1 SRAW Test Data Summary (Table)

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Shot #	Time/Date (Jan)	TGT Range (1)	TGT Course (2)	TGT Speed (KM/HR)	Missile Launch?	Missile Arm?	Hit	Remarks
1	1000/04	453	090	0	YES	YES	YES	
2	1100/06	213	270	25	YES	YES	YES	
3	1300/07	637	210	10	YES	NO	YES	
4	2300/10	321	065	14	NO	NO	NO	HangFire
5	1500/15	587	225	8	YES	YES	YES	High Winds
6	0300/16	14	170	25	YES	NO	YES	
7	2300/18	612	193	0	YES	YES	NO	
8	1230/22	17	100	30	YES	YES	YES	
9	0400/27	325	045	5	NO	NO	NO	Soldier Inj. (3)
10	0330/29	292	280	10	YES	YES	YES	

(1) Distance in meters from the gunner to the target at time of missile launch.
(2) A target course of 090 means the target is moving left to right with a target compass heading of 90 degrees giving the gunner a full broadside view.
(3) Shot 9 is under investigation. Marine severely burned when firing trigger pulled. Witness alleged that Marine kicked the missile sight with his right foot prior to picking missile up.

2 Conclusions, Operational Test Director

Assignment for Operational Test Director

You are the Operational Test Director (OTD). From that perspective, briefly (two or three sentences for each question) answer the following three questions:

- **Question #1:** From your OT perspective what are the 3 most important conclusions you draw from your analysis of the data from the first 10 SRAW firings?
- **Question #2:** Based on the IOT&E data so far, what are your top three reasons for placing the SRAW into deficiency status?
- **Question #3:** What options might you have considered other than placing the SRAW in deficiency status?

2.1 Test Director Key Conclusions from Test Results

2.1.1 Reliability of Arming and Firing Too Low

of the 8 successful launches, 2 were arming failures, giving a confidence level of less than .05 for the 80% reliability required by DoD.

2.1.2 Reliability for Operability/Firing is Too Low

Two failed firings is less than .40 confidence of an 80% reliability for operability. One of the mishaps resulted in severe burning of the personnel.

2.1.3 Reliability of Probability of Hit Reduced in Armed Mode

7 of 8 launched missiles were hits. Both unarmed launches were hits, but one of the 6 armed launches was a miss. Combined with repeated failures to arm, and consistency

and objective performance of the unarmed missiles, the combined performance results imply a need to ensure the arming device is properly integrated into the system

2.2 Top 3 Reasons for Deficiency Rating

2.2.1 The arming capability is a key measure of effectiveness

Testing live missiles when the arming is unreliable does not give the necessary assurances regarding this key measure of effectiveness.

2.2.2 Firing Rate Unacceptable

Failures at the firing level are especially dangerous to personnel and property. Although the safety features are demonstrated to work as designed (the missile does not arm when it does not fire), two failed firings, including a burn incident indicate more research into the issue is necessary to offset the high risk to safety and damage.

2.2.3 Probability of Hit Rate Declines When Armed

The reliability rating for the probability of hit consistently approaches the objective in this round of tests. Performance data includes a single failure to hit, which occurred while in the armed mode. Because the missile successfully maintained target accuracy at distances nearing the objective level, the multiple arming failures and single fail in the armed state imply the arming device is not properly incorporated into this round of weapons, and would not pass IOT&E.

2.3 Alternative to Deficiency Rating

Examining the assembly process which produced the current round of test weapons is potentially a less expensive option of continued testing, instead of requiring complete recertification. Since all previous testing (component and integrated) was successful, a problem during assembly may be causing interconnectivity issues in the firing and arming mechanisms. If the quality control at the assembly level is discovered, fixing the assembly process and resuming IOT&E would be less expensive and time-consuming than putting the test into deficiency status.

3 Program Manager Conclusions:

Assignment for Program Manager

You are the Program Manager (PM). From that perspective, briefly (two or three sentences for each question) answer the following three questions:

- **Question #1:** From your perspective as an advocate of the system, what are the 3 most important conclusions you draw from your analysis of the data from the first 10 SRAW firings? Cite specific firing results to support your answers.
- **Question #2:** The OTD believes there have been too many failures already; do you agree? Why or why not? Use specific shots as examples to support your assertion.
- **Question #3:** Based on extensive DT&E results, you recommended that SRAW progress to IOT&E. Does the data collected thus far in IOT&E reflect a problem with the SRAW, or with the test plan and conduct? Provide a short justification for your answer using specific test conditions and test data (shot numbers).

3.1 Program Manager's Key Conclusions from SRAW Data Analysis

3.1.1 Arming Failures and Trigger Pull Issues Isolated to Current Models

Although the missile failed to arm in 4 out of 10 firings, 2 of the arming failures (shots 4 and 9) were appropriate safety behaviors by the weapon during "fired but not launched" condition. Due to having emerged so late in the weapon life-cycle, research into the failure to arm could be initiated as a quality control issue during assembly. This would be a less costly problem than a design or material problem, both of which are less probable causes of failure in the current round, due to having passed previous integration tests.

3.1.2 Probability of Hit Has High Reliability

Shots 1, 3, and 5 demonstrate target accuracy performance near the objective (see table below), across the longest distances and diverse target movements.

3.1.3 Safety Behaviors Meet Original Safety Requirements

Although a mishap did occur that resulted in as serious personnel burn, the missile safety behaviors demonstrate that the missile safety behaviors satisfy the original safety requirements by preventing the missile from detonating under misfire conditions. Once an investigation determines the precise nature of the malfunction which caused the burns to personnel, further design efforts may or may not be appropriate to expand the safety features of the weapon. However, the minimum safety requirements seem to currently be met, based on the weapon behavior on shots 4 and 9.

3.2 Deficiency Status Determination

Since this initial 10 firings are testing the first production run of early prototypes, and are following successful integrated developmental testing, it seems potentially fruitful to research the assembly process for top-level flaws which impact the arming process. The Probability of Hit capability is stable, exceeding the objective of .5 of the KPPs (listed below), meeting performance standards even in high winds (shot 5). Operational availability is not currently meeting the development threshold (.95 per the table), but from a 10-shot sample, only one shot (the hanging fire on #4) out of 10 is a verified system malfunction, since a witness noted that shot #9 failure to fire might be due to operator error. Based on that data, the confidence level of operational availability might resume an acceptable level as the sample size increases. The issues related to failure to arm noted (shots 3 and 6) and the potential trend in problems with the trigger assembly (shots 4 and 9) seem likely to be mechanical issues that emerged in the initial production of an early round of prototypes.

Key Performance Parameters	Development Threshold	Development Objective
Minimum range	17 meters	17 meters
Maximum range	$\geq$ 600 meters	$\geq$ 800 meters
Probability of hit (stationary target)	.5 (400 meters)	.7 (400 meters)
Probability of hit (crossing target)	.5 (200 meters) .45 (250 meters)	.6 (200 meters) .55 (250 meters)
Operational Availability	.95	.95
Warhead Defeat capability	T-80 MBT w/ explosive reactive armor	T-80 MBT w/ explosive reactive armor

3.3 Assessment of Problem Based on IOT&E SRAW Data

Having successfully passed all component testing and integrated testing in the DT&E prior to IOT&E, it seems most likely that the production methods for the IOT&E prototypes are inconsistent. It is possible that changes to the final dimensions between DT&E and IOT&E may also contribute to lowered reliability of the arming device and trigger assembly. It seems that the test plan so far is working as intended to identify and analyze critical vulnerabilities with a minimum expenditure of test resources. Based on successful integration testing during DT-2, the arming problems demonstrated in shots 3 and 6, and the two trigger-pull problems in shots 4 and 9 imply the possibility of assembly issues unique to this production group of weapons.

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