total items fixed</b>			<b>1008</b>				<b>0</b>				<b>0</b>				<b>0</b>		
<b>Total infractions</b>					<b>1061</b>				<b>0</b>				<b>0</b>				<b>0</b>



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Prepared by:

A handwritten signature in blue ink that reads "Dale A. Webb".

Dale A. Webb  
Safety Manager

A handwritten signature in blue ink that reads "Karen Kenagy".

Karen Kenagy  
Assistant Safety Manager

Approver:

A handwritten signature in blue ink that reads "Buell Jannuzi".

Buell Jannuzi  
Director

A handwritten signature in blue ink that reads "Jeffrey S. Kingsley".

Jeffrey S. Kingsley  
Associate Director