

FROM 500MD TO LAH – CHALLENGE TOWARD VERTICAL LIFT IN KOREA

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Abstract

From 500MD to LAH, a successful progress already has been achieved from KHP program and now LAH program is ongoing. In this article, Korean helicopter history overviews of direct procurement, licensed production and development are included and stated.

1 Status before 1990s

Before '90s, Korean helicopter industry was focused on a direct procurement or a licensed production of the military rotorcraft, therefore, the contributions to the other industries were insignificant. At this moment, 500MD for the reconnaissance/Command & control/light attack missions, UH-1H for the Air Mobile/Command & control missions, AH-1S for an attack mission and CH-47D for a large transportation mission were acquired and operated. 500MD was only licensed production model in domestic while UH-1H, AH-1S and CH-47D were direct procurement models as finished products. The licensed production of 500MD was conducted by Korean Air Lines (KAL) as a domestic prime contractor and the components manufacturing & production were composed of almost 3,278 items. The detailed examples were the casting/forging/machining productions of 1,477 items, the large sheet metal forming production of 27 items, the fuselage detailed & frame reinforcing parts productions of 652 items, the aircraft skin & fuselage parts manufacturing of 651 items and, etc.

2 Korea Helicopter Program (KHP)

After that, Korean helicopter industry have run the programs for the heavy transportation

helicopter, the light armed helicopter for reconnaissance, the medium class utility helicopter and Korea Helicopter Program (KHP). Especially, the KHP was a turning point project with the broad military acquisition requirements. The heavy transportation helicopter program proceeded as a direct procurement to acquire additional CH-47D. The light armed helicopter program to replace AH-1S Scout and 500MD also proceeded but most requirements were integrated to KHP. Then, only a few fleets acquired by licensed production of BO-105 with additional mission equipment installed to achieve the reconnaissance mission by DAEWOO Heavy Industry (they merged to KAI later).

The medium class utility helicopter program was decided to proceed as a technology transfer production program based on a large acquisition fleets. The program was driven by Ministry of National Defense (Project management), Agency for Defense Development (Technical management), KAL (Domestic prime contractor). This program was a joint project of Army, Navy, Air Force and run by Ministry of National Defense under the technical management from Agency for Defense Development. The missions of this helicopter were Air Mobile, transportation, search & rescue and Command & control.



Fig. 1. Medium class utility helicopter (UH-60P).

The helicopter has been operated by Army, Navy, Air Force as the main helicopter until now. For this program, UH-60L BlackHawk as shown in Fig. 1. (Sikorsky, USA) was selected as the baseline platform for the technology transfer production. When the technology transfer production of UH-60 was introduced to Korea, the name of the platform was changed to UH-60P due to the additional installations of the equipments or the rebuilding of the parts. During the domestic production, the technical improvements has been conducted for three times (called R0, R1, R2). The technology transfer production was localized by steps from I to IV with respect to the domestic production amounts. After that, the expanded localization of the auxiliary machinery drive was processed and the additional UH-60P was produced at the second phase. The technology transfer production of medium class utility helicopter was originally planned as a stepped technical acquisition project which was a part of long-term plan of securing the individual helicopter technology. From this program, many technology advances were acquired except the dynamic components of the rotorcraft. The acquired technologies were manufacturing of the airframe and subsystem components, testing, evaluating and the quality control. They became the basis for the successful accomplishment of KHP and the light armed helicopter program (called LAH) launching.

3 Details in KHP

In June 2006, Korea finally launched the first development program in helicopter field called Korean Helicopter Program (KHP). Actually KHP consisted two different programs, one is an utility version and another is an attack version. Because of various reasons, utility version named Korean Utility Helicopter (called SURION) as shown in Fig. 2. was started first and its Full Scale Development Phase was completed in June 2012. SURION entered into Military Service from Dec. 2012. Korean Utility Helicopters (KUH) will be produced until 2013 with more than 200 Volumes. In the program, the vehicle system (including 4 flight test vehicles), the training system and ILS were

developed. Korean helicopter program management office was established to manage the program in cooperation with Ministry of National Defense and Ministry of Commerce, Industry and Energy. Department of procurement agency was in charge of making contract with three Development Leading Agencies. ADD (Mission Equipment Package, Armament), KARI (Dual Use Components), KAI (System Integration), these three DLA were in charge of KUH development and Eurocopter joined as technical supporter. More than 150 industries, 18 universities and 10 research institutes were involved for the localization. The KUH was installed dual T-700 engine with FADEC and the advanced systems such as AFCS, Glass cockpit (integrated mission computer, MFD, CDU), full survivability equipment and etc. The missions of KUH are the Air assault, Medical evacuation Raffel, Fast-rope, Search & rescue and etc. Now they are operating very successfully. Basic platform of KUH is modified for the derivatives such as Maritime, Navy, Parapublic version and the Police helicopter version was delivered in Dec. 2013.



Fig. 2. Korean Utility Helicopter (Surion).

4 New challenge of Light Armed Helicopter (LAH) Program

Earlier mentioned, the LAH (Light armed helicopter) development is a part of KHP program as shown in Fig. 3. Through the various strategies changes, the LAH program was launched at the end of June 2015. The LAH will be developed as a cooperation program with the Light Civil Helicopter (LCH). The LCH program is a joint business project to develop a successive/upgraded model of the

legacy helicopter owned by the bidder. The LCH will be developed by the international co-development between the domestic contractor (now KAI) and the bidder (now Airbus helicopter) to produce, sell and to provide MRO thereof. KAI and Airbus helicopter shall reserve the equivalent rights. The LAH program is a development program led by the Korean domestic contractor (now KAI) with technical support of a bidder. The LAH including ILS/Training System will be developed on the basis of the LCH and in compliance with the requirements of ROK Army. The maximum commonality between LCH/LAH is to be maintained for cost saving and risk mitigation. The FSD phase of LAH will be continued until 2022.



Fig. 3. Light Armed Helicopter (LAH).

5 Summary

From 500MD to LAH, rapid step toward vertical lift happened in Korea. After the first operation of 500MD, Korea planned two major programs in two decades and one of them was already finished very successfully. Also, Korea surely has more than enough potentials to proceed the new LCH/LAH programs from the accumulated technologies through many development programs in the past. Finally, Korea will keep going on developing a new, innovative, advanced technologies for the rotorcraft and will hopefully be the one of the leading countries in the near future.

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