

Chapter 10 WEAPONS SYSTEM PERFORMANCE RECORDING SYSTEM

(Revised)

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Introduction

1. The weapons' system performance recording system (WSPRS) records signals fed from various equipments during an attack manoeuvre so that the performance of the aircraft weapons delivery system and the pilot's tracking ability may be analysed after a mission. The recording system also provides for the transmission of a 1-kHz tone to enable the airborne traces to be correlated, in time, with the traces recorded by the ground equipment on an instrumented bombing range. A detailed description of the WSPRS, including servicing information, is in AP 112R-0208-13A.

Modification standard

2. This Chapter includes Mod 1168A, 1190A, 1430, 1577 and 1589.

Description

General

3. The WSPRS has three basic recording

modes as follows:-

- (1) Long, Medium and Vari Toss
- (2) Dive Toss (All variations)
- (3) DSL and Laydown Modes (Manual and Auto)

The particular mode selected is dependent on the settings of the weapon and attack selector switches (*Cover 3, Sect 10, Chap 2*) and is processed by the control and release computer. In addition, an automatic calibration mode is included in which the selected parameters are recorded with known input conditions, thus allowing a correction factor to be introduced when analysing flight results.

Switching adapter unit

4. The switching adapter unit (SAU), identified N-AL, is secured directly to the airframe in the vicinity of the attack system control and release computer (*Sect 9, Chap 4, this Cover*), on bulkhead 78 in

the nose section of the aircraft. Power supplies to the SAU, and signals between the control and release computer and the recorder unit pass through a single quick-release connector. The SAU contains demodulators and such interface circuits as are necessary to protect and/or modify the signals generated in the control and release computer.

Weapons system performance recording unit

5. The weapons system performance recording unit (WSPRU) is fitted to an anti-vibration mounting tray in the radio bay and is identified R-FN. Contained in the unit is an A223H recorder, fitted with an A50 cassette, automatic calibration circuits, relay switching circuits and such interface circuits as are necessary to protect and/or modify input signals generated by other equipment in the aircraft.

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6. The WSPRU has four quick-release plugs connecting the following services:-

- Plug No. 1 28 V d.c.
- Plug No. 2 200 V, 3-phase, 400 Hz
- Plug No. 3 Signal inputs/switching inputs from the aircraft services
- Plug No. 4 Signal inputs/switching inputs from the control and release computer and adapter unit.

7. The lid of the WSPRU is secured by quick-release pins fitted at each corner so that easy access to the recorder cassette may be obtained.

Control panel

8. The recording system control panel, C-FU, is fitted on the port side of the observer's cockpit. The panel incorporates a green press-to-test indicator lamp, A, marked RECORD, a three-position, single-pole toggle switch, B, marked RECORD-OFF-CALIBRATE, spring-loaded to the OFF position and a three-position, single-pole toggle switch, C, marked AUTO-OFF-MANUAL, used for selecting the radio tone transmission facility.

Operation

Calibrating

9. With the desired mode of attack selected, the system is put into an automatic calibration sequence by momentarily selecting the RECORD-OFF-CALIBRATE

switch on the control panel to CALIBRATE. Approximately 30 seconds after operating this switch, the RECORD lamp will flash for 34 seconds at a rate of 1 Hz. Termination of flashing indicates that calibration is complete, after which a further 30 seconds are required for the servos within the control and release computer to return to normal.

Note...

During the calibration period the display on the pilot's display unit will behave unexpectedly and any demands generated (e.g. pull-up) must be ignored.

Recording

10. When the RECORD-OFF-CALIBRATE switch is selected momentarily to RECORD, the recording of the required parameters is initiated. The system will record the parameters appropriate to the particular attack selected, and will stop automatically at release, or if the target reject push-switch (Cover 3, Sect. 10, Chap. 2) is operated. During the recording period the RECORD lamp will flash at a rate of 1-Hz.

Radio tone transmission

11. With the UHF transmitter-receiver selected to the appropriate frequency channel of the ground receiving station, the radio tone transmission facility is selected as required using the AUTO-OFF-MANUAL switch on the recorder control panel.

12. For a timed vari toss or computed mode of attack, the tone selector switch is set to AUTO before the attack commences. When the pull-up point is reached, a signal is fed from the attack system control and release computer; the signal, which is routed via normally-closed contacts 10-8 of secondary firing relay A, earths the tone switching line of the UHF installation, causing a 1-kHz tone to be transmitted as described in Sect 8, Chap 4 of this Cover. Subsequent operation of relay A, during the release sequence (Cover 3, Sect 10, Chap 2) opens contacts 10-8, and transmission of the tone ceases. Termination of the signal from the computer prevents further tone transmission when relay A is de-energized.

Note...

Cancellation of the signal from the computer, due to operation of the target reject push-switch, will also cause tone transmission to cease.

13. For a laydown or manual mode of attack, the tone selector switch is set to MANUAL. Contacts 3-2 of the switch earth the tone switching line, via contacts 10-8 of secondary firing relay A, causing immediate transmission of the 1-kHz tone. Transmission of the tone ceases when relay A, is energized during the release sequence, and recommences when the relay is de-energized. Setting the selector switch to OFF isolates the tone switching line and switches off the tone.

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modes as follows:-

- (1) Long, Medium and Vari Toss
- (2) Dive Toss (All variations)
- (3) DSL and Laydown Modes (Manual and Auto)

The particular mode selected is dependent on the settings of the weapon and attack selector switches (Cover 3, Sect. 10, Chap. 2) and is processed by the control and release computer. In addition, an automatic calibration mode is included in which the selected parameters are recorded with known input conditions, thus allowing a correction factor to be introduced when analysing flight results.

Note...

On pre-Mod 1430 aircraft, the WSPRS is interconnected with the guided weapons installation (Cover 3, Sect. 10, Chap. 5) via T.Bs. J and H on panel R-HG. Provided that neither Mod 1577 nor Mod 1589 is embodied, the recording system will accept signals from the Bullpup installation. In this mode, however, the signals are not processed by the control and release computer.

Switching adapter unit

4. The switching adapter unit (SAU), identified N-AL, is secured directly to the airframe in the vicinity of the attack system control and release computer (Sect. 9, Chap. 4, this Cover), on bulkhead 78 in the nose section of the aircraft. Power supplies to the SAU, and signals between the control and release computer and the recorder unit pass through a single quick-release connector. The SAU contains demodulators and such interface circuits as are necessary to protect and/or modify the signals generated in the control and release computer.

Weapons system performance recording unit

5. The weapons system performance recording unit (WSPRU) is fitted to an anti-vibration mounting tray in the radio bay and is identified R-FN. Contained in the unit is an A223H recorder, fitted with an A50 cassette, automatic calibration circuits, relay switching circuits and such interface circuits as are necessary to protect and/or modify input signals generated by other equipment in the aircraft.

6. The WSPRU has four quick-release plugs connecting the following services:-

- | | |
|------------|--|
| Plug No. 1 | 28V d.c. |
| Plug No. 2 | 200 V, 3-phase, 400 Hz |
| Plug No. 3 | Signal inputs/switching inputs from the aircraft services |
| Plug No. 4 | Signal inputs/switching inputs from the control and release computer and adapter unit. |

7. The lid of the WSPRU is secured by quick-release pins fitted at each corner so that easy access to the recorder cassette may be obtained.

Control panel

8. The recording system control panel, C-FU, is fitted on the port side of the observer's cockpit. The panel incorporates a green press-to-test indicator lamp, A, marked RECORD, a three-position, single-pole toggle switch, B, marked RECORD-OFF-CALIBRATE, spring-loaded to the OFF position and a three-position, single-pole toggle switch, C, marked AUTO-OFF-MANUAL, used for selecting the radio tone transmission facility.

Operation

Calibrating

9. With the desired mode of attack selected, the system is put into an automatic calibration sequence by momentarily selecting the RECORD-OFF-CALIBRATE switch on the control panel to CALIBRATE. Approximately 30 seconds after operating this switch, the RECORD lamp will flash for 34 seconds at a rate of 1 Hz. Termination of flashing indicates that calibration is complete, after which a further 30 seconds are required for the servos within the control and release computer to return to normal.

Note...

During the calibration period the display on the pilot's display unit will behave unexpectedly and any demands generated (e.g. pull-up) must be ignored.

Recording

10. When the RECORD-OFF-CALIBRATE switch is selected momentarily to RECORD, the recording of the required parameters is initiated. The system will record the parameters appropriate to the particular attack selected, and will stop automatically at release, or if the target reject push-switch (Cover 3, Sect. 10, Chap. 2) is operated. During the recording period the RECORD lamp will flash at a rate of 1-Hz.

10A. *Pre-Mod 1430.* Recording of the parameters appropriate to a Bullpup attack differs in that recording commences at weapon release and continues for 40 seconds, when the system switches off automatically.

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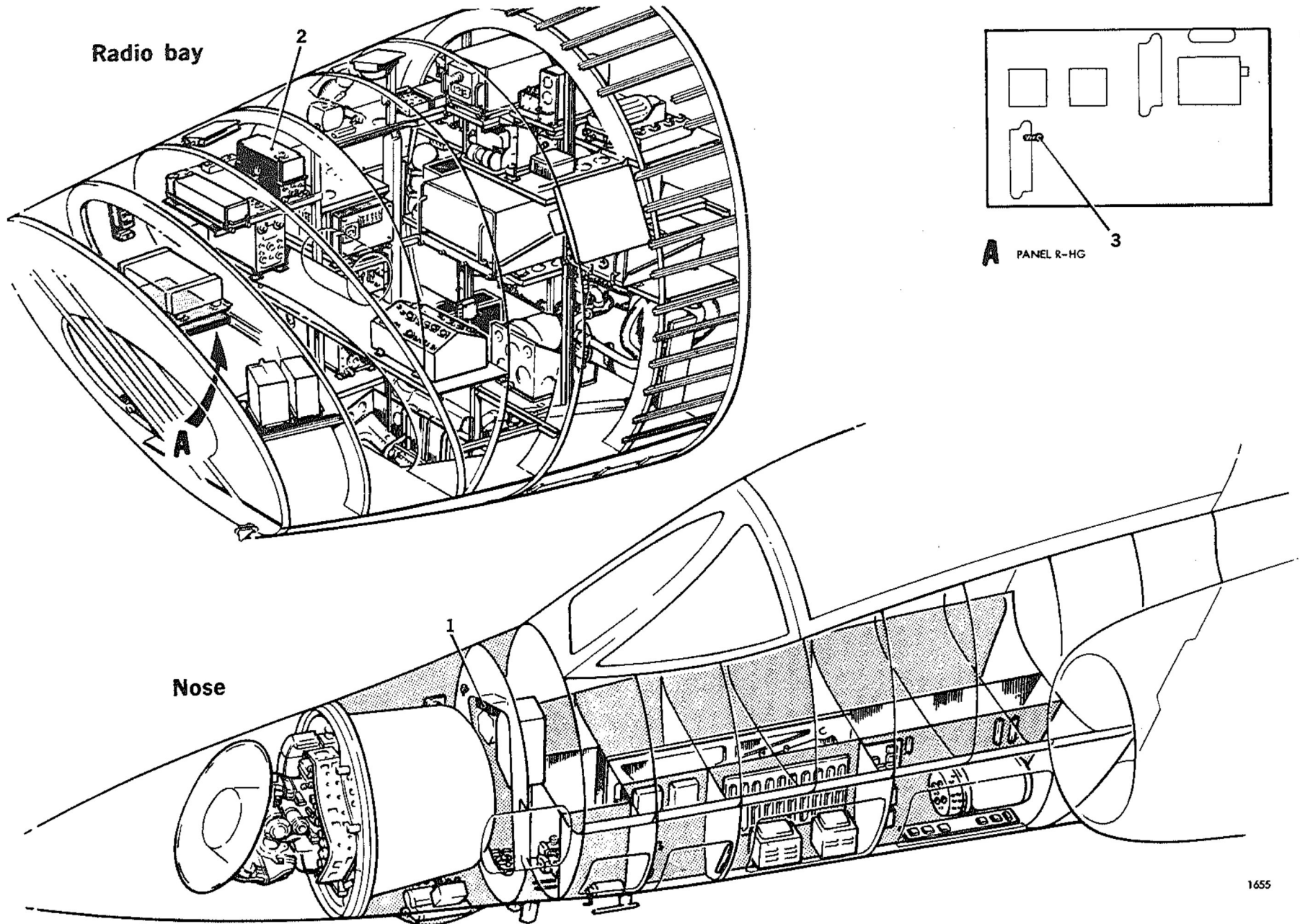


Fig.2. Location of components

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Radio tone transmission

11. With the UHF transmitter-receiver selected to the appropriate frequency channel of the ground receiving station, the radio tone transmission facility is selected as required using the AUTO-OFF-MANUAL switch on the recorder control panel.

12. For a timed vari toss or computed mode of attack, the tone selector switch is set to AUTO before the attack commences. When the pull-up point is reached, a signal is fed from the attack system control and release computer; the signal, which is routed via normally-closed con-

tacts 10-8 of secondary firing relay A, earths the tone switching line of the UHF installation, causing a 1-kHz tone to be transmitted as described in Sect. 8, Chap. 4 of this Cover. Subsequent operation of relay A, during the release sequence (Cover 3, Sect. 10, Chap. 2) opens contacts 10-8, and transmission of the tone ceases. Termination of the signal from the computer prevents further tone transmission when relay A is de-energized.

Note...

Cancellation of the signal from the computer, due to operation of the target reject push-switch, will also cause tone transmission to cease.

13. For a laydown or manual mode of attack, the tone selector switch is set to MANUAL. Contacts 3-2 of the switch earth the tone switching line, via contacts 10-8 of secondary firing relay A, causing immediate transmission of the 1-kHz tone. Transmission of the tone ceases when relay A, is energized during the release sequence, and recommences when the relay is de-energized. Setting the selector switch to OFF isolates the tone switching line and switches off the tone.

TABLE 1 List of components

Item	Fig	Component	Type or Part No.	Ident	Access panel	A.P. Ref
Chap. 1		Warning lamp	C500/B/7	A } (panel C-FU)	-	113F-0627-13A
Chap. 1		Toggle switch	ITL1-7	B }	-	} 4343C, Vol. 1, Book 1
Chap. 1		Toggle switch	ITL1-1	C }	-	
1	2	Switching adapter unit	B/3994/41050	N-AL	-	} 112R-0208-13A
2	2	Weapons system performance recording unit	D/3994/41003	R-FN	238	
3	2-A	Diode rectifier	ZR24	T.B. J (panel R-HG)	238	-

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