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17 November 1953

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COMMENTS ON CASTLE AIR OPERATIONS PROCEDURES (SAMPLING)

J-21574

1. Operation Tigercat held at San Diego, California by Task Group 7.4 was a dry run on air operational procedures to be used at CASTLE both for shock wave and sampling aircraft. The following comments on the procedures applying to sampling aircraft are offered for your information.

2. Basically the air operational procedures of CASTLE differ from those used on IVY by not requiring in-flight refueling of the sampling aircraft, either on approach to or departure from the sampling area. The airborne "Air Force Control", which on IVY was placed in a B-29 operating at 20,000 feet, will in CASTLE be located in the sampling control B-36. While not requiring re-fueling of the sampling aircraft, the CASTLE procedures do require that a careful account of the position and the remaining flight time of the sampling aircraft be kept.

3. The CASTLE procedures operate on the principle of "positive control", that is to say, the sampling pilot is informed that he is under the sole control of either the take-off, intermediate, or sampling area control agency as he passes from one area to another during the mission. Because control is transferred positively from one control center to another according to the situation of the aircraft, it is believed that this system will avoid the confusion which arises when orders to an aircraft issue simultaneously from all control centers.

4. The primary means by which the position of the aircraft is known by the various control centers is through the use of surface and airborne radar as well as an IFF radar transmitter in the sampling aircraft. So long as this equipment works properly and so long as electromagnetic and material interference with the signals do not arise (as was the case with Mike Shot) this system should be successful in following the location of the sampling aircraft at all times and in avoiding the tragedy which occurred on Operation IVY. During the course of the dry run, it was discovered that a certain amount of undesirable confusion in the Estes control center occurred and certain difficulties arose with the Laison radio communication which affected the transfer of control. These difficiencies were recognized by CTG 7.4 which will make an attempt to overcome them on the overseas operation. In so far as sampling was concerned, the most critical deficiency noted by the undersigned was the occurrance of faulty VHF receiving and transmitting equipment as well as difficulties with the radio compass in about 25% of the sampling aircraft. Faulty operation of such equipment makes placement of the aircraft with respect to the cloud very difficult as well as being potentially disastrous in case an aircraft gets into operational difficulties. At the Commander's Meeting which followed the dry run, it was asked why such equipment could not be put into 100% operational status for the mission. The question was answered by the proposal that each aircraft be test flown on the afternoon before each sampling mission to check mechanical condition and the status of the communication equip-

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ment. It is felt that continued emphasis on high caliber maintenance of VHF and radio compass equipment in the sampling aircraft should be maintained in order that the sampling missions can be executed properly.

5. One other item worth mentioning is that it was noticed that the SA-16 rescue aircraft orbited below and followed the control B-36 at approximately 10,000 feet. It was pointed out at the Commander's Meeting that in the actual operation it might be undesirable to have the SA-16 located below the B-36 because of the possibility of very highly radioactive material in that area. It was also pointed out that the movements of the B-36 might be restricted if the SA-16 were positioned upon it. It was suggested that, depending upon the wind structure, the SA-16 might take a position somewhat farther from ground zero than the B-36 not necessarily dependent upon the latter's position.

6. It is felt that the use of radar to effect location control of sampling aircraft will inevitably lead to considerable confusion in the various control centers because of the innately complicated nature of the equipment and attendent communications. Further, radar signals are of doubtful reliability in the presence of the electromagnetic and material interference caused by high yield explosions. It would appear preferable to base a control system primarily upon the use of powerful low-frequency homing beacons and reliable VHF communication in order to achieve a greater degree of reliability than the present system appears to have. If it were not for the fact that on the operational level the pilots are to be instructed to rely upon; 1) dead reckoning (self-positioning), 2) radio-compass, 3) radar, 4) VHF-DF in order of decreasing importance, this problem would be considered more critical. As it is, the least reliable of the control or positioning aids is rated at the lowest in importance.

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