



Fig. 16.11. Example of Corona satellite photographs. A low-resolution photo (top) shows the area of the Soviet Saryshagan antiballistic missile defense test range (presently in Kazakhstan) obtained by a KH-5 Argon mapping camera (Mission 9058A; 29 August 1963). Lake Balkhash is covered by fog on the right. Bottom high-resolution photos show (left) site 2 (KH-1; Mission 9009; 18 August 1960) with the guidance radar and (right) the area of long-range radars (KH-4; Mission 9035; 30 May 1962). In a missile defense “first,” the long-range “Hen House” radar (*Dunai-2*) detected a Kap-Yar-launched ballistic missile R-12 (SS-4) at a distance of 975 km. The radars at site 2 and two other similarly instrumented locations precisely followed the warhead that was intercepted by a V-1000 missile on 4 March 1961 (see also Fig. 16.12 on the next page). Courtesy of Mike Gruntman.

16. Opening the Skies



Fig. 16.12. Example of intelligence derived from the Corona program — a map of the Saryshagan antiballistic missile defense test range, ca. 1963. Related representative Corona photographs are shown in Fig. 16.11. The figure also illustrates the first “nonnuclear” intercept of a warhead by a missile (see also Fig. 16.11) accomplished in the Soviet Union by a team led by Grigori V. Kisun'ko on 4 March 1961. (A photograph of Kisun'ko, 1918-1998, is shown in the right top corner.) Three precise guidance radars were located at the sites (circled on the map) forming an equilateral triangle with the side 150 km (93 miles). Each radar measured distance to the incoming ballistic missile warhead with a 5-m (16-ft) error. The two-stage V-1000 interceptor missile developed by design bureau *Fakel* of Pyotr D. Grushin was launched from a site marked “Launch Complex B.” The intercept with the accuracy 32 m (105 ft) was achieved at altitude 25 km (16 miles) 43.7 s after the interceptor missile launch. The interceptor was detonated 0.3 s before nominal intercept, releasing 16,000 spherical 25-g balls, each containing an explosive charge and a hard core made of carbide-tungsten-cobalt alloy. The released balls formed a uniform disk 150 m (500 ft) in diameter with high statistical probability to hit the target. On impact, the ball's explosive charge detonated and destroyed a part of the target external wall with the hard core penetrating inside and damaging the nuclear charge of the warhead. The long-range radars similar to those first observed on the shore of Lake Balkhash were later spotted near Moscow, thus revealing deployment of the antiballistic missile defence system around the Soviet capital. Original map courtesy of Central Intelligence Agency; Kisun'ko photograph courtesy of the Russian Academy of Sciences. Courtesy of Mike Gruntman.

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