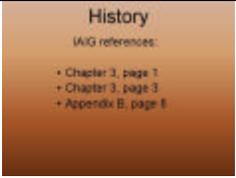


Interagency Aerial Ignition Guide
Plastic Sphere Dispenser Operator Training (01-16-04)

Introduction -Unit 0

ITEM	DESCRIPTION
Unit Objective	Introduce students to the history and use of the Premo Mark III.
Class Time	15 to 30 minutes.
Instructor Qualifications	<ol style="list-style-type: none"> 1. Qualified and current as a plastic sphere dispenser operator and any helicopter manager qualifications. <p>and</p> <ol style="list-style-type: none"> 2. Approval of regional helicopter operations specialist or State/regional aviation manager.
Materials, Equipment, & Handouts	<ol style="list-style-type: none"> 1. Materials: <i>Interagency Aerial Ignition Guide (IAIG)</i> 2. Equipment: Computer, computer projector 3. Handouts: PLDO Task Sheet
	Instructor may substitute local photographs where appropriate. Asterisks (*) in the outline refer to test questions.
	<p>I. Introduction</p> <ol style="list-style-type: none"> A. Welcome and cadre introductions B. Housekeeping <ol style="list-style-type: none"> 1. Phone messages 2. Restrooms 3. Fire exits 4. Vending machines 5. Coffee 6. Local area accommodations/directions
	<p>II. Logistics</p> <ol style="list-style-type: none"> 1. Review prerequisites. 2. Discuss the plan of events: class, bench test, field ops. 3. Distribute and explain the PLDO Task Sheet. 4. Review field requirements: PPE, lunches, water, and transportation. 5. Review the test requirements.
	<p>III. History of the PSD</p> <p>Currently, the only plastic sphere dispenser authorized for use is the Premo Mark III Aerial Ignition Device distributed by Aerostat, Inc., in Leesburg, Florida.</p> <p>The plastic sphere dispenser (PSD) machine was developed to provide a method of igniting continuous surface fuels, in a short timeframe, on large and small acreages without causing undue</p>

Introduction -Unit 0

ITEM	DESCRIPTION
	damage to the over story. This method had to be cost effective, environmentally acceptable, simple to use, and readily available.
IAIG Page III - 3	During the early 1960s, Australian foresters accepted the challenge. They developed a spot-firing technique whereby ignition devices were dropped from aircraft onto 5,000- to 10,000-acre blocks of eucalyptus forests to consume the litter and reduce the fire hazard. This early system consisted of a small plastic capsule containing potassium permanganate. A syringe was used to inject ethylene glycol into the plastic capsule, and then the charged device was dropped from an aircraft. The exothermic reaction resulted in spot fires where the device landed.
IAIG – B8	The pharmaceutical vials used by the Australians to contain the potassium permanganate were satisfactory for manual dispensers, but their irregular shape caused malfunctions when used in faster machines. The Alberta Department of Land Management and Forest, Equipment Development Section, introduced a spherical container.
	Instructor note: A discussion should follow about how the PSD is used nationally and an example of the uses specific to your area.
 <p>Operational Overview</p> <ol style="list-style-type: none"> 1. Basic applications of Premo Mark II 2. Advantages and disadvantages of PSD and helitorch 3. Premo operations sequence 	<p>IV. Operational Overview</p> <ol style="list-style-type: none"> A. Discuss basic applications for the Premo Mark III such as use on wildland fire suppression, fire use, or prescribed fire. B. Discuss the advantages and disadvantages of the PSD and helitorch. C. Discuss the cycle of events in the Premo operations sequence: <ol style="list-style-type: none"> 1. Pre-operational: check of equipment needs, logistical concerns, and aircraft. 2. Operational period: operational briefing, aircraft preflight briefing, organization, machine installation, Go/No Go checklist, recon, in-flight equipment check, test fire, firing operation, re-supply of equipment and aircraft. 3. Post-operational period: debriefing, equipment maintenance, documentation, storage and transportation of equipment and materials.

**Interagency Aerial Ignition Guide
Plastic Sphere Dispenser Operator Training (01-16-04)**

Unit 1: PSD Function and Maintenance

ITEM	DESCRIPTION
<p>Unit Objectives</p> 	<ol style="list-style-type: none"> 1. Know what the Premo Mark III aerial ignition device is and how it can be used. 2. Know the basic parts of the dispenser and their function. 3. Be able to assemble and disassemble the dispenser unit. 4. Become familiar with the ignition spheres used in the unit. 5. Become familiar with the maintenance procedures of the Premo MK III.
<p>Class Time</p>	<p>2 hours in the classroom</p>
<p>Materials, Equipment, & Handouts</p>	<p>Materials:</p> <ol style="list-style-type: none"> 1. <i>Interagency Aerial Ignition Guide (IAIG)</i> 2. <i>Premo Mark III Operators Manual</i> <p>Equipment: Premo Mark III</p> <p>Handouts: None</p>
<p>Introduction</p>	<p>I. Introduction</p> <p>Instructor note: You will need to set up the Premo Mark III in front of the class.</p> <p>The basic function of the dispenser is to inject ethylene glycol into the plastic sphere, thereby initiating an exothermic reaction with potassium permanganate, and to expel the primed sphere from the aircraft.</p> <p>Incorporated into the mainframe are the power train, glycol pump, glycol tank, separate water reservoir and pump, slipper blocks and injection mechanism.</p> <p>*The dispenser contains four slipper blocks and chutes. Drive motor speed and the number of chutes open can be varied to determine the number and spacing of ignition sources on the ground.</p> <p>*Power to the dispenser is supplied by the aircraft electrical system. The dispenser may be ordered for use with either 12- or 24-volt DC electrical systems. There are differences between older and current machines. Parts will often interchange. These points will be covered in unit 4.</p>

Interagency Aerial Ignition Guide
Plastic Sphere Dispenser Operator Training (01-16-04)
Unit 1: PSD Function and Maintenance

ITEM	DESCRIPTION
 <p>PSD COMPONENTS REFER TO IAG PAGE 16-10 & 11</p>	<p>II. Parts of the dispenser and function</p> <p>A. Main frame: Constructed of heavy gauge aluminum, 61 pounds with glycol.</p> <p>B. Cap for glycol tank: Must be tight, leak proof, and vented. Check seal. Note: Ethylene Glycol is corrosive to the airframe.</p>
 <p>CAM SHUTS HOPPER TIE DOWN STRAPS POWER CABLE EMERGENCY WATER TANK</p>	<p>C. Feed chute: Feeds balls from hopper to injection assembly.</p> <p>D. Hopper: Holds 450 spheres. Separate unit that mounts on mainframe. Contains motorized shaker that prevents balls from jamming.</p> <p>E. Tie down straps: Two-inch wide nylon webbing used to secure machine to aircraft. (Longer straps will be required for some types of aircraft; i.e., A-Star, Bell 212.)</p> <p>F. Power cable: From aircraft. 12- or 24-volt. Discuss plug standards: Type III contract requirements.</p> <p>G. Emergency water tank: Holds .8 gallons. The emergency water supply is for extinguishing fires in the PSD. Note: Emergency water is power dependent.</p>
<p>IAIG III-10 Table 3</p>  <p>FEED CONTROL MANUAL ASSIST EXIT CHUTE</p>	<p>H. Feed control: Four levers control ball entry to slipper blocks. Determines number of spheres ejected. Newer models have locking levers. (Recommend locking type levers.)</p> <p>I. Manual assist: Gear used to manually cycle injection mechanism. It is used to clear PSD following power loss or jam.</p> <p>J. Exit chute: Ensures all spheres will fall clear of aircraft. Ensure knurled nuts and wing nuts are tight. Extensions are used in some aircraft.</p>

**Interagency Aerial Ignition Guide
Plastic Sphere Dispenser Operator Training (01-16-04)
Unit 1: PSD Function and Maintenance**

ITEM	DESCRIPTION																					
	<p>K. Control panel: Switches, fuses and breakers to control pumps, emergency water, main power, and slipper block speed.</p> <p>L. Hopper power cord: Provides power to shaker assembly in the hopper.</p> <p>M. Hopper controls: Switches, fuses and breakers.</p> <p>N. Transparent plastic lid: Must be on Premo Mark III.</p>																					
	III. General Features of Plastic Sphere Dispensers (PSD).																					
IAIG III-1 Table 4	<p>A. Plastic Spheres</p> <p style="margin-left: 40px;">Material: high-impact Polystyrene</p> <table style="margin-left: 40px; border-collapse: collapse;"> <tr> <td style="padding-right: 20px;">Mass empty</td> <td style="text-align: right;">2.3 grams</td> </tr> <tr> <td>Mass KMnO (potassium permanganate)</td> <td style="text-align: right;">3.0 + 0.3 grams</td> </tr> <tr> <td>Mass total</td> <td style="text-align: right;">5.3 + 0.3 grams</td> </tr> <tr> <td>Diameter</td> <td style="text-align: right;">32 mm</td> </tr> </table>	Mass empty	2.3 grams	Mass KMnO (potassium permanganate)	3.0 + 0.3 grams	Mass total	5.3 + 0.3 grams	Diameter	32 mm													
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	<p>B. Plastic Sphere Dispenser (Premo Mark III Aerial Ignition Device)</p> <table style="margin-left: 40px; border-collapse: collapse;"> <tr> <td style="padding-right: 20px;">Main frame mass, glycol full</td> <td style="padding-right: 20px; text-align: right;">27.5 kg</td> <td style="text-align: right;">61.0 lb</td> </tr> <tr> <td>Hopper and chutes</td> <td style="text-align: right;">10.5 kg</td> <td style="text-align: right;">23.0 lb</td> </tr> <tr> <td>Emergency water tank full</td> <td style="text-align: right;">3.8 kg</td> <td style="text-align: right;">8.5 lb</td> </tr> <tr> <td>Hopper capacity (450 spheres)</td> <td style="text-align: right;">2.7 kg</td> <td style="text-align: right;">6.0 lb</td> </tr> <tr> <td>Approximate operational weight</td> <td style="text-align: right;">44.5 kg</td> <td style="text-align: right;">98.0 lb</td> </tr> <tr> <td>Glycol tank volume</td> <td style="text-align: right;">9.0 liters</td> <td style="text-align: right;">2.4 US</td> </tr> <tr> <td>Emergency water tank volume</td> <td style="text-align: right;">3.2 liters</td> <td style="text-align: right;">0.8 US</td> </tr> </table>	Main frame mass, glycol full	27.5 kg	61.0 lb	Hopper and chutes	10.5 kg	23.0 lb	Emergency water tank full	3.8 kg	8.5 lb	Hopper capacity (450 spheres)	2.7 kg	6.0 lb	Approximate operational weight	44.5 kg	98.0 lb	Glycol tank volume	9.0 liters	2.4 US	Emergency water tank volume	3.2 liters	0.8 US
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IAIG III-1 II. Description	<p>C. PSD dimensions</p> <table style="margin-left: 40px; border-collapse: collapse;"> <tr> <td style="padding-right: 20px;">Length</td> <td style="padding-right: 20px; text-align: right;">68.5 cm</td> <td style="text-align: right;">7.25 in</td> </tr> <tr> <td>Width</td> <td style="text-align: right;">27.0 cm</td> <td style="text-align: right;">10.5 in</td> </tr> <tr> <td>Height</td> <td style="text-align: right;">66.0 cm</td> <td style="text-align: right;">26.0 in</td> </tr> </table>	Length	68.5 cm	7.25 in	Width	27.0 cm	10.5 in	Height	66.0 cm	26.0 in												
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Width	27.0 cm	10.5 in																				
Height	66.0 cm	26.0 in																				
	<p>D. Overall dimensions</p> <table style="margin-left: 40px; border-collapse: collapse;"> <tr> <td style="padding-right: 20px;">Length</td> <td style="padding-right: 20px; text-align: right;">83.0 cm</td> <td style="text-align: right;">33.0 in</td> </tr> <tr> <td>Width</td> <td style="text-align: right;">33.0 cm</td> <td style="text-align: right;">13.0 in</td> </tr> <tr> <td>Height</td> <td style="text-align: right;">69.0 cm</td> <td style="text-align: right;">27.0 in</td> </tr> </table> <p>E. Total shipping weight 45.0 kg 98.5 lb</p>	Length	83.0 cm	33.0 in	Width	33.0 cm	13.0 in	Height	69.0 cm	27.0 in												
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**Interagency Aerial Ignition Guide
Plastic Sphere Dispenser Operator Training (01-16-04)
Unit 1: PSD Function and Maintenance**

ITEM	DESCRIPTION
<p>Tech Tips December 1991</p> <p>5700-9157- 1305-SDTDC</p>	<p>F. Ignition Spheres</p> <p>The sphere is a container 32 mm (1.25 inches) in diameter containing approximately 3.0 grams of potassium permanganate contained by two ultrasonically welded and permanently sealed hemispheres of high impact polystyrene.</p> <p>The rate of chemical reaction is dependent on particle size and concentration of the chemicals involved. Water-glycol solutions ranging from 50 to 100% concentration of ethylene glycol (common antifreeze) are advocated and provide reliable ignition with a time delay of at least 20 seconds.</p> <p>All shipping cases are labeled with the recommended percentage of glycol solution needed to obtain the desired time delay for the sphere type in the case.</p> <p>*Instructor note: Inform trainees of the effects of temperature and humidity on the exothermic characteristics of sphere ignition.</p>
<p>IAIG III-12 XVI - A</p>	<p>G. Ethylene Glycol</p> <p>The ethylene glycol commonly used is standard vehicle antifreeze. Other types of antifreeze may not contain enough ethylene glycol to create proper reaction with the potassium permanganate. These other types of antifreeze include biodegradable, RV, and antifreeze with high concentrations of additives. Propylene glycol is not to be used.</p>
	<p>H. Assembly and disassembly of the unit (hands-on exercise).</p>
	<p>IV. Cleaning and Preventive Maintenance</p>
	<p>A. Suggested Tools</p> <ol style="list-style-type: none"> 1. Small 3-inch slotted screwdriver 2. Medium 5-inch slotted screwdriver 3. No. 2 Robertson screwdriver (square tip) 4. Set of Allen wrenches 5. Combination box-end wrenches, 5/16, 3/8, 7/16, 1/2, 11/16 6. Small, smooth file for emergency touch-up of needles 7. Toothbrush

**Interagency Aerial Ignition Guide
Plastic Sphere Dispenser Operator Training (01-16-04)
Unit 1: PSD Function and Maintenance**

ITEM	DESCRIPTION
	<p>B. Suggested Supplies</p> <ol style="list-style-type: none"> 1. Lubricant: graphite or Teflon based (not petroleum based product) 2. Teflon tape 3. Brass wool, not steel wool 4. Scotch Brite pad
Tech Bulletin 99-02	<p>C. Suggested Spare Parts</p> <ol style="list-style-type: none"> 1. Fuses 5A, 3A, 1.5A (newer PSDs have circuit breakers) 2. Needles (set of 4) 3. Valve springs (set of 4) 4. "O" rings for valve stems (set of 4) 5. Bulbs for indicator lights 6. 1/4 x 20 wing nuts (2) 7. *Electric drive motor 8. *Electric fuel pump 9. *Solenoid valve 10. Caps for the glycol and water tank <p>*Items marked are field serviceable, but the time required may result in delays of 1 to 2 hours.</p>
	<p>D. Preventive Maintenance</p> <ol style="list-style-type: none"> 1. Keep the needles sharp; sharpen dull needles or replace if bent. 2. Keep moving parts lubricated. 3. Keep as clean as possible by removing residuals from balls and potassium as soon as possible. 4. Check slipper blocks for powder buildup after approximately 6,000 spheres.
	<p>E. Cleaning (machine empty of all spheres) (Note: Clean after each use.)</p> <ol style="list-style-type: none"> 1. Flush machine with lots of water (avoid electrical components). 2. Use cleaner-degreaser and brush to clean slipper block area. 3. Dry machine. 4. Lubricate all moving parts. 5. Cycle by hand. 6. Wipe off excess lubricant. 7. Wipe down machine with cloth dampened with lubricant. 8. Wipe down helicopter floor when PSD is removed.
	<p>F. Prolonged Storage</p>

Interagency Aerial Ignition Guide
Plastic Sphere Dispenser Operator Training (01-16-04)
Unit 1: PSD Function and Maintenance

ITEM	DESCRIPTION
	<ol style="list-style-type: none">1. Drain water reservoir.2. Drain and flush glycol reservoir.3. Check clean valve spring plugs, springs, and valves.4. Remove and clean needles; sharpen if needed.5. Lubricate all parts before reassembling.6. Check drive chain and lubricate.7. Check and clean electrical connections.

Unit 2: Operation and Safety

ITEM	DESCRIPTION
<p>Unit Objective</p> 	<p>Upon completion of this unit, the trainee will be knowledgeable of safe PSD operations to include:</p> <ol style="list-style-type: none"> 1. Briefing types and elements <ol style="list-style-type: none"> a. Operational b. Helibase c. Preflight d. Postflight e. Incident or project debrief 2. Personnel qualifications 3. Organization: personnel responsibilities 4. Communications: internal and external 5. Emergency procedures covered during briefing 6. Hazardous material handling 7. PPE 8. Case studies of close calls 9. Fire behavior (optional)
Class Time	30 minutes to 1 hour on the classroom
Materials, Equipment, & Handouts	<p>Materials:</p> <ol style="list-style-type: none"> 1. <i>Interagency Aerial Ignition Guide (IAIG)</i> 2. Safecomms of in-flight PSD emergencies; query for current and past PSD incidents and near misses; seek the assistance of the State or regional aviation specialist (see section VIII). <p>Equipment:</p> <ol style="list-style-type: none"> 1. Computer and computer projector 2. Harness, tether, and carabiners <p>Handouts:</p> <ol style="list-style-type: none"> 1. One 8.5 x 11 copy of the PSD checklist 2. Tech Tips <ol style="list-style-type: none"> a. Dec. 1991 – 5700 9157 1305-SDTDC b. Jan 1995 -5100/5700 9551-2310-MTDC c. June 1999 –99-02 OAS

Unit 2: Operation and Safety

ITEM	DESCRIPTION
	<p>I. Briefings</p> <p>A. Operational Briefing</p> <p>The operational briefing will follow the standard incident action plan (IAP) briefing format:</p> <ol style="list-style-type: none"> 1. Objectives 2. Organization and personnel 3. Assignments 4. Air operations summary 5. Weather 6. Fire behavior 7. Communications plan 8. Medical plan 9. Crash rescue plan <ol style="list-style-type: none"> a. Roles and responsibilities b. Engines, hand crews, dozers, aircraft
	<p>B. Helibase</p> <ol style="list-style-type: none"> 1. Organization and personnel 2. Communications 3. Landing areas 4. Safety/safety hazards 5. Operations 6. Administration
<p>IAIG Appendix A-14</p> 	<p>C. Preflight Briefing</p> <ol style="list-style-type: none"> 1. *Standard pilot preflight aircraft safety briefing with a discussion concerning weight and balance. 2. *Burn boss/PSD operator protocol: In-flight commands. There is a well-established process that is discussed in this unit. 3. *The pilot, ignition specialist, and PSD operator must be present at the pre-mission aircraft briefing. This briefing should address (at a minimum) in-flight commands, emergency procedures, frequency management, available flight time, equipment installation, aircrew responsibilities, and the PSD air operations/safety Go/No Go checklist. 4. *The pilot and/or mechanic must inspect and approve of the PSD machine installation.

Unit 2: Operation and Safety

ITEM	DESCRIPTION
 <p>BRIEFINGS</p> <ul style="list-style-type: none"> • Post Flight & Post Incident / Project • Success and Failures • Consequences and Mitigation • Next operational events • Documentation 	<p>D. Post Flight</p> <ol style="list-style-type: none"> 1. Success and failure 2. Consequences and mitigation 3. Documentation <ol style="list-style-type: none"> a. OAS 23s, FS 122s b. Unit log, daily diary c. Cost summary d. PSD logbook e. Safecom, SafeNet
	<p>F. Post Incident/Project</p> <ol style="list-style-type: none"> 1. Success and failure of objectives 2. Next operational period events 3. Finalization of the documentation package
 <p>Aircraft & Pilot Approved</p>	<p>II. Personnel</p> <ol style="list-style-type: none"> A. *Pilot qualification card and helicopter data card must be inspected before a mission is flown. B. *Personnel qualifications: The PSD operator must successfully complete this course and must be current. Currency consists of meeting current IAIG operator requirements.
<p>IAIG III-4</p>  <p>PSD Organization</p> <p>Who is in charge?? Anyone know the plan??</p> <p>Chapter II, page 4 in your IAIG will cover position roles and responsibilities</p> <p>What do I do??</p>	<p>III. Organization: Position Responsibilities</p> <p>Instructor note: For the purpose of this course, the burn boss/ignition specialist refers to the person riding next to the pilot.</p> <ol style="list-style-type: none"> A. PSD Operator <ol style="list-style-type: none"> 1. Serves as PSD operator to the burn boss/ignition specialist. 2. Briefs the pilot, identifies safety requirements at the operations briefing, and monitors the overall operation. 3. May serve as the helicopter manager. 4. Provides information on aerial safety procedures to be used by the burn boss/ignition specialist. 5. Is responsible for the preparation, operation, maintenance, and care of the PSD. 6. Verifies for the burn boss/ignition specialist that prescribed spacing of ignition is occurring and recommends

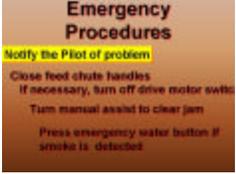
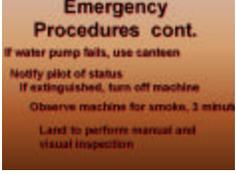
Unit 2: Operation and Safety

ITEM	DESCRIPTION
	<p>necessary adjustments.</p> <ol style="list-style-type: none"> 7. Determines if a malfunction occurs and acts accordingly. 8. Determines whether an onboard fire can be extinguished or the unit must be jettisoned. 9. Communicates on all procedures associated with the operation and/or emergencies occurring during the operation.
	<p>Instructor note: Some agencies require the operator to wear a full-body restraint system in addition to seat belts. Seat belts shall be worn according to the manufacturer's specifications. See IAIG Chapter III.VI.A</p>
	<p>B. Pilot</p> <ol style="list-style-type: none"> 1. The Pilot will be carded/approved for aerial ignition Premo Mark III operations. 2. The pilot will follow the lighting plan under the direction of the burn boss/ignition specialist. 3. The pilot-in-command is responsible for all matters related to aircraft operations and safety.
<p>IAIG III-5</p> 	<p>IV. Communications</p> <p>A. *Internal Communications</p> <p>All three personnel inside of the ship must have intercom.</p> <p>Sequence of commands to begin firing:</p> <ol style="list-style-type: none"> 1. The ignition specialist communicates to the PSD operator, "Prepare to fire/activate machine." 2. The operator's actions: <ol style="list-style-type: none"> a. Hopper feed switch on b. Drive motor on c. Glycol pump on 3. The PSD operator communicates to the burn boss/ignition specialist, "Ready to fire." 4. The burn boss/ignition specialist communicates to the PSD operator, "Start firing (and calls the number of chutes and machine speed)." 5. The PSD operator replies, "Firing (and calls the number of open chutes and machine speed)." 6. The PSD operator monitors the machine operation and

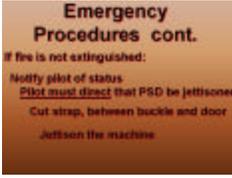
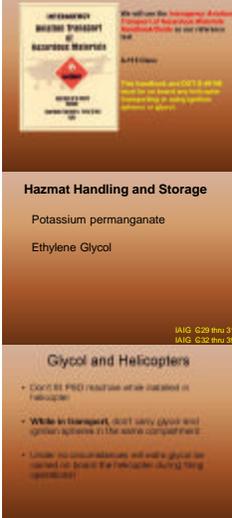
Unit 2: Operation and Safety

ITEM	DESCRIPTION
	<p>refills the hopper as needed.</p> <ol style="list-style-type: none"> 7. When appropriate, the burn boss/ignition specialist communicates, "Prepare to stop firing." 8. The PSD operator places a hand on the chute handles and communicates, "Ready to stop." 9. The burn boss/ignition specialist gives the order, "Stop firing." 10. The operator closes the chute handles and responds, "Firing stopped." 11. The operator observes the last sphere clear of the PSD and relays, "Machine cleared." 12. The burn boss/ignition specialist communicates to the PSD operator, "Secure machine" or "Prepare for next firing sequence." 13. If securing the machine, operator actions: <ol style="list-style-type: none"> a. Hopper feed switch off b. Drive motor off c. Glycol pump off 14. The PSD operator communicates, "Machine secured" or "Ready to fire."
	<p>Instructor note: It is recommended that commands be taped to the lid of the hopper.</p>
	<p>B. External Communications</p> <ol style="list-style-type: none"> 1. Use dedicated air/ground frequency to obtain clearance from holding forces that they are ready (to start and stop). 2. Some burns may only require one frequency. 3. All flight following requirements are to be met by the pilot.
	<p>V. Emergency Procedures Covered During Briefing</p> <p>Instructor note: Ensure that the students follow the correct response procedures.</p> <p>Instructor note: Specific crash procedures and crash seating positions must be discussed in the preflight briefing for aircraft being used.</p>

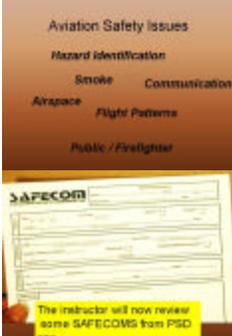
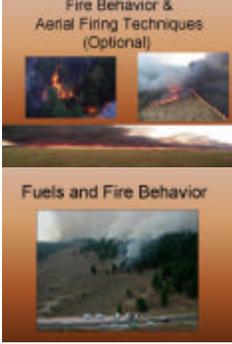
Unit 2: Operation and Safety

ITEM	DESCRIPTION
	<p>Instructor note: The jettison of the Premo Mark III from the aircraft has not been accomplished during a live operation to the best of current knowledge. The IAIG states that this should be done in the event of an uncontrollable fire. It is recommended that you first use water to extinguish the fire; if this doesn't work, jettison the machine.</p>
 <p>Emergency Procedures <small>Notify the Pilot of problem</small> <small>Close feed chute handles</small> <small>If necessary, turn off drive motor switch</small> <small>Turn manual assist to clear jam</small> <small>Press emergency water button if smoke is detected</small></p>	<p>A. *The operator notifies the pilot of the problem, gives a brief description (i.e., machine jammed, electrical short), and initiates emergency procedures.</p> <p>B. *The operator closes the feed chutes; the pilot prepares to locate a safe landing area.</p> <p>C. *If necessary, the operator will turn off the hopper feed switch, glycol pump, and drive motors.</p> <p>D. *The operator clears the machine by turning the manual assist until all spheres are ejected.</p>
	<p>Instructor note: It is very difficult to manipulate the machine so the trainee cannot clear the machine using the manual assist. The instructor must ask each trainee to demonstrate the correct procedure to follow if the manual assist fails to clear the machine.</p>
 <p>Emergency Procedures cont. <small>If water pump fails, use canteen</small> <small>Notify pilot of status</small> <small>If extinguished, turn off machine</small> <small>Observe machine for smoke, 3 mins</small> <small>Land to perform manual and visual inspection</small></p>	<p>E. If there is no fire, you may continue work after a visual inspection. If there is a fire, continue with the following steps:</p> <ol style="list-style-type: none"> 1. Press the emergency water button if smoke is detected until the fire is extinguished. Note: The indicator light will not be on, nor will the emergency water pump work, if the power is lost. 2. If the emergency water pump fails, pour water from the canteen into the hopper. 3. The operator notifies the pilot of problem status.
	<p>F. If the fire is extinguished, follow these steps:</p> <ol style="list-style-type: none"> 1. The operator turns off the motor, glycol pump, and hopper switches. 2. Watch the machine for 3 minutes for possible smoke before leaving the ignition unit. 3. Land and perform manual and visual inspection to identify and solve the problem.

Unit 2: Operation and Safety

ITEM	DESCRIPTION
 <p>Emergency Procedures cont. if fire is not extinguished: Notify pilot of status Pilot must direct that PSD be jettisoned Cut strap, between buckle and door Jettison the machine</p>	<p>G. If the fire is not extinguished, perform the following additional steps:</p> <ol style="list-style-type: none"> 1. Notify the pilot of failure to extinguish fire. The pilot must direct that the PSD be jettisoned. 2. Cut the restraining strap between the buckle and aircraft door with a seatbelt cutter. 3. Grasp the dispenser, lift, and jettison clear of the aircraft. Be aware that the power cord should separate at the quick disconnect.
 <p>Emergency Procedures cont. Complete documentation SafeCom, SafeNet PSD log book, unit log Notify agency aviation administrator</p>	<p>H. Complete documentation: Safecom, PSD maintenance log, unit log.</p> <p>I. If necessary, notify the agency aviation administrator.</p>
 <p>Hazmat Handling and Storage Potassium permanganate Ethylene Glycol</p> <p>Glycol and Helicopters</p> <ul style="list-style-type: none"> • Don't fill PSD machine if it is installed in helicopter • While in transport, don't carry glycol and ignition systems in the same compartment • Under no circumstances will extra ethylene glycol be carried on board the helicopter during firing operations 	<p>VI. Hazardous Material Information</p> <p>Instructor note: Make sure that the students know they must take the hazardous materials training as per the DOT hazardous materials exemption. The course is A-110 in the Interagency Aviation Training program. The course may be taken online at <http://iat.nifc.gov>.</p> <p>A. Discuss the requirement to have the <i>Interagency Aviation Transportation of Hazardous Material Guide</i> and exemption on board the aircraft.</p> <p>B. The basic components of the system are ethylene glycol and potassium permanganate.</p> <p>C. Material Handling</p> <ol style="list-style-type: none"> 1. *Do not fill the PSD machine with glycol while installed in the helicopter. 2. *If in transport, ethylene glycol and spheres must be in separate compartments. 3. *Under no circumstances will extra ethylene glycol be carried on board the helicopter during firing operations.

Unit 2: Operation and Safety

ITEM	DESCRIPTION
<p>Tech Tips: December 1991 5700-9157- 1305- SDTDC</p>  <p>Storage of Spheres</p> <ul style="list-style-type: none"> • Keep boxes dry and away from glycol • Rotate boxes regularly • Clean up residue and spills promptly • Utilize older spheres first • Store unused spheres in plastic bags and original box 	<p>D. Storage of Spheres</p> <ol style="list-style-type: none"> 1. Keep boxes dry because spheres are not sealed against moisture. Store away from glycol and petroleum products. 2. Flip boxes over every 3 months or drop boxes approximately 3 feet to prevent clumping of potassium permanganate. 3. Sweep up residue and spills promptly. 4. Insure older spheres are used first. 5. Unused spheres should be stored in a clean plastic bag and the original box. <p>Instructor note: In-flight sphere storage: Show different types of storage by aircraft and emphasize non-porous materials.</p>
 <p>Personal Protective Equipment</p> <ul style="list-style-type: none"> • SPH-4/5 Flight Helmet • Flight Suit or Full Nomex Clothing • Flight or leather gloves • Leather boots, minimum height above ankle • Cold weather gear, if needed; constructed of non-flammable fabrics 	<p>VII. *Personal Protective Equipment (PPE)</p> <p>Interagency-established special use equipment to be utilized on all PSD missions :</p> <ol style="list-style-type: none"> A. SPH-4/5 flight helmet. B. Flight suit or full Nomex clothing. C. Flight or leather gloves. D. Minimum above-the-ankle boots with leather uppers. E. Cold weather gear, if needed; use no flammable insulating garments, i.e., no down jackets, nylon, etc.
 <p>Aviation Safety Issues</p> <p>Hazard Identification</p> <p>Smoke Communication</p> <p>Airspace Flight Patterns</p> <p>Public / Firefighter</p> <p>SAFECOM</p> <p>The instructor will now review some SAFECOMS from PSD ops</p>	<p>VIII. Case Studies of Close Calls</p> <p>To reinforce the safety requirements, discuss the Safecom reports (from the query) with the assistance of the State or regional aviation specialist.</p>
 <p>Fire Behavior & Aerial Firing Techniques (Optional)</p> <p>Fuels and Fire Behavior</p>	<p>IX. Fire Behavior Knowledge (optional)</p> <p>Instructor note: Spend more time on the fire behavior section if pilots are taking the aerial ignition training for the first time.</p> <ol style="list-style-type: none"> A. Fuels B. Weather factors C. Topographic features D. Fire behavior

Interagency Aerial Ignition Guide
 Plastic Sphere Dispenser Operator Training (01-16-04)

Unit 2: Operation and Safety

ITEM	DESCRIPTION
<p>OBJECTIVES</p> <ul style="list-style-type: none"> Identify key elements of the fire environment: <ul style="list-style-type: none"> Fuels Weather Topography Fire behavior Discuss how the fire environment influences burn objectives <p>Pre-burn Reconnaissance</p> <p>Key participants</p> <ul style="list-style-type: none"> Pilot Burn Boss/Ignition Specialist PSD Operator <p>Pre-burn Reconnaissance</p> <ul style="list-style-type: none"> A thorough recon of the burn area and a discussion of the burn objectives are essential to a successful firing operation. Fire environment elements to consider during the recon are: <p>Pre-burn Reconnaissance: Fuel Characteristics</p> <ul style="list-style-type: none"> Type and loading Continuity Fuel moisture Chemical properties <p>Pre-burn Reconnaissance: Weather Factors</p> <ul style="list-style-type: none"> Temperature Relative humidity Windforce Frontal passages Winds <ul style="list-style-type: none"> direction speed gusts wind shear Recent and expected precipitation <p>Pre-burn Reconnaissance: Topography</p> <ul style="list-style-type: none"> Slope Aspect Elevation Local influences <ul style="list-style-type: none"> canyons ridges mountains plateaus <p>Pre-burn Reconnaissance: Fire Behavior</p> <ul style="list-style-type: none"> Fire types <ul style="list-style-type: none"> surface ground Fire growth characteristics <ul style="list-style-type: none"> head fire backing fire banking fire <p>Aerial Firing Ignition Patterns</p> <ul style="list-style-type: none"> Strip-head Spot Chevron Center Backing fire Or a combination of the above <p>Interaction</p> <ul style="list-style-type: none"> Fuels, weather, topography, fire behavior, and ignition pattern all interact to create fire effects Adjustments to firing patterns can be made to produce fire effects that will meet burn objectives 	<p>Note: PSD operators should maintain situational awareness of the flight pattern as it relates to approaching fuel types, ignition pattern, and unit boundaries.</p>

Interagency Aerial Ignition Guide
 Plastic Sphere Dispenser Operator Training (01-16-04)
Unit 3: Bench Testing, Troubleshooting, and Maintenance

ITEM	DESCRIPTION
<p>Unit Objective</p>  <p>UNIT THREE Objective: students will go outside and perform the following.</p> <ul style="list-style-type: none"> • Bench Testing with the PSD • Troubleshooting • Simulated in-flight communications 	<p>Students will be able to accomplish bench testing, troubleshooting, and in-flight communications. Under no circumstances will a trainee be allowed to operate the machine in the aircraft before passing the bench-testing phase.</p>
<p>Class Time</p>	<p>1 to 3 hours outside</p>
<p>Materials, Equipment, & Handouts</p>	<p>Materials:</p> <ol style="list-style-type: none"> 1. <i>Interagency Aerial Ignition Guide</i> (IAIG) 2. <i>Premo Mark III Operators Manual</i> <p>Equipment:</p> <ol style="list-style-type: none"> 1. Premo MK III 2. Tool kit 3. Spheres: empty and loaded spheres 4. Ethylene glycol 5. Power source (24-volt converter) 6. Water 7. Metal bucket 8. Spare parts 9. Chair or seat 10. Harness(es), tethers, and carabiners <p>Handouts: none.</p>
	<p>I. Bench Testing Procedures</p> <p>Instructor note: This ratio is recommended per instructor: 5 students and 1 Premo MK III.</p> <p>A. Selection of Bench Testing Site</p> <p>This phase of the training requires the activation of ignited spheres that will create several safety hazards to training personnel and adjoining property if not properly conducted. The following safety procedures will be followed during bench testing:</p> <ol style="list-style-type: none"> 1. The training site must be outdoors and clear of buildings, vehicles, aircraft, and flammable materials. 2. Adequate fire extinguishers and water sources must be available.

Interagency Aerial Ignition Guide
 Plastic Sphere Dispenser Operator Training (01-16-04)
Unit 3: Bench Testing, Troubleshooting, and Maintenance

ITEM	DESCRIPTION
	<ol style="list-style-type: none"> 3. During this session, spheres should not be dropped in the water. If moisture is allowed to come in contact with an injected live sphere, the sphere may be propelled erratically long distances endangering personnel and property. 4. The wind direction must be considered so that the operator and trainees will stay clear of the smoke. 5. During bench testing operations, designated individuals will remove activated spheres from the test area. 6. The students shall wear eye and hand protection, flight helmet, and flight gloves (to simulate flight conditions). 7. The test platform needs to be a minimum of 30 inches high and stable to allow for the proper installation of the PSD (i.e., PSD box, heavy duty picnic table, or bench).
<p>Manufacturer's Operators Manual: Pg 14</p>	<p>B. Premo Mark III Setup</p> <p>Instructor note: Have the students talk through this process.</p> <ol style="list-style-type: none"> 1. Remove the Premo Mark III from the container. Mount the mainframe of the unit to the test platform. 2. Attach the exit chute and tie-down strap if possible. 3. Check the glycol level in the tank to assure that it is full. 4. A visual inspection of the slipper blocks and injection needles shall be accomplished. This inspection should reveal that the slipper blocks operate smoothly (through rotation of manual assist) and the needles are clear of obstruction, straight, and secured tightly. 5. Examine the interior of the mainframe with a flashlight and look for leaks, loose components, and foreign objects. 6. Connect the mainframe to the 24-volt power source. 7. Turn the drive motor on. The unit should rotate in the direction of the arrow on the manual assist. If the rotation is in the opposite direction, immediately turn off the power and check for reverse polarity. 8. If the drive motor is moving in reverse, then the positive and negative leads need to be reversed. 9. Allow the students to observe the action of the slipper blocks and needles using empty spheres. 10. Have the students look at the injected spheres. They should have been filled with approximately $\frac{3}{4}$ to $1\frac{1}{4}$ cc of glycol. 11. Install the hopper on the base. 12. Partially (halfway) fill the hopper with loaded spheres. 13. Demonstrate the use of the unit by using high/low speed and $\frac{2}{4}$ chutes.

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Unit 3: Bench Testing, Troubleshooting, and Maintenance

ITEM	DESCRIPTION
	<p>Instructor note: Review the firing commands with the students.</p> <p>Instructor note: Have the students take a break (to give the instructor time to “sabotage” the machine). Establish a student rotation.</p>
	<p>II. Student Operation</p> <p>After the instructor is assured of the trainees’ familiarity with normal operating procedures, the instructor will demonstrate the procedures necessary to clear a jammed machine. Before the trainees practice this procedure, the machine will be cleared of active spheres.</p> <p>Although there are two types of machine malfunctions that can leave a live sphere in the machine and will cause a fire inside the machine, the emergency corrective procedure is the same. The reason for simulating both types of malfunction is to emphasize the only reliable way an operator can identify a possible fire in the machine.</p>
	<p>Instructor note:</p> <ol style="list-style-type: none"> 1. You must emphasize to the students that if the manual assist stops turning, the operator must initiate emergency procedures to clear the machine. 2. Instructors shall create malfunctions at random for each trainee, with various speeds and chutes opened. If the trainees are required to keep the hopper filled during the exercise, this will simulate the actual duties of the operator. 3. To simulate problems, turning the power switch “off” on the power converter simulates a power failure or jam. 4. During this exercise, the instructor should become aware of the trainees’ abilities to react to stressful conditions and to operate the machine. Any trainee who can’t satisfactorily perform should not be allowed to operate the machine in flight. 5. At the end of this exercise, the instructor should demonstrate the effect of loose potassium permanganate coming in contact with glycol and how water is effective in extinguishing the chemical.

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Unit 3: Bench Testing, Troubleshooting, and Maintenance

ITEM	DESCRIPTION
	<p>III. Troubleshooting the PSD</p> <p>A. The spheres do not move freely in the chutes.</p> <ol style="list-style-type: none"> 1. Check the feed control handles. 2. Check to assure no jam has occurred in the hopper.
	<p>B. The drive motor does not start.</p> <ol style="list-style-type: none"> 1. Check the aircraft power supply connection, aircraft main switch circuit breaker, and PSD motor switch and fuses. Check quick disconnect to mainframe and control housing. 2. Check the wiring to the motor; repair the wiring or replace the motor.
	<p>C. The motor starts but the PSD jams.</p> <ol style="list-style-type: none"> 1. Turn off the motor switch if the PSD jams. 2. If the problem persists, close the chute control, remove the chute assembly, and check the chambers for plastic sphere fragment. 3. Check for damaged needle, replace using box-end wrench to prevent damage. Crushed spheres will indicate damaged or dull needles. 4. Slipper blocks may seize and stop the motor, which will necessitate removal, cleaning, lubricating, or replacement.
	<p>D. The glycol pump does not start.</p> <ol style="list-style-type: none"> 1. Bleed the air from the system by loosening one of the four valve spring plugs (brass plug) on the front side of the valve block and operating pump. 2. Check the glycol pump wiring; repair the wiring or replace the pump.
	<p>E. Incorrect amount of glycol.</p> <ol style="list-style-type: none"> 1. Check the glycol level in the tank and the pump operation. 2. Open or close the adjustment valves on top of the valve blocks; do not over close. *The needle should provide $\frac{3}{4}$ to $1\frac{1}{4}$ cc of glycol with each activation of the valve. 3. Check the needles for blockage; remove, clean, sharpen, and/or replace. 4. Remove the coupling to the valve block. Check for obstruction and clear supply line. Replace the pump if necessary.

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ITEM	DESCRIPTION
	<p>F. Leakage of glycol.</p> <ol style="list-style-type: none"> 1. If the leak occurs during flight, land to make repairs. 2. Check the coupling for tightness. 3. Check the valve stems/springs for obstructions in the valve block. 4. Replace the O rings on the valve stems with neoprene O rings. 5. Check the brass valve cap nuts. <p>Note: Any spilled glycol must be cleaned up thoroughly.</p>
	<p>G. Plastic spheres do not ignite.</p> <ol style="list-style-type: none"> 1. Check the fluid level in the glycol tank. 2. Take precautions against delayed ignition: Examine the spheres. 3. The contents of the primed sphere appears too dry: Insufficient glycol (see section E or F above). 4. The contents of the primed sphere is soupy (too much liquid): Excess glycol (see section E above). 5. Spheres receiving appropriate glycol: Check the glycol concentration or glycol quality. 6. Drop the boxes to loosen the potassium permanganate.
	<p>H. Ignition too soon: Less than 20 seconds.</p> <p>Follow the bench test procedure to adjust the glycol concentration.</p>
	<p>I. The water system does not function.</p> <ol style="list-style-type: none"> 1. Check the reservoir. 2. Check the line for routing kinks or blockage. 3. Check the water ports in the valve block. 4. Check the push button, wiring, solenoid, fuse, and pump. 5. Repair and replace as necessary. 6. Check for frozen lines when working in cold temperatures.
	<p>Instructor note: Spheres that have been injected will be contained and disposed of according to local hazmat procedures.</p>

Unit 4: PSD In-Flight Operations

ITEM	DESCRIPTION
<p>Unit Objective</p> 	<ol style="list-style-type: none"> 1. Properly preflight Premo Mark III. 2. Successfully install Premo Mark III in the Helicopter. 3. Participate in the preflight briefing with pilot, burn boss/ignition specialist, helibase manager, and operator; and complete PSD Air Operations/Safety Go/No Go Checklist. 4. Demonstrate proper operating procedures of the Premo Mark III while in flight. 5. Post flight debriefing and documentation.
<p>Class Time</p>	<p>Suggested time will vary due to class size. We will use the classroom and field for this unit. The instructor needs to consider the logistics for the field operations: travel time, lunch, water, etc.</p>
<p>Materials, Equipment, & Handouts</p>	<p>Materials:</p> <ol style="list-style-type: none"> 1. IAIG 2. Premo Mark III Operators Manual <p>Equipment:</p> <ol style="list-style-type: none"> 1. Personal protective equipment 2. Premo Mark III 3. Helicopter 4. PSD operator safety harness 5. Fire shelters 6. Ethylene glycol 7. Water 8. Spheres 9. Metal bucket 10. Helicopter support kit 11. Shovel 12. Pulaski 13. Tri-max or fire protection group (optional) <p>Handouts:</p> <p>PSD Operations Checklist</p>
	<p>Instructor note: Pass out the PSD Operations Checklist and review.</p>

Unit 4: PSD In-Flight Operations

ITEM	DESCRIPTION
	<p>I. Preparation of Helicopter</p> <p>A. Remove the appropriate door/doors. B. Remove all loose cushions and other loose materials. C. Locate and ensure proper electrical fittings.</p>
	<p>Instructor note: The IAIG lists the installation procedure for specific helicopter makes and models.</p>
	<p>II. Preparation of PSD (Premo Mark III Aerial Ignition Device)</p> <p>A. *Fill the glycol tank at least 25 feet from the aircraft. B. Fill the water storage tank. C. Ensure adequate supply of plastic spheres is available to complete the project. D. Ensure extra one-gallon container of water is on board, secured, and readily accessible.</p>
	<p>III. Installation</p> <p>The PSD is designed to be operated from the right rear of a Bell 206 series Jet/Long Ranger helicopter. Other types of helicopters may require an auxiliary support bracket so the exit chute clears the aircraft fuselage.</p> <p>A. Install in the doorway with exit chute attached and overhanging. B. Attach tie-down strap: 1. Y end attached to PSD beside exit chute. Fastens from the inside out. 2. Pass strap under the fuselage, making sure it clears all wiring and accessories attached to the bottom of the aircraft. 3. Return through the opposite door. 4. Fasten to buckle attached to machine. 5. Cinch tight and secure loose ends. C. Connect power supply cord (reference agency helicopter contract). D. Perform electrical power check by turning on drive switch and hopper feed switch. Manual assist must rotate counter-clockwise (direction of arrow). E. Recheck the installation. F. Ensure a seat belt cutter is available and secured to cut holding strap in case it is necessary to jettison the PSD. G. Have one fire shelter per occupant of the aircraft.</p>

Unit 4: PSD In-Flight Operations

ITEM	DESCRIPTION
	<p>IV. *Briefings</p> <ul style="list-style-type: none"> A. Standard pilot preflight aircraft safety briefing with a discussion concerning weight and balance. B. Burn boss/PSD operator protocol: in flight commands. There is a well-established process, which is discussed in unit 2. C. The pilot, ignition specialist, and PSD operator must be present at the pre-mission aircraft briefing. This briefing should address (at a minimum) in-flight commands, emergency procedures, frequency management, available flight time, equipment installation, aircrew responsibilities, and PSD Air Operations/Safety Go/No Go Checklist. D. Pre-operational briefing by burn boss/ignition specialist to all burn personnel. E. Post operational de-briefing to include success/failure of days operations and closeout of documentation.
	<p>V. Preflight Test</p> <p>Note: Sphere ignition delay time need not be checked in the preflight test if the bench test has been performed.</p> <p>Instructors note: Do not conduct this test near refueling area or in flashy ground fuels.</p> <p>Test procedures are as follows:</p> <ul style="list-style-type: none"> A. Place the metal container under the exit chute. B. Start up the PSD as follows: <ul style="list-style-type: none"> 1. Aircraft auxiliary power on. 2. Hopper feed on. 3. Drive motor on. 4. Glycol pump on. C. Drop one sphere in a slipper block at a time starting from the left side. D. Once the sphere has dropped into the (metal container), remove it from the vicinity of the aircraft. E. Time ignition delay by measuring time of injection to ignition. F. Shut down machine as follows: <ul style="list-style-type: none"> 1. Drive motor off. 2. Glycol pump off.

Unit 4: PSD In-Flight Operations

ITEM	DESCRIPTION
	<ul style="list-style-type: none"> G. Check the system for leaks. H. Test the onboard fire extinguisher system by pushing the red water button on the control panel. I. Check the intercom communications and air-to-ground communications. J. The PSD operator ensures harness is secure and attached to helicopter hard points and seatbelt is on and buckled.
	<p>VI. In-Flight Operations</p> <p>Dry run over the burn area procedures:</p> <ul style="list-style-type: none"> A. Check that the burn area is clear of personnel. B. Identify burn area boundaries. C. Ensure communication with ground personnel. D. Make practice run of the first firing sequence. E. Coordinate machine speed, sphere spacing, and number of chutes to be used on the first run with burn boss/ignition specialist. F. Identify helispots and emergency landing areas. G. Notify ground personnel that ignition will commence.
	<p>VII. Ignition Operation</p> <ul style="list-style-type: none"> A. The burn boss/ignition specialist gives the directions as to where he/she wants the spheres to be placed in the burn area. This should be made clear during the dry run before any firing begins. It is important that all parties (burn boss/ignition specialist, pilot, and PSD operator) understand where the firing is to be done. This includes the starting points, ending points, and desired placement and spacing. B. The maximum recommended speed should be 50 mph. Slow aircraft speed to planned application speed when the firing operation is in progress. Optimum speed is 25 to 35 mph. C. The burn boss/ignition specialist gives direction to the pilot once the firing run has begun and during the dry run to assure correct placement of the injected spheres. D. *Recommended flight operations are between 300' AGL and 500' AGL. Some firing operations may be above 500' AGL, but never below 300' AGL.

Unit 4: PSD In-Flight Operations

ITEM	DESCRIPTION
	<p>E. Occupants of the helicopter shall be limited to the pilot, PSD operator, and burn boss/ignition specialist or instructor if essential to the mission.</p> <p>F. When the helicopter with the PSD leaves the burn area (crosses a fire control line) with the intent of immediately returning to another live firing run, the switches on the PSD are not required to be turned off; however, the operator's right hand must remain on the feed control levers in the closed position (not required if locking handles installed).</p> <p>G. If leaving the burn area for any other reason than returning for a firing run, the machine will be completely shut off.</p>
	<p>VIII. Use of different aircraft: Refer to the IAIG for additional type of aircraft.</p>

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1. In the planning for the use of the PSD what equipment and personnel must be qualified/approved to perform the mission? Circle your answers.
 - a. Pilot
 - b. Burn Boss
 - c. Helicopter
 - d. Line Officer

2. Who holds the ultimate responsibility for the safety of the aircraft? Circle your answer/s.
 - a. Burn Boss
 - b. Pilot
 - c. Line Officer
 - d. Dispatch

3. List the PPE that is required of the PSD Operator.
 - a.
 - b.
 - c.
 - d.

4. List the individuals by job title that should be present at the pre-mission aircraft briefing.
 - a.
 - b.
 - c.

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5. List the subjects that should be discussed and clarified at the pre-flight briefing.
- a.
 - b.
 - c.
 - d.
6. What two documents will prove that the aircraft and pilot are certified/approved to fly the Mark III PSD?
- a.
 - b.
7. What is the rounded up weight of the Premo Mark III with full fluid and hopper full?
- 150 lbs. 76 lbs. 100 lbs
8. It is a requirement to complete a helicopter load calculation prior to the Premo Mark III operations?
- a. yes
 - b. no
9. During the preflight you need to run some empty spheres through the machine. On an average how much glycol should be injected into each sphere?
- a. half full
 - b. $\frac{3}{4}$ -11/4cc
 - c. three quarters full
10. During the bench test of the machine you will run live spheres through the Premo Mark III. What variables can affect ignition time?
- a.
 - b.
 - c.
11. During the preflight you discover that the water pump will not work. Since you have an alternate water source is it ok to continue to use the machine?
- a. Yes
 - b. No
12. What is the operating voltage of the Premo Mark III in the helicopter?

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- b.
 - c.
20. During your burn operation, where do you store extra spheres and glycol in the aircraft?
21. What is the weight of a box of 1000 spheres?
22. Why is it important that the operator inform the pilot/burn boss that the machine has been cleared?
23. List some of the advantages of using the Premo Mark III.
24. Aerial ignition personnel should make a dry run over the planned burn unit prior to starting ignition.
- a. True
 - b. False
25. A damaged or dull injector needle could cause a sphere to jam in the dispenser?
- a. True
 - b. False
26. The main drive motor and hopper drive motor use the same type of motor, and both the glycol and water pumps use the same type motor.
- a. True
 - b. False

Plastic Sphere Dispenser Operator Test Key
Updated 01/16/2004

1. In the planning for the use of the PSD what equipment and personnel must be qualified/approved to perform the mission? Check your answers.

- a. Pilot ___X___
- b. Burn Boss ___X___
- c. Helicopter ___X___
- d. Line Officer _____

2. Who holds the ultimate responsibility for the safety of the aircraft and the continuation of the mission? Check your answers.

- a. Burn Boss _____
- b. Pilot ___X___
- c. Line Officer _____
- d. Dispatch _____

3. List the PPE that is required of the PSD Operator.

- a. Approved flight helmet
- b. Flight suit or fire resistant pants and shirt
- c. Leather boots above ankle
- d. Leather/Leather Nomex flight gloves

4. List the individuals by job title that should be present at the pre-mission aircraft briefing.

- a. PSD Operator
- b. Pilot
- c. Ignition Specialist or/and Burn Boss

5. List the subjects that should be discussed and clarified at the pre-flight briefing.

Plastic Sphere Dispenser Operator Test Key
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- a. In-flight commands b. Safety concerns
- c. Emergency Procedures d. PPE
- e. Frequency Management f. Aerial Hazards
- g. Equipment installation h. Aircrew responsibilities
6. What two documents will prove that the aircraft and pilot are certified /approved to fly the Mark III PSD?
- a. Pilot Qualification card
- b. Helicopter data card
7. What is the rounded up weight of the Premo Mark III with full fluid and hopper full?
- 150 lbs. 76 lbs. **100 lbs**
8. It is a requirement to complete a helicopter load calculation prior to the Premo Mark III operations?
- a. **yes** b. no
9. During the preflight you need to run some empty spheres through the machine. On an average how much glycol should be injected into each sphere?
- a. half full b. **¾ to 11/4 CC** c. three quarters full
10. During the bench test of the machine you will run live spheres through the Premo Mark. What variables can affect ignition time?
- a. Temperature d. Looseness of Potassium Permanganate
- b. Humidity
- c. Amount of Glycol
11. During the preflight you discover that the water pump will not work. Since you have an alternate water source is it ok to continue to use the machine?
- a. yes b. **no**
12. What is the operating voltage of the Premo Mark III in the helicopter?
- a. 120 volts b. 12 volts c. **24 volts** d. 220 volts

Plastic Sphere Dispenser Operator Test Key
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c. **Press emergency water button**

20. During your burn operation, where do you store extra spheres and glycol in the aircraft?

Spheres should be carried in original boxes or approved bags.
Extra glycol should never be carried on the helicopter.

21. What is the weight of a box of 1000 spheres?

13 to 16 lbs.

22. Why is it important that the operator inform the pilot/burn boss that the machine has been cleared & secured?

So that the pilot can leave the burn unit.

23. List some of the advantages of using the Premo Mark III.

Labor efficient, cost effective, controllability of firing, fewer support people, less initial purchase cost, Burn boss on board.

24. Aerial ignition personnel should make a dry run over the planned burn unit prior to starting ignition.

True False.

25. A damaged or dull injector needle could cause a sphere to jam in the dispenser?

True False

26. The main drive motor and hopper drive motor use the same type of motor, and both the glycol and water pumps use the same type motor.

True False

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27. Aerial ignition can utilize firing patterns that could not be implemented by ground forces due to safety concerns.

True False

28. Glycol and water can be added to the machine while it is mounted in the helicopter.

True **False**

29. The Premo Mark III should be cleaned thoroughly and lubricated after each use.

True False

30. To extinguish a fire in the machine, activate the emergency water system until the fire is extinguished.

True False

31. A gallon of water and a seat belt cutter must be carried on board the helicopter within reach of the operator at all times.

True False

32. Personnel allowed onboard during the mission include; circle the correct answers.

- A. Aerial observer
- B. Holding Boss.
- C. Helicopter Engineer.
- D. Pilot Trainee.
- E. **None of the above.**

33. The maximum recommended flight speed during dispersal of spheres with the Premo Mark III is _____ MPH.

50 MPH

34. It is an interagency regulation that a manifest and a **Load Calculation** form be completed for weight and balance prior to each mission?

35. What type of lubricant is used on the PSD? **Any graphite or Teflon based lubricant (not petroleum based products)**