The Illinois Aerospace Institute Plan

(For Teacher Orientation)

The initial Illinois Aerospace Institute was designed as a short and nontechnical introduction to the "world of aerospace." It provided the participants with an adequate knowledge of aerospace activities so that they were able to meet, with some depth, everyday questions in the classroom.

The Illinois technique was deliberately designed for use by the local community in its effort to capitalize on those aerospace education resources which were readily available in the community. This is contrary to the attitude frequently taken that such a program's success and value is dependent upon nationally recognized speakers or well-known aerospace facilities. Although such factors will admittedly contribute to an effective program, there is much to support the Illinois institute's "localized" approach.

One final consideration in the design of the Illinois institute was the development of a general format which would allow laymen knowledgeable in aerospace matters, but not professional education, to contribute effectively to the in-service training of the community's teachers. Although no claim is made that the Illinois institute technique is a better approach to in-service teacher training than other techniques, there is a degree of uniqueness and flexibility in its design which seems to lend itself to success in varied in-service training situations.

The specific educational objectives of the Illinois Aerospace Institute come within the framework of the generally accepted objectives of aerospace education. These objectives are:

1. To provide the teacher with a sufficient understanding of the basic concepts and impact of aerospace upon our lives so that he will have confidence in introducing aerospace education into the classroom. This understanding should include:
   a. A sufficient reading and speaking vocabulary of aerospace to understand and discuss current aerospace events,
   b. A general knowledge of aerospacecraft and the basic scientific principles related to their use, as well as an understanding of the environment of aerospace flight,
   c. An introduction to the broad social, economic, and political implications of aerospace activities.
2. To identify and familiarize the teacher with some aerospace education materials, personnel, and other resources.
3. To introduce the teacher to the local aerospace-related facilities.
4. To provide a flight experience.
5. To motivate the teacher in capitalizing on the contemporary interest of children in aerospace in their classroom situtations.

The institute does not attempt to instruct the teacher in techniques of introducing aerospace education concepts into the classroom; rather, it is assumed that the participant, as a professional educator, will utilize the information, experience, and materials acquired to enrich his individual classroom curriculum.

Recommended Procedures of Operation of an Institute

The procedures for establishing an institute will vary with the individual community and school system. In some instances, a qualified individual is available within the school system to initiate planning. In other instances, an individual from an organization associated with aerospace education—such as a state aerospace education committee, a department of aeronautics, the Air Force Association, or the Civil Air Patrol (which has many professional educators serving as volunteers)—may be relied upon for guidance and assistance or even complete sponsorship of the institute.

The director of the institute, preferably, should be an educator from the school system. However, this is not essential to the success of the institute.

The initial planning should include decisions regarding the following items:

1. *For whom is the institute designed?* It may be intended for all the teachers within a school system or it may be limited to elementary teachers only or to high school teachers.
2. *Is any special emphasis desired for the institute?* Generally, the basic overall plan is followed. Occasionally, science or social studies emphasis will be requested.
3. *Will there be provisions for credit allowance for salary schedule purposes?* Frequently a personal project is required in addition to regular attendance if the institute is recognized with credit provisions.
4. *Will there be a fee?* A nominal fee is sometimes required to cover costs incurred such as for transportation, special materials, coffee, rolls, etc.
5. *What should be the size of the class?* This is not a major factor so long as it does not exceed the facilities available. The experience to date tends to indicate that approximately fifty participants is an optimum number.
6. *What should be the method of teacher notification and selection?* This will vary with the school system and may frequently include local newspaper publicity arrangements.
7. *What should be the dates of the institute?* The dates must be established to allow sufficient time for the arrangements of speakers, materials, and other necessary activities. A minimum of six weeks is desirable.

The institute design requires careful use of the time available. It must be well planned and conducted in a highly organized manner, including seemingly minor details.

The meeting facilities should reflect an aerospace atmosphere whenever possible. If the local airport or aerospace installation has suitable space available, this would be a very desirable meeting place. An ordinary classroom or auditorium can be given considerable atmosphere by displaying airline posters, photographs, charts, and other materials relating to the topics.

The specific topics as outlined in sequence in the table shown above appear to provide the most desirable pattern. Frequently, however, it is necessary to rearrange the topics to fit an individual speaker's availability and/or to include additional topics. Occasionally the local situation may dictate an additional special interest topic, but this does not appear to be of major concern to the overall success of the institute.

Each participant should be provided with a printed schedule, including pertinent instructions, prior to the start of the institute.

While limited, the time for each topic will be adequate if the high points are emphasized and the technical details are eliminated. It is necessary that the speakers be properly briefed and oriented as to their part in the institute. This maintains the continuity and reduces repetition of subject matter. It has been observed that a speaker must be well prepared to cover his topic effectively within the time limitation. A deliberate interchange of speakers, films, and demonstrations will minimize the fatigue factor for the participants.

Coffee breaks should be organized to give the participants an opportunity to ask questions and to meet the speakers informally.

The presentations will be reinforced if the speakers and films are supplemented with pertinent handout materials suitable for classroom use. There is an abundant supply of free or low-cost materials available from numerous sources. A few carefully selected items to be reviewed between meetings are preferable to a large number of overlapping items. Care is required to see that these items are distributed in a manner which will not distract from the oral presentations. Examination copies of other inexpensive materials and aids will provide the teacher with further exposure to available materials.

Most institute directors do not require any type of examination at the close of the classroom activity. If credit is granted for institute participation, the submission of individual projects is often requested.

The airport visit and the flight experience might be considered as the laboratory session of the institute. Aerospace activities can be observed in operation, whether at a large military or civilian installation or a small community airport.

The small four-place airplane probably offers the most interesting flight experience, although any type of aircraft can be used effectively. In the small airplane the teacher has a more intimate experience with the cockpit, and he can observe better the effects of the controls upon the flight, watch the instruments, and question the pilot. A thirty-minute flight is sufficient for orientation purposes. Usually, the Civil Air Patrol or local airport manager will arrange the flights either gratis or at a nominal cost.

The field trip experience tends to translate the classroom lectures into a more meaningful context and is generally considered the institute's highlight. An appropriate certificate, such as the Civil Air Patrol Certificate of Accomplishment, denoting the teacher's successful completion of the program adds to the prestige of the institute. Many teachers proudly display such certificates on their classroom walls as an indication of their interest in and knowledge of this relatively new segment of the field of education.

Illinois Aerospace Institute Design

Number Sessions - 4
Number Topics -- 15
Estimated Time - 12 hr.

SESSION	TOPIC	DESCRIPTION	TIME ALLOCATED	RECOMMENDED METHOD OF PRESENTATION
First Session	INTRODUCTION	Explain objective of institute.	5 min.	
A	IMPACT OF AEROSPACE	Develop basic concepts in the field of aerospace. Describe the social-economic impact of aviation, the rapid shrinkage of the world in terms of time, the nearness and interdependence of the earth's people, and the importance of aerospace as a major industry—especially in view of the vast research and development required for military and space applications—as well as the relationship of these items to our everyday lives.	40 min.	A basic lecture supplemented with an appropriate film clip.
B	HISTORY OF FLIGHT	Discuss the evolution of aviation from the balloon to the space vehicle. Trace the dynamic growth and maturing of aviation and the evolution of man's changing behavior due to the rapid travel made possible by aviation.	25 min.	Show a "History of Aviation," film which is available from filmrental libraries, airlines, Air Force film library, FAA, etc.
C	VEHICLE FOR FLIGHT	Discuss the airplane as a vehicle. Identify its parts and functions of utility, mobility, power, lift, and stability control. Emphasize the common characteristics of different-looking aircraft.	20 min.	Give a chalk-talk, listing functions and showing pictures of the parts which fulfill the functions. (An aircraft model may be adequate for chalk-talk). Use a simple stick model to point out the five functions of its parts; fly it to climax talk.
	BREAK	Encourage informal discussion and questions regarding preceding topics.	10 min.	
D	FLIGHT PRINCIPLES	Reduce to everyday language the principles by which aircraft fly. Explain the forces of lift, gravity, thrust, and drag, as well as the equilibrium of these forces.	25 min.	Give an illustrated presentation using a simple model airplane, blackboard, and simple demonstrations of basic scientific principles.
E	MAN IN FLIGHT	Present a nontechnical discussion of the effects of increasing altitudes and speeds on man and the techniques and equipment used to support life in flight.	30 min. TOTAL 2 hrs. 30 min.	Invite an Air Force, Navy, or Reserve pilot to present this section, using his personal protective flight gear.
Second Session F	POWER FOR FLIGHT	Cover briefly the fundamental principles of the aerospacecraft powerplant. Explain reciprocating with the principles of propeller, jet, and rocket engines.	30 min.	Use models, drawings, and a film such as General Motor's "ABC'S of Jet Propulsion."
G	THE WEATHER	Explain the elementary principles of weather and show what weather means to aviation. Describe the Weather Bureau and its services.	30 min.	Make a presentation supplemented with blackboard drawings which show how weather moves and what causes it. Use weather charts available from U. S. Weather Bureau.
	BREAK	Encourage informal discussion and questions regarding the preceding topics.	10 min.	
H	ROCKETS, MISSILES, AND SPACE	Describe the rocket launch vehicle and missile as machines and vehicles of space. Explain why man is going into space and some of the problems encountered. Discuss satellites and orbits, as well as the benefits of space travel research—both that taking place today and that being planned for tomorrow. Review current and planned space vehicles.	95 min. TOTAL 2 hrs. 45 min.	Develop the topic by use of models available in hobby shops. Simple "ball and string" demonstrations may be used to illustrate the orbit principle. The many excellent films available from NASA and the USAF. If available, the NASA "Space Mobile" lecture-demonstration or slide-lecture is outstanding.
Third Session I	NAVIGATION	Explain in everyday language how a pilot finds his way in the sky. And how maps, compasses, and radio instruments are used. Discuss the wind's influence.	35 min.	Give each student an aeronautical chart and then go through a typical flight plan to show how checkpoints and the compass are used. Post illustrative maps and charts on the board.
J	AIRPORTS AND FACILITIES	Discuss briefly the facilities for flight, emphasizing airports, airways, and electronic aids and include such items as radio, radar, fueling, and servicing. Explain the role of the local airport.	20 min.	Give a lecture explaining the events in a typical flight in a manner which ties the many factors of this topic together.
K	OPTIONAL TOPIC	Present a topic of local interest or hold an informal discussion of preceding topics.	30 min.	A talk may be given about the community's unique aerospace facility or activities; for example, a soaring club, a defense installation, a local manufacturer, or a research laboratory.
	BREAK	Encourage informal discussion and questions regarding preceding topics.	15 min.	
L	RESOURCES AVAILABLE TO THE TEACHER	Report on available aerospace information such as printed materials, films, periodicals, and other aids. Discuss assistance which may be obtained from individual speakers and organizations such the Civil Air Patrol, National Aerospace Education Council, airlines, aerospace industries, state aerospace education committees, etc.	40 min.	Have handouts and sample copies on hand to stimulate the interest of the participants, as well as order blanks and membership applications.
M	BRIEFING ON AIRPORT VISIT	Explain the purpose of the airport tour and flight experience. Emphasize its relationship to the institute lectures.	10 min. TOTAL 2 hrs. 30 min.	Diagram the airport facilities and distribute a check list of pertinent items to be looked for, both before and during the orientation flight.
Fourth Session N	AIRPORT VISIT	Make a group tour of a local airport, if possible visiting a static display of aircraft, the control tower, the weather station, an airliner, etc. A flight experience in a light aircraft will enhance the understanding of institute concepts.	Approximately 3 hours	Since the topics previously covered are tied together through the experiences of this field trip, it will make an excellent review.
O	YOU AS AN AEROSPACE-MINDED CITIZEN	Review the place of the participant as an informed teacher, citizen, and consumer in today's America. Emphasize the fact that the informed citizen is the keystone of aerospace power. Present certificates.	30 min. TOTAL 3 hrs. 30 min.	Give a "wrap up" talk which stresses the utility of what has been presented during the institute. Award CAP Certificates of Accomplishment to participants.