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A HISTORY OF AERONAUTICAL RADIO, INC. FROM 1929 TO 1942

by

Paul Goldsborough

In 1929 several of the scheduled air carriers had brought to culmination experiments relating to air-ground radiotelephone (R/T) communications on frequencies in the bands from 3 to 6 megacycles (mcs.). The leading proponents for R/T were: Thorpe Hiscock of Pacific Air Transport (later became a part of UAL); Herbert Hoover, Jr., of Western Air Express; and Paul Goldsborough of Universal Airlines (later became a part of AAL). It was probably very logical that Western Electric Company, a subsidiary of AT&T, and the Bell Telephone Laboratories contributed a great deal to these early experiments in mobile voice communications.

The early airline experimental work was conducted under experimental licenses issued by the governmental authority, The Federal Radio Commission (FRC). These licenses permitted experiments to be conducted, but conveyed no "rights" to frequencies used or the conduct of regular orroutine communications.

There existed in 1929, therefore, a need to secure frequencies for air-ground R/T on a more permanent and broader basis than the experimental licenses. Concurrently, there also existed a need to secure licenses and frequencies to conduct point to point radio communications between the various airline stations. It is difficult to visualize, with the vast airline wire line teletype network which now exists, there was ever an era when manually operated radiotelegraph (CW) couldfulfill the operational requirement in domestic airline operation for speedy communications between stations for handling company operations, reservations, and administrative communications. It did this quite adequately, however, augmented to some extent by non-leased public communications facilities in the years 1930 to 1935.

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As a result of these radio communications requirements, late in 1929 representatives of several of the airlines went to Washington to discuss their communications problems with the FRC. They desired assignment of frequencies for CW point to point, and air-ground R/T communications. I have deliberately placed point to point first in importance because we had an existing operational need and a known technique for conducting radiotelegraph point to point. In the case of air-ground, we had only an idea. As a matter of fact, one domestic airline, Transcontinental Air Transport, had already filed application for frequencies for CW air-ground communications on M/F, and the big international airline, PAA, was not a bit interested in R/T communications. To say that neither of these airlines were any help at the FRC to the proponants of air-ground R/T would be an understatement.

Then, as now, there was an apparent shortage of frequencies on the order of those which appeared to the airlines as most suitable. This may be surprising in the light of the fact that at that time the so-called short waves or high frequencies were considered quite unreliable.

The FRC was well aware of the fact that R/T required about twice as much spectrum space as the well established CW communications.

Except for the fact that there was considerable doubt in the minds of some of the Radio Commissioners as to the wisdom of assigning frequencies to an industry group for conducting point to point communications in competition with public service, there were no particular hurdles to be gotten over in connection with point to point. At least, there were no technical objections as was the case of air-ground R/T.

Informal discussions with the FRC quickly disclosed the fact that the airline communicators were somewhat over their heads in the Washington Merry-Go-Round. The legal firm of Kirkland, Fleming, Green and Martin, and, in

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particular, Mr. Louis Goldsborough Caldwell, their resident Washington partner and formerly secretary of the FRC, were engaged to assist in presenting our case before the FRC. This firm and Mr. Caldwell have represented Arinc on all legal matters continuously to this date.

Two far-sighted and sympathetic individuals were found in the FRC in the persons of Commissioner W. L. Starbuck and Chief Engineer, Commander T. A. M. Craven (on leave from the Navy). After numerous discussions the FRC decided to hold an informal hearing on the airline requirements.

Technically, it was necessary to prove that it was possible to conduct two-way R/T communications between aircraft and ground on the frequency bands we were seeking. It should be borne in mind that we were pioneering not only communications in the bands selected, but HF mobile radiotelephone communications. I can recall that no less than the Chief Signal Officer of the Signal Corps stated at this hearing that what we proposed for R/T air-ground was technically impossible on HF's. I also recall, about one month after the hearing, that during a conference in the office of the Executive Vice President of Universal Aviation Corporation in St. Louis he and I talked over the telephone via radio relay to a Western Electric official in flight in a Bell Telephone Laboratories aircraft over New York City. The frequencies employed in the radio relay were in the bands we were asking for.

The early experiments conducted presented sufficient evidence at the informal hearing to permit a decision that mobile R/T air-ground communications were possible and the FRC was of the opinion that licenses for regular use (not experimental) should be granted on some regular basis.

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Discussions for the assignment and use of point to point frequencies had gone along with the R/T air-ground conversations with the FRC. It was established by the airlines, beyond doubt, that transit times for aeronautical point to point communications conducted over the existing commercial circuits such as Western Union and Postal were unsatisfactory for airline use. However, the FRC, as the custodian of all frequencies, had other applications on file from several nationwide organizations such as Sears Robuck, Firestone Tire & Rubber, and others, for point to point frequencies to link their main plant and nationwide branches together in a communications net. This presented the question of degree of justification between applicants for the frequencies to the FRC. Again, the need for high speed handling in the aviation service decided the issue in favor of the airlines.

At this point, both air-ground R/T and CW point to point applications of the airlines for recognition of the proposed services, frequencies, and licenses were considered jointly in the FRC. Justification had been established that a need of these types of communications existed, but there still remained to the FRC the problem as to how the services could be established, licenses granted and frequencies assigned, and the public interest safeguarded.

There would have been no question of safeguarding the public interest if there existed an inexhaustible supply of radio frequencies. Unfortunately, that was not true even in 1930. Whatever frequencies the airlines used were unavailable to any other service and there existed a necessity on the part of the FRC to make sure that the frequencies which were assigned to commercial aviation service were available to all of the commercial aviation service then existing and what might follow in the future.

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Up to this point in the negotiations with the FRC, the airline personnel present in Washington had been working together as an informal group. Now that the FRC had approved, in principle, our requirements, each one of the representatives came up with a list of frequencies required for his airline. The frequency demands were not modest, to say the least, and then, as now, the total requirements for frequencies exceeded the supply on hand. Actually, all services, including the military, had to be fitted into the spectrum. Unfortunately, the military in particular had received a year or so prior to the hearing large blocks of frequency assignments (by Presidential Order and beyond the control of FRC) which reduced the number commercially available. Furthermore, aviation was a late arrival and rated no space in the HF spectrum actually designated for aviation. Whatever space civil aviation got in the HF spectrum had to come from some other service.

The problem which confronted us from the FRC viewpoint was:

In what manner can available frequencies be assigned to the air transport industry for both point to point and air-ground so that all legitimate present and future civil users may make use of them on a non-discriminatory basis?

Our Council, Mr. Caldwell, had had previous experience with another group of propsective users banded together with a common communications requirement, namely, the U. S. Press. The original requirement of the Press was an intercity national radio net for the exchange of news. As in the case of the airlines, landline teletype eventually superceded the radio net, but in those days intercity radio nets were a very hot subject.

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Obviously, this called for a cooperative venture of some kind. Consideration was first given to the formation of an association which might act in substance as a frequency pool. An association, however, would not meet the requirements of the FRC as it lacked the legal responsibility which the FRC required of its licensees, i.e., either individual or corporation. Conversations with Counsel determined that further action by the FRC would be forthcoming only upon filing of applications, supported by statements as to intent by a legally constituted group.

Determination to form a corporation was made by the airline personnel; and Hiscock, Hoover and Goldsborough obtained funds from their respective companies sufficient to bring Aeronautical Radio, Inc. (Delaware) into existance on Dec. 2, 1929.

The Arinc Charter provided that the corporation operate non-profit, and might conduct business in all phases of aeronautical communications and navigational activities. Only airlines could become stockholders and no one airline or group of airlines under a single control might own over 20 per cent of the stock of the corporation.

Because of the FRC requirements the highly competitive airlines had found it necessary to join together in a communications activity where the competitive angle was completely eliminated. To the credit of the scheduled airlines and their personnel, this concept has prevailed through the years. An early statement by an airline communicator "that when the seats are full and the aircraft starts a trip, it is just another aircraft insofar as communications is concerned", is just as true today as it was in 1930.

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The first regular Board meeting on _____ authorized the issuance of stock, the sale of which would provide the necessary capital. The percentage of stock for each of the founders was determined by a formula based upon the schedule miles flown by each airline in relation to the total schedule miles flown by all Members. This pro rate worked so well that it was also used to determine the amount of annual contributions required of each airline in order to defray Arinc's operating costs. From its incorporation through 1950, the member airlines have contributed over $1,000,000.00 to cover these operating costs. During this period, Arinc has, as a licensee of the FRC-FCC, administered the FCC aviation communications program during a period of great growth to the complete satisfaction of the industry. There has never been an aggrieved user who found it necessary to formally appeal an Arinc action direct to the Government licensing body. I believe that Arinc, acting with the FCC as the single coordinator of this program, has saved the tax payers considerably more than it spent because it is a certainty that if the Government itself had done the job it would have cost a lot more.

Immediately after the corporation was formed applications for licenses and frequencies were filed with the FRC together with a statement of policy. This original statement of policy is quoted verbatum herewith. It expresses the intent of the founders:

(INSERT STATEMENT OF POLICY)

This Statement of Policy remained in effect until 1945 when it was modified by Board action to provide that Arinc would install, man and operate the radio stations which had been, up to that date, operated directly by the airlines under a contractual arrangement with Arinc, approved by the FCC. This Board action introduced an element of confusion into what up to

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then had been a harmonious ensemble. Unfortunately, the Board agreed to a change which was diametrically opposite to the basic operation and requirements of the domestic air carriers.

The Operations Departments of the airlines, Flight, Flight Planning, and Flight Control, did not and do not desire that ground personnel, i.e., the Radio Operator, Flight Follower, Flight ControlClerk, conduct every contact with an aircraft crew through a third party. That introduced an element of delay and the fundamental reason why R/T was inaugurated was to eliminate third party relay on a contact between a ground man who has immediately available the information requested by the aircraft pilot, or vice versa. The situation was confused because Arinc, on the one hand (even though Arinc was actually a 100% owned subsidiary of the air carriers), was attempting with considerable vigor to introduce a new operating practice which did not meet the operating requirements (not communications requirements) of the majority of Arinc Members. These requirements were apparently better understood by the founder airlines in 1930 than they were by the Board Members 15 years later.

The original officers and Board Members were:

(NAMES AND AIRLINES)

Mr. Hoover retained the Presidency for a short time and only long enough to assure a good start of the operation. He was succeeded by Mr. Goldsborough as President, who retained that office until 1942 when he went into active Naval duty. The original office of the corporation was in the Carleton Hotel in Washington, D. C., where one or two airlines also leased space.

The highly experimental air-ground R/T service developed quickly from its advent in 1930. The Western Electric Company supplied all the original ground and aircraft equipment. The start of R/T is linked closely with the

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development of the techniques for four-course radio range and night flying with passengers. Prior to 1930, little or no commercial instrument flying took place and it was only when the pilot had available radio marked courses and continuous communications contact with the ground that instrument and night passenger flying became technically and safely possible. When it did, it came fast and lead to the need for certain other radio devices in which Arinc took a leading part in the development of, both the ground and airborne equipment.

In the early phase of the development of instrument flying, based around the four-course radio range conceived, developed and installed by the Bureau of Lighthouses of the Department of Commerce, it soon became apparent that additional radio aids were necessary for accurate navigation and approach. The first requirement was a ground installed radio marker to indicate to the aircraft its position on the range course at predetermined points, and the second some type of "blind landing" system. It is significant that the phrase "blind landing" system has, over the years, been changed to "Instrument Landing System (ILS)", a title probably not quite as optimistic ? pessimistic as the original.

With the creationof the Civil Aeronautics Authority under the Department of Commerce by the Civil Aeronautics Act of (1934, ? NO-1938) Congress gave considerable guidance and money impetus to the development of the civil airways system. The Civil Aeronautics Administrator, Rex Martin, found a need to maintain close liaison with the air transport industry and other airways users to the end that the improvements in the ground radio aids would be in phase with the airways users ability to make use of the ground installations. Arinc was quite active in the interest of its members at this time in collaborating with the CAA on airways and navigational requirements, but it represented only one group of users. In consultation with Arinc and the Military, it was decided to form

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a technical consulting group composed of technicians from the CAA, the Military branches,and various civil users. As a result of these conferences, the Radio Technical Commission for Aeronautics (RTCA) was formed in _____, and it has since been the common technical meeting ground for those interested in the development,installations and operation and use of airways radio navigational and communications aids within the United States. The first chairman of this group was the then Civil Aeronautics Administrator, and the first secretary was the then President of Arinc. The work of this Commission is too well known to require comment, and probably its most important recommendations are in the SC-31 Report which has set a planned pattern for development of airways aids in the United States since it was issued.

The "Z" and fan marker development and installations for use in connection with the four-course range were a direct result of RTCA recommendations. Again we find Western Electric using an Arinc specification, manufacturing the first airborne marker receiver for the airlines.

Arinc participated from the first trials by civil agencies in the long and difficult blind landing tests. History tells us that the system was conceived by the Bureau of Standards. Development of both the ground and airborne equipment lagged considerably in theUnited States. On theU. S. military side, development of the system was retarded by arguments between proponents of several conflicting systems.

However, in _____ the airlines and Arinc determined that while possibly the term, "Blind Landing System", was a trifle optimistic, a low approach system built around the Bureau of Standards system was feasible and necessary if scheduled air transport was to improve schedules. They prevailed upon Bendix to manufacture equipment (both ground and airborne) and it was first

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flight tested at Oakland and Newark in _____. I recall that both a United Airlines 247 and a DC-3 were unserviceable the first day after the Newark tests. I also remember that the Newark glide path took me closer tothe top of the four-course range towers than I had been before or have been since. These tests, plus the work done by the Navy on "air track" overcame the reluctance of the CAA to embark upon a real development of the Bureau of Standards system which today accounts for ILS in regular use at major airports around the world. The ground system is almost,if not completely,ready for "blind landings", and Arinc has written the specifications on airborne equipment elements which, when available, and coupled to the automatic pilot, will make this possible.

As airline schedule density increased,the company operated radiotelegraph point to point started to bog down. There was more traffic than could be handled. In the interim period between thefirst radiotelegraph installations and 193-, wire line teletype service offered by the AT&T and Western Union had developed quickly. The cost per mile to lease the lines and the equipment, however, when spread over the number of flights conducted by the individual airlines, was prohibitive. Again, a cooperative line sharing project was calledfor,but the AT&T would permit only a single user on a leased circuit. Arinc was requested by the airlines to secure circuits for sharing purposes at a reasonable figure. At that time there were two separate AT&T tariffs in effect; the first a tariff which included all users other than government and press at a rather high rate; and the second a tariff for government and press. Upon the AT&T's refusal to supply Arinc the leased teletype service for use by its members and at a rate the sameas that of the CAA, Arinc filed a complaint with the FCC (which has succeeded the FRC). After a long hearing, which was contested aggressivelyby the AT&T and Western Union,

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the Commission ordered that AT&T lease lines to Arinc to be shared by its members. It took no action, however, on the lower rate Arinc had requested; but within a short time the AT&T cancelled the two tariffs in effect and filed a new andlower tariff for all classes of users. The new rate was so attractive that the airlines found it economically possible to contract for their own circuits. Although the airlines have become a very large AT&T customer for leased teletype service, there has been only one circuit leased to Arinc for the general use of a group of airlines.

With the expansion of the airline leased teletype service in the U.S. the radiotelegraph point to point service disappeared completely by 194_. The frequencies, however, remained in use either converted to air-ground R/T in a few cases or put into the Arinc long range international point to point service.

Returning to the matter of HF airline communications during the exceptionally high growth period between 1930 and 1937, with the service authorized by the FRC and station licenses granted, curcuit operation soon demonstrated the great benefits of direct contact between company ground personnel and the airplane pilot. This benefited the pilot because for the first time he could proceed along the route with full assurance that he could be kept current on weather along the route and at alternates. He could also converse with other pilots on the route. It made possible flight following by ground flight control personnel so that advance planning on disposition of aircraft and crews was possible. In the early phases of 1930 and 1934, before the government voice communications were installed at airports and added to the radio ranges, the Arinc stations performed airport, approach and enroute communications functions and were, in fact, the only air-ground communications stations

on the airways. As new airlines entered the picture, more frequencies were required; and without qualification Arinc was able to supply the requirements acting directly between the FRC(FCC) on the one hand and the airline industry on the other. The other mobile services quickly became aware of the possibilities of mobile radiotelephone and it was not long until HF ship-to shore long range R/T became available for passenger vessels; followed by HF installations in harbor ships, fishing fleets, police and fire departments, taxiis, power company repair departments, etc., and, in fact, all of the mobile services. The technical adoption of R/T by these other services was usually pioneered by former airline employees. During these years, the equipment manufacturers were hard put to develop and supply equipment to fulfill the demand.

The operating specification for the airborne equipment called for equipment which required no adjustments in use, capable of operating on a number of predetermined frequencies, selected by the pilot at will by a simple switch. The Bell Telephone Laboratories recommended the use of a piezo electric crystal circuit for frequency determination as all other existing means of frequency determination required constant adjustment in use and were not capable of automatic switching between a number of different frequencies with any assurance that the frequencies would remain within limits which would permit maintenance of communications without constant adjustment during use. Crystal circuits were adopted for use on both ground and airborne equipment and today are still a basic requirement in the R/T equipment. While the crystal circuit provided the complete technical answer to operation on the exact predetermined frequency, it limited the use of frequencies to those for which crystals had been provided in the equipment.

Early equipment provided not over four frequencies. As the routes were extended it was soon found that four frequencies were not sufficient in the airborne equipment on the major routes. The airlines requested Arinc to design and develop a crystal frequency controlled HF transceiver capable of covering ten predetermined frequencies. Within one year from the date of the request, Arinc development was completed and in production by Bendix to RTIA. This equipment is still in use in all areas of the world. Several new design features were incorporated into this unit which have been subsequently widely copies, i.e., rear plugs, advanced type of shock mount, standardized unit size and form factor, turret frequency switching and dual use of tuned circuits for both transmission and reception. Frank Mosely, as Arinc Engineer, gets full credit for the development of the Arinc _____.

In 1938 Major Armstrong appeared before the FCC and gave much technical information on the characteristics of the VHF and FM. It was very apparent that frequencies on this order had great possibilities for aviation because of their freedom from atmospheric, long range interstation interference, and to a lesser degree precipitation static and ignition noise. Here again, the scheduled airlines through Arinc and, incidentally, the Bell Telephone Laboratories, played a leading part in the introduction of VHFs into the mobile service. Arinc and TWA arranged for the establishment of an experimental VHF circuit. Both ground and airborne equipment were furnished by Bell Labs and the equipment tested on the TWA route between New York and Pittsburgh. Major Armstrong's claims for the VHF and FM were so interwoven as to benefits to

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be derived that it was originally impossible to determine which of the benefits were attributed to VHF and which to FM. The original tests made by TWA used AM and the technical expectancies were quickly verified. There were comparatively no atmospherics and the transmission characteristics were line of sight. Considering the fact that an aircraft in flight as compared to a ground vehicle, inherently extends the line of sight distance between itself and the ground station, it appeared that the VHFs were made to order for air transportation. A small Arinc Committee based upon the TWA reports gave the VHF project the green light. We could not ignore Major Armstrong's FM claims (although a great many of them favored a ground to ground rather than a ground to air situation). In the second phase of the tests, airborne equipment, both AM and FM of equal power, was placed in a Bell Lab aircraft. Similar ground installations were made by Bell Labs at their building in New York City with antenna on the roof of the building. The Bell Lab aircraft was flown on a course directly away from the building over Long Island at constant and variable altitude with frequent shifts between the AM and FM equipment. The line of sight characteristics were evident and the point in time where the noise overrode the signal level was found to be a matter of a few seconds in favor of FM. Bell Laboratories and Western Electric were quite frank in stating at that time in comparing the state of the art of AM versus FM that they could deliver a better AM airborne equipment, and they recommended AM. Consequently, Arinc prepared a specification on a four frequency VHF AM transceiver with a guard channel. The guard channel was incorporated into the equipment at the request of the airline Operations Departments to provide a common calling and working frequency to make possible inter-aircraft communications between aircraft not on the same company frequency. Arinc also

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prepared specifications on a VHF ground transmitter and receiver. The Western Electric Company was the successful bidder on the airborne equipment and Wilcox Electric Company was awarded the ground equipment contract.

None of the VHF airborne equipment on this order and little of the VHF ground equipment ever became available to the airlines directly from the manufacturer. By the time this equipment was in production the U. S. was preparing for World War II in a big way. Surprising deficiencies were evident in the Army Forces air-ground communications. I have never been quite certain whether this was occasioned by equipment deficiencies or actual selection of the HF's used. Shortly after our entry into the War the Electronics Section of the Bureau of Aeronautics received advice that better communications between carrier and carrier aircraft were a must and introduction of VHF was mandatory. As a result, the Navy took over the Arinc type _____available, and Western Electric was given orders to greatly expand production on it. The Army Air Force took over the ground set production and expanded the output considerably. Immediately the 4-channel VHF became available to the Pacific Fleet, requests originated for more channels and the Navy placed quantity orders with Western Electric for the ARC-1 ten-channel equipment which was a logical successor to the early four-channel Arinc type. Today ARC-1, modified from 20 to 50 channels, is the standard commercial VHF transceiver used all over the world.

Because of the HF communications deficiencies in Naval tactical aviation, which I can certainly vouch for, I believe the fact that the Navy found the Arinc equipment designed and in production was a very fortunate circumstance. Insofar as I know, no commendary recognition of this was ever forthcoming from the Navy and I do know that not one penny of the development costs was ever forthcoming to Arinc from either Western Electric or the Navy.

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Two important facts occur to me in connection with the above:

(a) By its decision to go to VHF AM instead of FM in the early development of R/T VHF air-ground, Arinc appears to have established a standard which has little chance of ever being changed. Without this early decision by Arinc it is possible to visualize that the Am-FM argument could still be going on.

(b) By the inclusion of a guard channel in the VHF airborne transceiver, Arinc established a procedure which was found extremely useful in naval carrier and aircraft communications in World War II for entirely different reasons from those for which Arinc provided the guard channel. Airline use of the guard channel has been abandoned, but it appears that it will be continued indefinitely in Navy practice.

July 2, 1951

AERONAUTICAL RADIO, INC.

(ARINC)

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HISTORY OF ARINC SERVICES TO THE AVIATION COMMUNITY

Going back several years prior to 1929 when Aeronautical Radio, Inc. (ARINC) was incorporated, the first successful experiments in air/ground communications were conducted in 1913. A year or so later with the outbreak of World War I, the Army and Navy, in coordination with several research laboratories and the Bureau of Standards, began the first intensive experimental work on two-way radio between airplanes and the ground. The equipment which evolved from these tests had a radio-telephone (voice) capability of from 25 to 50 miles and a radio-telegraph (CW) capability of approximately 100 miles. For almost ten years after the war ended there was a lull in U. S. research, while European scientists increased their efforts to develop reliable air/ground radio communications. The first operational air/ground radio-telephone voice system was inaugurated in 1919 when the first regular passenger air-transport service was established between London and Paris. The first U. S. aeronautical land station radio license was not granted until 1928.

It was May 11, 1929, that the first Federal Radio Commission* public hearing on aviation took place. This was the formal beginning of aeronautical radio service. In August, 1929, a series of conferences were held by the FRC with the military and industry to work out an acceptable plan for radio licensing and frequency utilization. Finally on September 9, 1929, the FRC adopted an aviation radio operating plan which called on the airline industry and all other civil aviation operators to coordinate their efforts and to consolidate their own

*The Federal Radio Commission (now the Federal Communication Commission) was created by the Congress with the enactment of the Radio Act of 1927.

frequency requirements and licensing activities under one central affiliated group to eliminate the confusion created by each airline independently securing licenses and operating its own radio facilities. By this time, it was clear to all concerned that a high degree of cooperation would be necessary between the airline operators if maximum efficiency in the utilization of their individual radio systems was to be achieved.

As a result of this concept of operation, on December 2, 1929, Aeronautical Radio, Inc., was organized and incorporated within the State of Delaware. In consonance with the company's role as the single licensee and coordinator of aeronautical radio communications for the aviation community, ARINC was formed as a business enterprise to be operated on a "not for profit" basis, the entire stock of which was subscribed to by the air transport operators.

Initially, the member air carriers continued to own and staff the ground station facilities. ARINC, as the licensee, provided supervision over the operating procedures to ensure standard operation and compliance with FRC regulations. On May 12, 1930, the FRC transferred to ARINC the licenses covering some 75 HF ground stations, which previously had been issued to the air carriers.

Gradually, as ARINC's capabilities grew and the advantages of standardized procurement, operation, and centralized research became apparent, the company was called upon by all but a few of the airline operators to assume full operational responsibility for their air/ground communication requirements. As the state of the art was advanced, so ARINC's capabilities continued to grow and expand comensurately and the aviation community looked more and more to ARINC as the center of communication planning for the entire air transport industry.

Some of the more significant periods in ARINC's history which have marked the company's growth include the following:

- The period between 1930 and 1937 when all air/ground/air and point-to-point communications were carried out on high frequencies. Air/ground messages consisted almost exclusively of position reports, weather, and traffic advisories, since no air traffic control existed at this time, and many of the major airports had no control towers. These were the days when the towers that did exist controlled only traffic on the field and for take-offs, usually by means of an Aldis light. The point-to-point traffic was on either voice or CW, primarily involving operation of the airline. Since relatively few people were flying and full planes were a rarity, messages relating to passenger service were in the minority.

- A most important milestone in ARINC's history was the 1937 hearing before the FCC -- ARINC vs. AT&T -- which resulted in an order requiring AT&T to lease wire circuits to ARINC for use by its members. The decision handed down by the FCC stated specifically that AT&T could not refuse ARINC's right to contract for circuits which might be apportioned at cost among a group of users.

- The period between 1930 and 1939 during which ARINC stations (staffed by airlines personnel) performed airport, approach, and enroute communications functions and in fact were the only air/ground communication stations on the airways. This marked the first time an airline pilot could proceed along the route with full assurance that he could be kept current on weather and alternate airports. It made flight following by ground controllers possible so that the airline concerned for the first time could do advance planning with respect to the disposition of aircraft and crews. In July of 1936, the

Bureau of Air Commerce
Civil Aeronautics Authority*, with ARINC's technical assistance, established the first Government air traffic control centers at Newark, Chicago, and Cleveland. However, for some time thereafter, ARINC stations operated by airlines personnel continued to perform air traffic control functions.

● During the same period, ARINC, in cooperation with the Civil Aeronautics Authority, played a leading role in the research and development of radio navigational aids to aircraft and instrument landing systems and the development of the applicable techniques and equipment operating procedures. As a result of this effort, the Radio Technical Commission for Aeronautics (RTCA) was established. This commission has since become the foremost technical consulting group in the aviation community, of which ARINC is still an active member. In this field of radio aids to aircraft navigation, during this early period ARINC contributed to the development of numerous equipment characteristic standards and specifications, including standards for the flight checking of ground facilities.

● Also, during this same period, which established ARINC's future within the framework of the FRC's plan reposing the responsibility for licensing and frequency assignments under a central agency of the air transport industry, ARINC developed the specifications and design for crystal controlled airborne transceivers capable of operating on a number of predetermined frequencies selected by the pilot at will by a simple switch, and which equipment would eliminate the need for frequent adjustments by the pilot as was the case before. This was a big first for ARINC and one which marked an important forward step for the airlines.

*Created by the Civil Aeronautics Act of 1934 (later renamed the Civil Aviation Authority).

In 1938, ARINC appeared before the FCC to present information on the technical characteristics of VHF AM and FM radio transmissions. This was followed by the production of prototype equipment in collaboration with the Bell Laboratories and a phase of experimental work and testing. Following up this activity, ARINC prepared a specification on a four-frequency VHF AM transceiver with a guard channel. The guard channel was incorporated at the request of the airline operations people who wanted a common calling and working frequency for inter-aircraft communications -- between aircraft not working the same company frequencies.

The period between 1939 and 1946 was dominated by World War II, hence no significant civil aviation progress was made. Only a skeleton fleet of domestic aircraft was maintained, with all other efforts directed toward winning the war. For example, United Airlines, the largest domestic carrier, today operates or has on order some 450 jet aircraft. During WW II, their domestic fleet consisted of twenty-nine DC-3's, carrying mostly war priority passengers and cargo.

The end of the war in 1946 released, for the first time, large, long range aircraft in quantity, and the peace-time economy brought an entirely new generation of air-minded travellers. New and better ways had to be found to cope with the air/ground and point-to-point communication requirements thus generated. From 1946 to 1956, a spectacular increase in these demands caused the airlines to turn to ARINC to solve these problems. Where the early ARINC stations were staffed with airline personnel, in 1948 and 1949, the volume indicated that maximum sharing of frequencies and operators was essential. The first of ARINC's present 15 Communication Centers was implemented at Houston, Texas, to be shortly followed by similar Centers at

New Orleans, Anchorage, Tokyo, San Juan, Honolulu, Seattle, San Francisco, Los Angeles, and Okinawa. At the same time, wire lines replaced the old CW point-to-point service, and VHF began to replace HF as a means of communicating with the flight crews.

The ramifications of the business of supplying communication services to the aviation community and the complexities of Government regulation under which ARINC must administer them, when combined with the rapid progress of the state of the art and the accelerating requirements of the aviation industry's communications requirements over the years makes it literally impossible to record the voluminous details of ARINC's first forty years in business; no doubt in the next forty years the company's history will repeat itself.