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TALAR: What Is It?

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WHAT IS IT?

A year or so ago a change appeared in the C-130B Dash One which contained a few instructions in Section 4 concerning something called TALAR. Then a few months later some TAC C-130s (E models) began coming back from Depot mod with a new face plate on the flight director instrument selector control panel. A new position had been added for the flight director mode selector switch and labeled TALAR. Interests were now sufficiently aroused and many pilots began devouring the poop in the good book only to come away unsatisfied. True the book gives the range as 10 NM in the rain and 28 NM in clear weather, but from what? And the book also says that TALAR is flown using the pitch and bank steering bars like an ILS but is it an ILS? In addition the Dash One says that to place the unit in operation merely select TALAR with the flight director mode selector switch. How about the frequency, where do you dial it in? Questions, questions — how about some answers.

First the word TALAR. The letters are an abbreviation for Tactical Landing and Approach Radar. But don't let the word Radar mislead you. It's not radar in the traditional sense with scopes and the like, rather it operates on a radar frequency transmitted from the ground. You may also hear TALAR referred to (especially in maintenance publications) as the Tactical Precision Approach System.

By whichever name is used, it is, in essence, a suitcase ILS system developed for use in forward areas and unsophisticated airstrips. Development of the system stretches back to before 1966 and airborne testing of the system by the Flight Dynamics Lab at Wright-Pat began in 1967. Then TALC (Tactical Airlift Center) at Pope AFB got ahold of it for Category III testing in 1968 and finished the test in 1969. Then came a joint AFCS Category III TAC OT&E which was completed in the spring of 1970. The system is operational in SEA and will soon see service in TAC.

OKAY, WHAT IS IT?

TALAR is a portable instrument approach and landing system which consists , basically of a ground transmitter (AN/TRN-27) and an airborne receiver (AN/ARN-97). The ground unit transmits a signal similar to that transmitted by a standard ILS. The airborne unit receives the signal and provides analog outputs proportional to glide slope and localizer deviation. This signal drives the conventional cross-pointer indicator of the flight director computer.

THE GROUND EQUIPMENT

The ground equipment consists of a 50 pound tripod mounted transmitter with a power source of either 24V DC, 28V DC, or 115V AC, 60HZ. During the tests a standard Combat Control Team Jeep battery provided sufficient input power. The transmitter can be set up by two men in approximately five minutes. The glideslope can be adjusted from 2 degrees to 6 degrees by means of a borescope sight. The transmitter has a power output of 10 watts minimum and operates on a frequency of [illegible] gHz. It transmits four time-shared beams of microwave energy. These beams operate in two pairs: an up-down pair for glide slope and a left-right for localizer. The crossover of a two paired set of beams defines

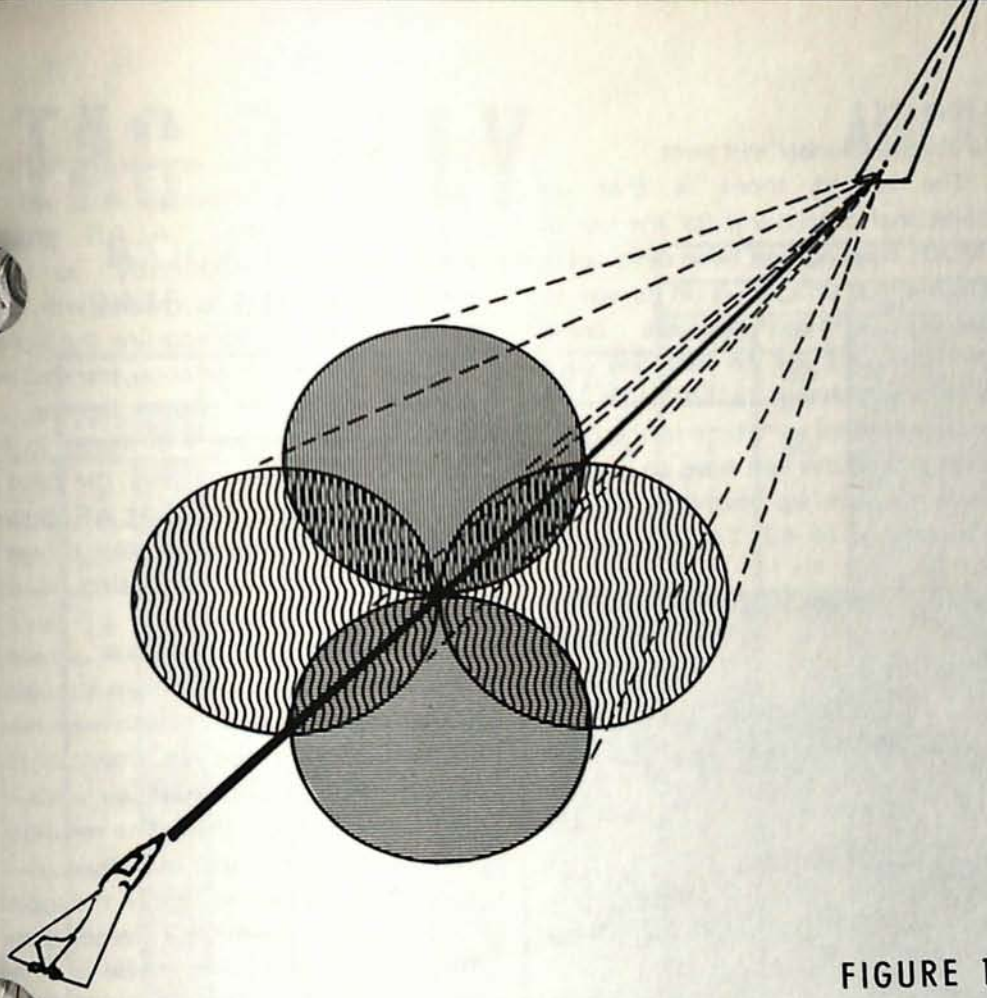

FIGURE 1

e glide slope and the localizer course (Figure 1). This differs radically from the conventional ILS system which employs two separate transmitters, one located at the far end of the runway which radiates localizer information, and the other positioned to one side of the runway for glide slope information. The TALAR transmitter is positioned on runway centerline near the runway threshold (approximately 300 feet prior to the runway and on the extended runway centerline).

THE AIRBORNE EQUIPMENT

The airborne equipment consists of two black boxes with a combined weight of just over 5 pounds. One ck box contains the receiver and rn-type antenna. Due to its small size and weight (2 pounds) it can be installed just about any place where the antenna horn gets an unobstructed forward view and is generally aligned with the longitudinal axis of the aircraft. The amplifier, which is the other black box, need not be collocated and presents no particular mounting problem because of its small size and weight.

The receiver is pre-tuned and requires no frequency selection by the pilot (therefore none is provided). All TALAR transmitters and receivers will operate on the same frequency.

The airborne equipment will process the electronic information by comparing the relative amplitude of energy received from each of the two pairs of beams. The comparison of this relative amplitude will be a measure of aircraft displacement relative to beam intersection and will be displayed to the pilot through the conventional crosspointer indicators, such as, glide slope indicator, localizer displacement on the HSI and pitch and bank steering bars (Figure 2).

Sounds pretty good doesn't it? But, as with everything, there are a few thorns in the bed of roses.

The first one is: we don't got it yet. While the combat control teams have (or soon will have) the necessary ground equipment and are being trained in its use and the airlift wings have ordered the necessary maintenance stuff, the airplanes aren't ready yet. That position on the flight director mode selector switch which announces loud and clear, TALAR, is as dead as last night's cold duck.

The hold up is in the procurement of the "A" kit for the TCTO (1C-130-820), which consists of wiring, shock mounts, and so forth. The "B" portion of the complete package, which is the receiver/antenna and amplifier is already on hand. It

TALAR BEAM PATTERN

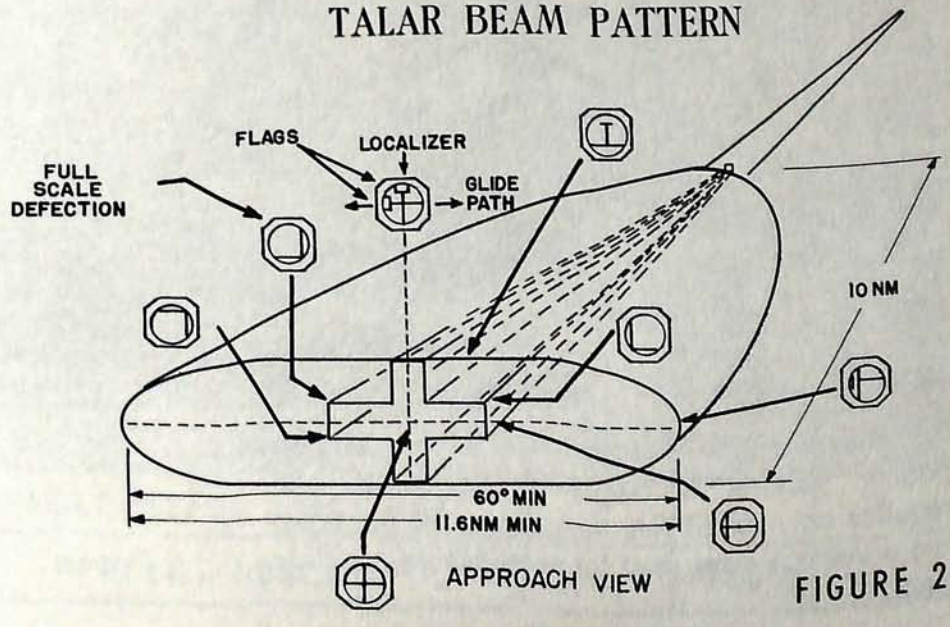

FIGURE 2

TALAR - WHAT IS IT?

appears now that the complete kit (combination of A and B) won't be ready until 1 November at which time 100 kits will become available and 15 January at which time the remainder will be on hand. Also the TCTO was originally to be accomplished at the depot level, but will now be done at the organizational/field level.

The second thorn is that air operational procedures for the use of TALAR have not yet been developed. However this problem is on its way to resolution. Procedures are being developed and will be included in a forthcoming change to TACM 55-130 (to be published sometime in the fall). These procedures will have to include means to take up the slack in the shortcomings of the TALAR system such as:

The complete TALAR transmitter weighs only 50 pounds making it highly transportable and requires only about five minutes to set up. Note the borescope sight used for establishing the glide path.

- No initial approach fix/final approach fix navigational aid is provided in the TALAR ground equipment. Consequently, as in conventional ILS, a means will have to be employed to acquire the signal. The use of a radar beacon transmitter, portable TACAN, radio beacon, or some other means will have to be provided in order to give the pilot a way to capture the TALAR signal. Crew coordination will play a bigger part than ever in navigating to the final approach course.
- Since all TALAR ground transmitters will operate on the same frequency special attention will have to be directed to the placement of the transmitters at different airfields in relation to one another. The results of inattention in this area are obvious.
- There is no aural means to identify the transmitted signal. Some other means will have to be used to insure that the right one is the one you got. Again, an outer marker, radar beacon, etc., will have to be used.
- The approach beam becomes more sensitive to fly during the last two miles because the transmitter is located short of the runway as opposed to conventional ILS where the localizer transmitter is located at the far end of the field. Minimums will have to be established taking into consideration the approach aids available, the absence of course guidance during a missed approach, the absence of a middle marker, and the approach beam sensitivity.

There's a lot of work yet to be done to make the TALAR system completely workable, but there's no doubt that the addition of the system will give us a precision approach capability into austere airfields that is sorely needed. One has only to remember such names as Khe Sanh, Kham Duc, An Loc, An Khe Golf Course and many more, to applaud the addition of TALAR.

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