

jeopardy ... my gallant crews [face] and the compromising of our only method of winning this war.⁸⁶

Three days later, though surely not as a result of this outburst, priority for the allocation of labour within the jurisdiction of the Ministry of Aircraft Production (MAP) was given over to the Lancaster. That pleased the AOC-in-C, but he returned to the attack in early summer, when Halifax losses were soaring, the Mark III program seemed irretrievably bogged down, and no headway was apparently being made on modifications to the flame dampeners and tail assemblies on the Mark II and V – which, in No 6 Group, were in service with Nos 408, 419, 427, 428, and 431 Squadrons. Indeed, the only real improvements to the latter variants, he complained, were those initiated by individual squadrons, and these consisted primarily of cleaning up the nose, usually by replacing the front turret with a Perspex blister. That reduced drag, giving the IIs and Vs slightly better speed and altitude, but it also reduced their defensive firepower.⁸⁷

A few months before, when morale was allegedly 'cracking,' Harris had suggested doing away with the Halifax altogether, concentrating production on the Lancaster, or at least completely redesigning the Halifax wing to make that type more like the Lancaster. Although morale could easily have been worse in May 1943 given recent losses, there was by then no hope of shifting production in that way. For one thing, MAP was boasting that with an uninterrupted run of nine to twelve months the aircraft industry might well exceed its bomber production quota for 1944; after the many battles fought to increase the size of his command, it would have been difficult for Sir Arthur to demand time-consuming modifications that could only bring a decrease in output. For another, Harris had already decided that he would soon have to withdraw his Stirlings from all operations over Germany and that Wellingtons could not make the deep penetrations that would follow once he had finished with the Ruhr; if he also withheld the Halifax IIs and Vs from long-range missions, Bomber Command would be left with an all-purpose main force of about four hundred Lancasters and whatever Halifax IIIs had been produced – scarcely enough to sustain an intensive campaign.⁸⁸

For the moment, then, Harris had to live with the Halifax in all its variants, but he ensured that their weaknesses were neither forgotten nor hidden – and by doing so probably reinforced the view prevalent in OTUs that they were 'a machine to be avoided.' Pilots were warned against taking 'violent' evasive manoeuvres, for example, because of the risk of spins and the possibility that their machines might break up altogether under the strain. At the same time, the AOC-in-C was determined to make the Halifax as air- and battle-worthy as possible, and to this end he was adamant that steps be taken immediately to improve its defensive armament and, in particular, the Fraser Nash FN 20 tail turret – a 4 × .303 mounting which, besides its unsatisfactory fire power, was 'useless' from the standpoint of the air gunner. Nothing could have been worse, he declared, except to have built 'the whole turret solid'; if attempts to give it a better downward view failed, the FN 20 was to be got rid of altogether. In the meantime, however, as a desperate measure to counter the

increased number of attacks from below, Harris told his Halifax squadrons to cut holes in the floors of their aircraft, fitting Perspex navigation blisters made surplus by previous modifications, and to jury-rig downward vision ports (something with which Nos 4 and 6 Groups were already experimenting). That the lookouts using them would have to lie flat and, for the best view, stick their heads down into the blister was an unavoidable discomfort and inconvenience.⁸⁹

Such makeshift measures were hardly satisfactory and, impatient with the lack of progress in producing new turrets, in June 1943 Harris demanded a meeting with representatives of the Air Ministry and MAP to reiterate his demands for heavier armament and better downward vision. The request was not universally welcomed in Whitehall, where Sir Arthur's persistent complaining about all manner of things was often a source of frustration and exasperation – especially when one of his recommended turret modifications would have required gunners to 'have their legs amputated' if they had any hope of fitting inside. The conference was called, however, and Harris succeeded in gaining some sympathy for the plight of his crews. He also won approval for his own pet project – a 2 × .5-inch rear turret designed by Rose Brothers, a Gainsborough firm he had approached informally and in private; but, with twelve months likely to elapse before mass production could begin, neither the Air Ministry nor MAP could offer much in the interim. The meetings broke up after agreeing only that vision ports cut in the floor were acceptable and, as another temporary measure, that the FN 20 turrets could also be removed and replaced by Perspex blisters fitted with two hand-held guns. Although fire-power would be reduced, gunners would at least have a better view below, where, by now, the greatest danger clearly lay.⁹⁰

Beyond that, with the failure of Airborne Mandrel and Tinsel to interfere decisively with the enemy's early warning radars and radio communications, and given the imperfections in Boozer and Monica, additional measures were needed to overcome Himmelbett if casualties were to be kept at acceptable levels. This was particularly so if most raids were to be mounted on those clear nights when Pathfinder ground-marking techniques could be exploited to the fullest – but night-fighter crews could best see their prey. The alternative was to rely even more on navigation and bombing aids to attack on dark and cloudy nights, but Oboe and Gee each had their limitations, while H2S was simply not precise enough to serve as a reliable blind-bombing instrument.

Facing the facts, and arguing that target selection must reflect what was possible rather than conform to economic theory, Harris declared that while he was willing to concentrate on 'the most valuable target' on clear nights when ground-marking was practical, he did not want to attempt deep penetrations in summer, preferring to use the shorter nights to attack precise targets in France

* This was a permissive instruction, not an order; and, as with many other modifications to turret installations (a particularly enigmatic topic), it is difficult to know how widely it was applied.

or German objectives east of Emden-Dortmund-Munster. Larger areas would have to suffice when visibility was marginal or winds were high, but because of recent experience over the Ruhr he was convinced that Bomber Command could not return to the same area night after night without risking heavy losses. The focus of attack would be shifted frequently. He was also ready to undertake shuttle raids in which the main force flew past the target to bases in North Africa, Cyprus, or Malta, leaving behind those fighters ready to pounce on the bomber stream as it returned to England.* In the poorest weather, however, he promised the CAS no more than that he would make for the largest possible area where 'even a very scattered raid is likely to do worthwhile damage.' In that regard, instructions were soon issued to main-force crews to use H2S as a navigation aid only in the expectation that it would 'certainly enable one without fail to hit the town somewhere.'⁹¹

Even then, however, there was reason to doubt whether crews would routinely find the right city. Navigation was becoming more complex, in part because of the increased bad-weather flying and the higher altitudes manageable in the Halifax and Lancaster, which increasingly precluded map-reading, but also because all the new electronic equipment intended to help crews adhere to strict courses and timings had to be monitored. Beginning in June, therefore, Bomber Command asked that changes be made in the composition of main-force crews to ease this burden, either by substituting a second, fully trained navigator for the bomb-aimer or, failing that, by reallocating duties within the existing crew to create a 'navigation team' in which the navigator would be freed as much as possible from monitoring and manipulating equipment and left to do what he was trained for: using a variety of data and his own knowledge and experience to produce an accurate plot.

This was the solution eventually adopted, with bomb-aimers being trained to use H2S as a navigation aid and to do most of the astro-navigation, and wireless operators, already the electronic warfare specialists, doubling on Gee. Beyond that, to guard against the 'stupid mistakes' that were still occurring all too frequently, the final approach to the target would be a timed run on a set speed and course from an unambiguous reference point. It was further laid down that continuous evasive action, which offered no protection against unpredicted Flak and did not fool seasoned Lichtenstein operators, but did much to reduce navigation and bombing accuracy, was to be avoided. Instead, crews were to fly a steady and straight course to, over, and from the target – except when they were 'actually singled out for engagement.'⁹²

For its part, the Luftwaffe was making its own adjustments in the summer of 1943. By early July, General Martini's radio-intelligence organization was so efficient that it could monitor upwards of 70 per cent of Bomber Command's

* This was tried for the first time in a major way on 20/21 June 1943, when No 5 Group flew on to North Africa after bombing the Würzburg factory at Friedrichshafen, and returned to England via Spezia, near Genoa on the Italian coast, three nights later – without suffering any losses on either raid.

day-time radio traffic, and from that was almost always able to deduce not only the nights for which operations were planned but also how many bombers were likely to take part. Although High Wycombe was aware of this, and issued instructions to limit transmissions during pre-raid test flights, the element of surprise could no longer be counted upon.⁹³ Furthermore, while Bomber Command was right in thinking that most of its losses resulted from radar-controlled and -assisted interceptions,⁹⁴ Major Herrmann's Wilde Sau experiments with single-engined machines had proved remarkably successful. On clear nights his pilots had had little difficulty in finding, following, and opening accurate fire on enemy machines, particularly those whose positions were given away by their tell-tale exhaust flames. Eager to do more, on 6 July he informed Generalfeldmarschall Erhard Milch, secretary of state for air, that he had assembled 120 pilots experienced in night flying, and asked that permanent Wilde Sau units be created to supplement the regular Himmelbett organization.

In the area of the *Flak* division in the Ruhr, where the illumination conditions are fairly good, you can expect, on the average, that 80 to 140 enemy targets will be captured by the searchlight beams in the course of an air raid, and in fact will be tracked for more than two minutes. The requirement I place on crews is that every target which is tracked longer than two minutes by the searchlights will be shot down. I believe I can say that if the British continue these attacks in this kind of weather, as they've done up to now, they can quite easily lose an additional 80 aircraft during the course of one night, if I get the necessary aircraft to do the job.⁹⁵

Although Kammhuber remained opposed to freelance night-fighting, Herrmann's logic was unassailable. Using single-engined machines belonging to (and still being flown by) day-fighter units, the Wilde Sauen would strengthen the night defences without requiring any more aircraft. They would also be operating directly over the target cities, where there were no Himmelbett boxes, and whatever success they enjoyed was likely to boost the morale of the civilians below. Too good to pass up, Herrmann's request to form three Wilde Sau Geschwader was quickly approved.⁹⁶

Elsewhere in Germany, the electronics industry was well advanced in the development and production of the next generation of AI radar, Lichtenstein SN2. Using a different frequency from the B/C then in service – it was actually hidden within the Freya band – SN2 was more difficult to jam and had a better search pattern over a much improved range. German scientists and technicians had also made significant strides in the design of two homing devices to be fitted to all twin-engined interceptors – Flensburg, useful against Monica from up to sixty miles, and Naxos, which detected H2S emissions from as far away as thirty miles.⁹⁷

Meanwhile, Hauptmann Rudolf Schoenert had already claimed a number of victories using *Schräge Musik*, a pair of oblique (60°), upward-firing 20-millimetre cannon mounted in the fuselage of his Me 110, and following his success the installation of up to six such guns was authorized for the Dornier 217, the Junkers 88C-6, and the Messerschmitt 110 fighters. Capable of devas-

tating destruction, *Schräge Musik* was fired from the blind spot of most British bombers, from below and just slightly behind, and so made Harris's concerns about downward vision all the more appropriate. It would also prove to be a great leveller in terms of Bomber Command casualties. Until now, experienced crews generally had a better chance of surviving an operation in part because they had learned how to evade night-fighters once they were discovered. With *Schräge Musik*, however, the attacker was rarely visible before he opened fire, and that advantage was lost. 'Absolutely nothing had been seen,' the second pilot of a No 426 Squadron Lancaster told intelligence officers after his release from prison camp in 1945, 'when we were hit from underneath.' Knowing nothing about the new weapon at the time of the attack – the RAF confirmed the existence of *Schräge Musik* only in 1944 – Flying Officer Joseph Heron could only guess that his machine had been destroyed by 'incendiary rockets fired from vertical guns of a fighter' – reasonable enough under the circumstances.⁹⁸

The Luftwaffe high command was nevertheless uneasy by the late summer of 1943. Despite the northward extension of the Kammerhuber line and the stationing of the night-fighter control ship *Togo* in the Baltic, bomber streams approaching from the north were sometimes lost after they passed Denmark. More radars and better trained observers might have alleviated this problem to some extent, but the pressure of the war on the Russian front meant that resources were still being siphoned away from the night air defence organization as experienced observers, electronics technicians, and even scientists in good physical condition were ordered into active military service – a blow for the present and the future. Most important, it would still be a few months before Naxos, Flensburg, Lichtenstein SN2, and new Panorama ground control radars would be available in quantity and, until then, the pillars of *Himmelbett* continued to be Würzburg and Lichtenstein B/C, which operated on virtually the same frequency and could therefore be put out of action by the same jamming device. If the British learned that soon enough – and their superiority in electronics and jamming was widely acknowledged – the whole edifice would crumble.⁹⁹

Into the Electronic Age, Hamburg and After, July–October 1943

Sir Arthur Harris was ready for the next stage of the bombing offensive even before he had mounted his last raids against the Ruhr. Persuaded that considerable damage had been done to Germany's main industrial area and fearful of the rising loss rate there, he issued an order on 27 May 1943 for a concentrated campaign against Hamburg. If 10,000 tons of bombs could be dropped on the city, its total destruction might follow; and that, he believed, would serve as a fitting and appropriate prelude to a similarly sustained campaign against Berlin.¹

Hamburg was considered an ideal target for Bomber Command even on short summer nights. Situated at the head of the Elbe estuary, the city was comparatively easy to find, its H2S signature was distinctive, and it could be approached with minimal exposure to the enemy's air defences. The elimination of its U-boat base and construction yards was also an important objective for the Royal Navy, and an intensive effort against it might placate at least some of the Admiralty critics who complained that Harris was not doing enough against the submarine threat. Moreover, as Europe's largest seaport, Germany's second largest city, and the site of more than one hundred power stations, oil refineries, and factories – including nine plants involved in the manufacture of aero engines and aircraft components – Hamburg met practically every criterion outlined in the Casablanca directive.²

Inspired in large measure by the American preference for attacking precise objectives, that directive had singled out four 'strategic' target systems for particular attention in a combined Anglo-US bomber offensive: submarines, oil, transportation, and the aircraft industry. Since then, USAAF planners had extended and refined their analysis of German industry and, in cooperation with the British Ministry of Economic Warfare (MEW) and the staff of the director of bomber operations at the Air Ministry, they had produced a list of seventy-six facilities whose destruction, it was claimed, would severely reduce the enemy's capacity to make war. Five of these were located in Hamburg.³

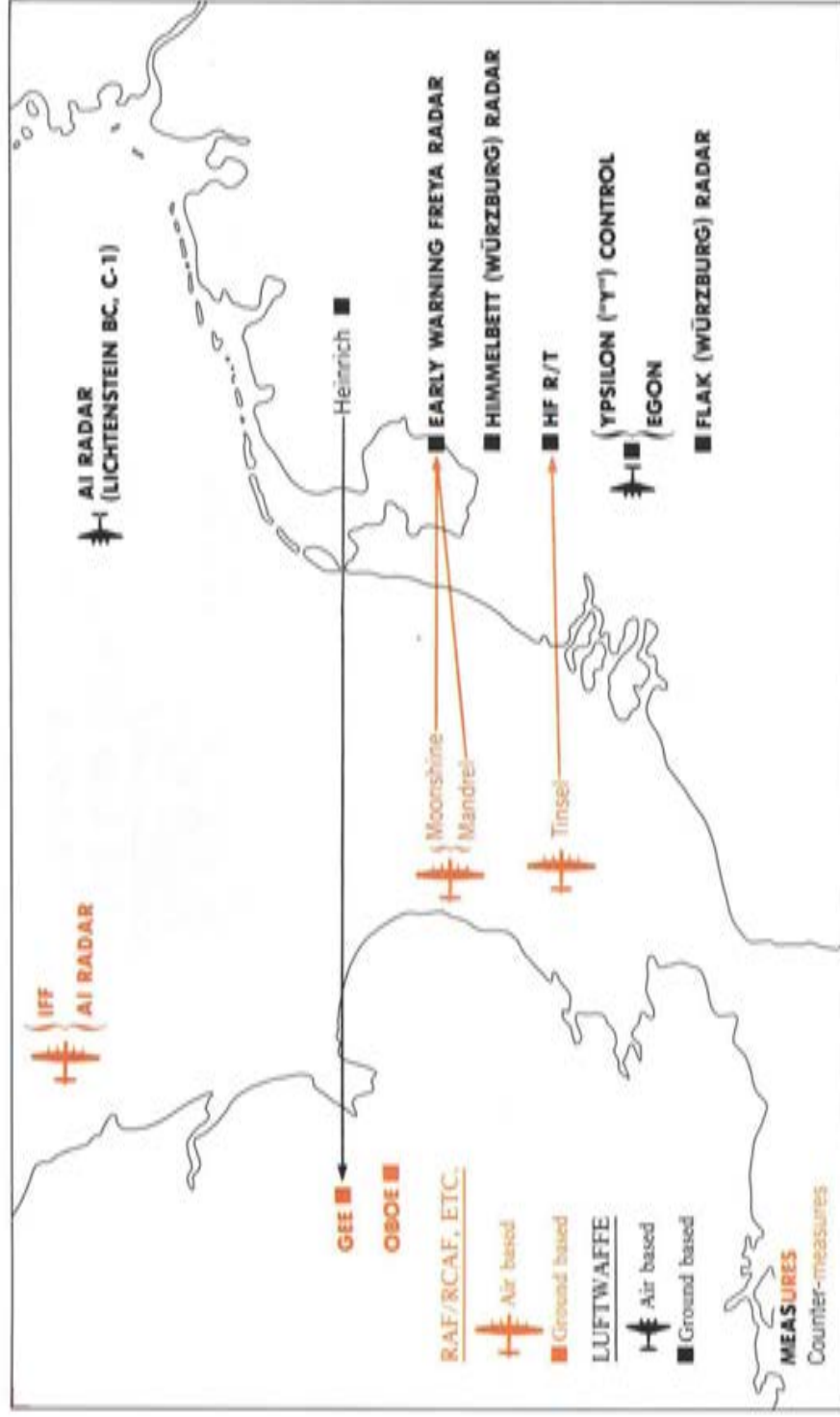
Submitted for the consideration of the Combined Chiefs of Staff at the Trident conference held in Washington in May 1943, the revised proposals approached the proposed Combined Bomber Offensive (CBO) from a decidedly

American perspective. Thinking it 'better to cause a high degree of destruction in a few really essential industries than ... a small degree of destruction in many industries,' Major General Ira C. Eaker, commander of the American heavy bomber force in Europe, urged that the combined effort be directed principally at 'all-out attacks' on targets which would affect 'a limited number of selected objective systems.' He anticipated that these attacks would involve 'precision bombing ... by day and night where tactical conditions permit, and area bombing by night against the cities associated with these targets' when conditions were less favorable.⁴

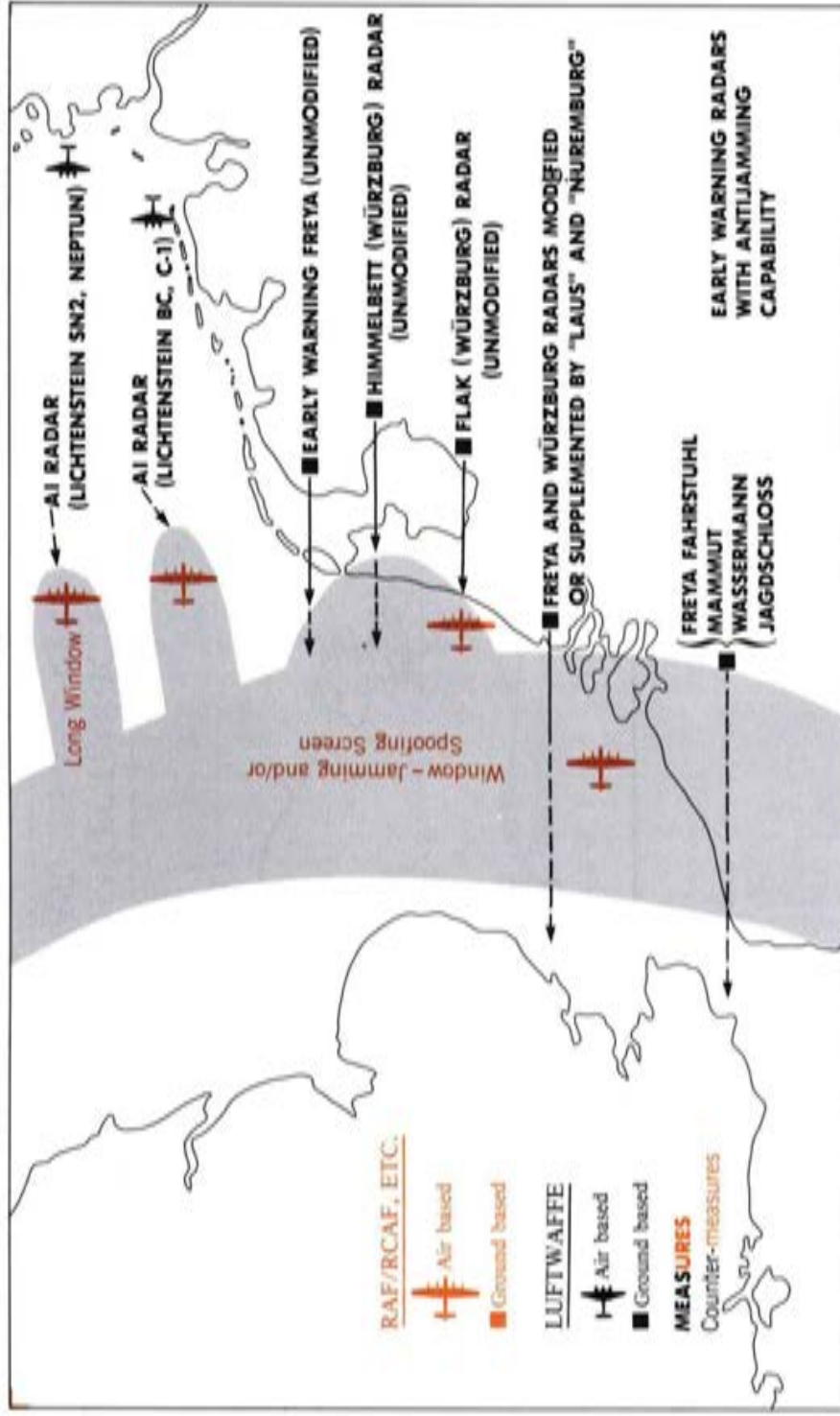
Having previously met and overridden similar arguments put forward by the Admiralty, MEW, and the RAF's own director of bomber operations, Harris was not overly impressed (or persuaded) by Eaker's intervention. But not wanting to impede the build-up of the United States Army Air Forces in England, Harris did not challenge the American commander directly, observing only that restricting the offensive to seventy-six individual facilities 'may prove somewhat inelastic.'⁵ Sir Charles Portal shared the AOC-in-C's concern, but he too went along with Eaker's submission, commenting (in a subtle and inverse fashion) that it was the 'perfect complement of our own night bombing operations' – as if area bombing were the key element in the proposal.⁶

Once at the Trident conference, Portal did what he could to secure the greatest possible operational freedom for Bomber Command within the framework of the CBO. The doctrinal statement regarding the importance of causing 'a high degree of destruction in a few really essential industries' was not included in the Pointblank directive which grew out of the Washington meetings. Similarly, although the Combined Chiefs declared that Bomber Command should complement and complete American operations, they added that it would customarily bomb 'the surrounding industrial area,' not individual plants or factories. 'Fortunately,' they observed, 'the industrial areas which ... Bomber Command has selected for mass destruction' contained most of the seventy-six specific objectives included in Eaker's list. Because the Americans would bomb by daylight, when the enemy's defences were likely to be most effective, they insisted that the German fighter force had to be neutralized before they could take on most other targets. Since Portal agreed that defeating the Luftwaffe was an 'intermediate objective ... second to none in priority,' both to allow the Americans to proceed and to achieve air superiority before the cross-Channel invasion (now tentatively scheduled for 1 May 1944), he could hardly object to the employment of Harris's bombers in efforts to achieve it. Nor did he want to. Thus, while reaffirming that Harris's overriding aim would still be 'the general disorganisation of German industry,' Pointblank specifically instructed Bomber Command towards:

- (i) the destruction of German air-frame, engine and component factories and the ball-bearing industry on which the strength of the German fighter force depend
- (ii) the general disorganisation of those industrial areas associated with the above industries



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- (iii) the destruction of those aircraft repair depots and storage parks within range, and on which the enemy fighter force is largely dependent
- (iv) the destruction of enemy fighters in the air and on the ground.⁷

Although Bomber Command was also feeling the Luftwaffe's sting, Harris had not been persuaded that the aircraft industry was anything other than a panacea target – a seductive one, to be sure, but one whose effective elimination would be difficult and probably very costly. Whether he would willingly restrict his effort to a few cities – many of which were hard to find at night, involved deep penetrations, and were well defended – and whether it was at all reasonable to expect that his crews could destroy small factories in them, remained open questions. Predating Pointblank by ten days, Harris's plan for the obliteration of Hamburg – Operation Gomorrah – revealed his conception of what the CBO was all about.

Although the city was included in both the Casablanca and the Eaker lists, and the Americans, whom Harris had invited to participate, would attempt selective, pinpoint precision bombing of specific manufacturing and military facilities, the battle of Hamburg would be a terror campaign, pure and simple, for High Wycombe. Despite the neat concentration of industrial targets on the Elbe's southern shore, the aiming points and areas of anticipated 'creep-back' were located mainly in the residential districts north of the river. Furthermore, great emphasis would be placed on fire-raising, an indiscriminate form of attack, not because Hamburg was particularly inflammable – a large fire in 1842 had destroyed many of its readily combustible medieval buildings, while the canals and waterways which threaded their way through the city would act as fire-breaks – but rather because incendiary bombs tended to cause 'more serious and lasting ... damage ... [than that] inflicted by similar weights of high explosive bombs' if houses, not factories, were the target. Indeed, the main contribution of high-explosives in the early stages of the attack would be to force firefighters to take cover and to open up buildings so that the flames would spread. Under the circumstances, Gomorrah was an appropriate code-name.⁸

The battle of Hamburg would also feature an important and powerful innovation – and a delay in its introduction was one reason for the two-month interval between 27 May, when Harris issued his operation order, and 24/25 July 1943, the first night of the campaign. For well over a year Bomber Command had known that strips of metallized paper or aluminum foil cut to half the wavelength used by Würzburg and dropped in clusters from approaching bombers could jam the enemy's radars by multiplying the echoes registering on their cathode-ray screens. A force of two hundred bombers might thus look like two thousand to confused operators unable to distinguish between the real and the false, while the residual effect of hundreds of thousands of strips drifting slowly to the ground would create interference on radar screens through which almost nothing could be seen.⁹

The havoc that should be created in an air-defence organization predicated

on rigid ground control was obvious: but it was for this very reason that the use of Window (as this counter-measure was called by the British) or Chaff (as the Americans would know it) was prohibited throughout 1942 and early 1943 despite forecasts that it could reduce losses by a third. For if the Luftwaffe learned to turn Window against Britain following its introduction over Germany – an argument which assumed that the enemy had not already thought of it themselves – then the RAF would be responsible for placing the air defence of Great Britain at risk. British radars were every bit as susceptible to jamming as German ones, even if Fighter Command's system of ground control was less rigid than Kammhuber's. The equation would change only when there was unmistakable evidence that the Germans had developed the technique on their own, or when a way had been found to shield British radar against it.

No less competent than their British counterparts, German physicists knew all about the jamming and deception properties of Window (which they called *Düppel*), and indications they were experimenting with it had begun to accumulate in November 1942.⁹ Because of that, it was decided that British night-fighters would receive American SCR 700 radar (known in the RAF as Mark X AI) to replace their Mark IX sets. The Mark X was better able to discriminate between *Düppel* and bombers, but as it would not be available until the late summer of 1943 the use of Window by Bomber Command was postponed until then. In the interim, however, on 9 May a German night-fighter crew defected to Britain in a Lichtenstein B/C-equipped Ju 88 which confirmed beyond all doubt what had been learned the previous December: Window would also affect the only known German AI radar. Opposition to its use weakened, but not wanting to give anything away before Operation Husky, scheduled for 10 July 1943, the Air Ministry now decided to wait until air superiority over Sicily had been firmly established and the beachheads there were secure. Released for operational employment two weeks after the landings, Window was introduced over Hamburg on the night of 24/25 July 1943 – dropped down the flare chute by either the bomb-aimer or the flight engineer in two-pound bundles of 2000 strips at a rate of one bundle per minute.¹⁰

The results satisfied all expectations. The early warning Freyas, Wassermans, and Mammut, operating on wavelengths that were only mildly affected by the type of Window employed, detected the bomber stream over the North Sea an hour before the first bombs began to fall. The Würzburgs were then tuned and set for the anticipated approach, the ground control organization came to life, and fighters were dispatched to their Himmelbett boxes. The Pathfinder element was correctly identified, the first plots projected onto control-room screens, but suddenly everything stopped. 'For minutes the illuminations on the screen representing the enemy had stuck in

⁹ In an instructive example of mirror-imaging, Reichsmarschall Hermann Göring had prohibited its use by the Luftwaffe for exactly the same reasons it was denied to Bomber Command.

the same positions. The signals officer switched into the direct lines to the radar stations and asked what was the matter. He received the same answer from all of them: 'Apparatus put out of action by jamming' ... The screens of the Würzburgs ... became an indecipherable jumble of echo points resembling giant insects, from which nothing could be recognised at all.¹¹ Listening intently to the German radio nets, British intelligence intercepted a number of transmissions from ground controllers to fighter crews describing their utter inability to assist them. The night-fighters would have to fend for themselves.¹²

It was no better in the air. One veteran pilot recalled that 'all that could be done now was to go fishing in the murk,'¹³ while another remembered that 'my radar operator suddenly had more targets than could have been possible. I know that I got some directions from him to head on but these were impossible to maintain because we couldn't possibly have overtaken the bombers so fast if they had been real targets. I was picking up targets that didn't exist everywhere. We kept jumping up behind a target but there was never the slipstream of the bomber.'¹⁴ Some Himmelbett controllers gave up in disgust and turned their crews into freelance night-fighters.

When we reached our box, we were immediately told by the fighter control officer that everything was jammed and that we were simply to fly in the direction of Hamburg. This was unusual; I had never heard this order before. I was surprised. We flew towards Hamburg and soon had many contacts on my radar screen. We thought that we were right in the centre of the bomber stream. The first impression was that the bombers were heading straight for us. Therefore, we turned, in order to get in behind one of these but, after the turn, they were still coming too fast. I said 'slow down, slower still, you're too fast.' The pilot said there must be something wrong because he had already let down the flaps and was flying as slowly as possible. We got contact after contact but not one of them was a firm one... This went on for a good hour. We landed at Stade ... My pilot went into the headquarters and had a conversation with *Major* Lent, whom he knew very well. He came back and said something like 'they seem to be all helpless and bewildered.'¹⁵

That portion of the Flak which depended upon Würzburgs for fire-control data was similarly affected, and many bomber crews remarked that the German gunners had obviously been 'groping blindly.'¹⁶

With so much of the Himmelbett organization unhinged, the German defensive effort was sporadic. Only twelve bombers failed to return, 1.5 per cent of those dispatched, and most of the victims, it was felt, were shot down because they had gone off track and so were outside the area protected by the mass of *Window*.¹⁷ All seventy-two Canadian crews returned, three-quarters of them being plotted within five miles of the allotted course to the target.¹⁸ Yet the bombing was not as concentrated as expected. Only half of the photographs taken were within three miles of the aiming point, and the creep-back extended six miles into the relatively open country north of the city. Although large fires were started (firefighting crews being called from as far away as Berlin) and

the death toll of 1500 was comparatively high, the city had already begun to recover by mid-day on the 25th.¹⁹

The same could not be said of the Luftwaffe. Despite its theoretical familiarity with the technique, no work had been done to find a counter-measure to Düppel, and nothing very useful could be improvised over the course of a single day. The Germans were therefore no better prepared to meet the second Window raid, carried out against Essen the next night. Although losses rose to 3.7 per cent, that was largely because of the heavy, but necessarily random, Flak put up over the Ruhr. The results of the attack were probably worth those higher casualties, however, as this was possibly the most effective of all the operations carried out against Essen during the war, and certainly the most damaging to the Krupp works. No 6 Group did slightly better than average, with only two of sixty-six crews (3 per cent) failing to return.²⁰

After a pause the next night, when not even Gardening missions were flown, Bomber Command returned to Hamburg on 27/28 July in a raid involving 787 crews, seventy-eight from No 6 Group, that would mark the zenith of its ten-day campaign against the city.²¹ A combination of freakish weather and atmospheric conditions (abnormally high temperatures, low humidity, and unusually juxtaposed frontal systems) together with concentrated bombing produced a firestorm which covered as much as five square miles of the city centre. Large and ever-growing fires raised the temperature at the core to several hundred degrees, and this super-heated air rose so rapidly that it sucked in behind it great quantities of cooler, oxygen-rich air at velocities approaching hurricane strength (65 miles per hour). These winds encouraged fires on the periphery, spreading the conflagration further – all while the bombing continued.²² Firefighting was impossible in such circumstances, and even those flying far above the city were soon aware that something extraordinary was happening. Canadian crews returning from the mission 'were all emphatic that Hamburg was blazing more furiously than on Saturday night ... The smoke from the fires was so thick that it penetrated into the cabins of the bombers, almost choking the crews ... Hamburg was blazing like a paper box.'²³

More than 40,000 Germans died in this one attack, many in shelters which functioned like ovens and which, once they were cool enough to be opened, revealed next to nothing of their former occupants. 'From a soft stratum of ash,' the city's police president explained, 'the number of persons who lost their lives [in one large shelter] could only be estimated by doctors at 250 to 300.' Elsewhere, there were stories of bodies lying in the 'coagulated black mess of their own molten fat tissue.'²⁴

Refugees had to make their way over the dead and dying. The sick and the infirm had to be left behind by rescuers as they themselves were in danger of burning ...

Many of these refugees even then lost their lives through the heat. They fell, suffocated, burnt or ran deeper into the fire ... Many wrapped themselves in wet blankets or soaked their clothes and thus reached safety. In a short time clothes and

blankets became hot and dry. Any one going any distance through this hell found that his clothes were in flames or the blanket caught fire and was blown away in the storm ...

Numbers jumped into the canals and waterways and remained swimming or standing up to their necks in water for hours until the heat should die down. Even these suffered burns on their heads. They were obliged to wet their faces constantly or they perished in the heat. The firestorm swept over the water with its heat and its showers of sparks so that even thick wooden posts and bollards burned down to the level of the water ...

The streets were covered with hundreds of corpses. Mothers with their children, youths, old men, burnt, charred, untouched and clothed, naked with a waxen pallor like dummies in a shop window, they lay in every posture, quiet and peaceful or cramped, the death-struggle shown in the expression on their faces. The shelters showed the same picture, even more horrible in its effect, as it showed in many cases the final distracted struggle against a merciless fate. Although in some places shelterers sat quietly, peacefully and untouched as if sleeping in their chairs ... in other shelters the position of remains of bones and skulls showed how the occupants had fought to escape from their buried prison.²⁵

Such were the scale of suffering and the length of the casualty lists on this single night that it was known immediately as *Die Katastrophie*, and the psychological impact on all of Germany was enormous.* Feldmarschall Wilhelm Keitel, Chef der Oberkommando der Wehrmacht, told his wife to 'leave Berlin as soon as possible' since Hamburg-like raids could be expected there once 'the nights are long enough. I am afraid of vast conflagrations consuming whole districts, streams of burning oil flowing into the basements and shelters, phosphorous, and the like.'²⁶

The industrial damage, too, seemed spectacular. Production at several chemical works, engineering firms, and shipyards was halted altogether; 'the entire tram and Underground system was brought to a standstill'; all the large gas works were put out of action; electrical supplies were interrupted; and some 250,000 of the city's 450,000 flats and apartments had been 'completely destroyed.' Indeed, Albert Speer informed the Führer that raids of similar intensity on six other cities 'would bring Germany's armaments production to a total halt.' Josef Kammhuber was profoundly disturbed by the thought that his crews would have to stand by 'helplessly' and 'watch the great cities of their country go up in flames one after the other' if the results of this raid could be replicated elsewhere.²⁷

* An official count of 41,800 killed was the final figure, 'but even this was obviously incorrect since in many of the cellars a pile of ashes or charred bones was the only evidence that people had been trapped. Again, after the war, when bulldozers levelled the sites before rebuilding began, they unearthed the legs and arms of people whose bodies had been buried under the piles of rubble and had not been found.' More than 10 per cent of the dead were children, and half were women. In addition to the dead, the police president of Hamburg estimated that 900,000 were homeless (out of a population of 1.7 million) and that many had left the city. German raids on Britain during the whole war killed about 50,000.

But they could not. As Harris later admitted, 'even with all the luck in the world, we could not have hoped to destroy in a brief space of time, six more great cities.' The product of rare and peculiar circumstances, firestorms could not be created at will, night after night; and, in fact, there may have been only two more before the end of the war in Europe, one at Kassel in October 1943, and the other at Dresden in February 1945. Moreover, the effect on Hamburg's war production was not as devastating as first imagined. Although a good part of the city had been burnt out, residential areas had suffered most, and commercial and industrial damage in the main affected businesses that were only marginally connected to the war effort. In fact, from one perspective the raid was actually beneficial to the German war economy. Workers displaced from non-essential tasks were soon doing more important things, a fact that helps to explain why Hamburg lost only about two months' worth of war production as a result of these raids and why, within five months, total output had recovered to about 80 per cent of pre-raid levels.²⁸

After one more experience with Window, the Luftwaffe also began to recover. On the night of the firestorm, the British had listened with considerable interest to radio broadcasts by ground controllers which gave 'something of a running commentary' to fighter crews, directing them either into the vicinity of the bomber stream as it made its way to the target or, more frequently, to Hamburg itself. From them, it was correctly deduced that the enemy was turning away from Himmelbett and allowing even twin-engined fighters to engage in freelance operations. It was also apparent that especially skilled Würzburg operators could distinguish, at least to some extent, between genuine echoes and false Window ones.²⁹

Meanwhile, Erhard Milch had decreed that in addition to releasing Me 110 and Ju 88 crews for point defence once Bomber Command had passed through their Himmelbett boxes, a crash program to develop radars able to resist jamming would be pursued. He also advocated a strengthening of the fighter arm, even if it meant curtailing bomber production. Göring would not go so far, but he did agree that the single-engined Wilde Sauen should be increased to three Geschwader and that intruder operations in the vicinity of Bomber Command's home bases should be resumed. Slowly, but inexorably, flexibility was being added to the German air-defence system. Although the enemy was still working out a response to Window, by 3 August – the last day of the battle of Hamburg – the missing rate on major raids against German targets since 24/25 July was just over 3 per cent, double that of the first Window operation. Yet Harris had been right in his overall assessment of its potential. While the enemy tactic of mass target interception had enjoyed 'a considerable degree of success,' Window had reduced casualties by a third or more and it seemed that it was particularly effective in protecting the most heavily concentrated waves of the main force.³⁰

No 6 Group's loss rate (2.9 per cent) was actually lower than the Bomber Command average during the battle of Hamburg, but High Wycombe was still inclined to think that not everything was right with the Canadian formation. Although icing and storms had affected all the participants on 2/3 August,

giving rise to an overall 42 per cent early return rate, the corresponding figure in No 6 Group, which benefited from the route selected that night and had a shorter distance to fly, was 59 per cent. Worse still, of the forty-three RCAF crews that returned early from Hamburg, only two had made any attempt to find and bomb an alternative target. 'It is possible,' an ORS investigator hypothesized, 'that too much emphasis had been placed on the danger of attempting to fly through the cloud bank.' Though unwilling to extend this tentative conclusion to comment generally about the tenacity of No 6 Group, the ORS nevertheless wondered whether RCAF crews were guilty of making 'a less determined attempt to get over enemy territory than some of the other Groups.'³¹

Having delivered almost 10,000 tons of bombs to Hamburg, and believing for the moment that it had, indeed, been knocked out, Harris suspended the campaign against the city following the raid of 2/3 August. He would have preferred to concentrate on other German targets, but for the rest of the month Bomber Command was ordered to conduct a number of operations against targets in Italy, in an effort to persuade the government of Maresciallo Pietro Badoglio (which had superseded that of Mussolini in July) to surrender to the Allies. No 6 Group participated in one of these raids, when it sent forty-seven crews to Milan on 11/12 August, losing one, on a wonderfully clear night over the Alps.³² But Badoglio clung to the Axis connection until 3 September, the day of the Allied landings in southern Italy.

Along with extensive Gardening operations, which accounted for most Canadian sorties in early August, some attention was still paid to German cities. Mannheim was attacked through cloud on 9/10 August, and Nuremburg was bombed the next night, also through cloud. As might be expected, the effect was scattered on both occasions, but the combination of Window and weather had handcuffed the German defenders. Only twenty-five crews were missing, about 2 per cent of those dispatched, and once again No 6 Group was fortunate, losing just one of eighty. Then, on 17/18 August, again on Air Ministry orders, Bomber Command set out to destroy the German rocket development complex at Peenemünde, located on a small peninsula on the Baltic coast due north of Berlin.³³

Operation Hydra was noteworthy for a number of reasons. Aimed at a specific facility, which had been identified only after painstaking intelligence work, it was an obvious anomaly in Harris's area offensive. Peenemünde's destruction also demanded precision bombing, and thus the attacking force was directed to operate between 6000 and 10,000 feet – unusually low altitudes for the main force of Bomber Command – and 'a new and much-improved marker bomb,' readily identifiable and difficult to simulate, was to be used.³⁴ Closely allied with it, and perhaps the most interesting innovation that night, was the employment of a senior Pathfinder officer, Group Captain J.H. Searby, RAF, as a 'master bomber' or on-scene commander, who would circle the target and, broadcasting over a reserved VHF frequency, 'provide the bomber force with minute to minute information regarding the progress of a raid ... issue warn-

ings of misplaced markers, give the position of dummies and generally to assist the bomber force in successfully attacking the correct aiming point. It is further hoped that such commentaries will serve to strengthen the determination of less experienced crews, thereby reducing wastage of effort from this cause.³⁵

This technique had been pioneered in the breaching of the Möhne and Eder dams, and Searby had rehearsed his role over Turin on 7/8 August. At Peenemünde, one of his deputies was Wing Commander John Fauquier,^{*} now commanding No 405 Squadron, Canada's Pathfinder unit – which itself contributed twelve crews to the operation.³⁶ Both the master bombers and the Pathfinders anticipated that H2S would be of great value on the raid. 'We believed at the time that Peenemünde was the ideal target in terms of radar echoes,' Searby recalled; 'not only is the peninsula itself quite distinctive, providing good contrast between land and water, but the small islet of Ruden [where the timed run was to begin] lay almost due north of the ... targets ... The radar experts assured us somewhat gleefully that this pimple set in the sea would stand out well on the screen.'³⁷

Window would be used, of course, but two additional tactical wrinkles were included in the operational plan to assist the main force in deceiving, and thereby evading, the enemy. Having noted how the Germans were now sending the bulk of their fighters to the likely target, and suspecting that they would always react to a threat to Berlin, Harris dispatched eight Mosquitos to the German capital about an hour before the start of the Peenemünde attack. Meanwhile, the route chosen for the main force not only skirted known strong-points, but also reinforced the deception that Berlin was the objective for as long as possible.

Hydra began well enough in bright moonlight and patches of thin cloud, with the initial markers falling accurately on the main aiming point. But a number of Pathfinders went awry because, contrary to the confident predictions of the 'experts,' H2S was of less help than anticipated. 'The return echoes were weak and some crews failed altogether to pick up the datum on their sets.' The marking error was soon corrected by the master bomber, however, proving his value, and by the end of the raid he was convinced that it was one of the 'most accurate' ever achieved, an opinion that was shared by the entire Pathfinder Force. Although more harm might have been inflicted, extensive damage had been done – enough to set back the V-2 rocket program by two months and to reduce its overall scale.³⁸

^{*} Fauquier, who was awarded two bars to the Distinguished Service Order along with the DFC in the course of his career, had commanded the squadron from February to August 1942, when he finished his initial operational tour and was posted first to RCAF Overseas Headquarters and then to No 6 Group Headquarters. He returned to the squadron as commanding officer when it was transferred to No 8 (Pathfinder) Group, receiving his promotion to group captain in September, and remained with it until January 1944, when he completed a second tour. He was again posted to No 6 Group Headquarters, was subsequently promoted to air commodore, but voluntarily stepped down to group captain when he volunteered (and was selected) to command the RAF's No 617 Squadron – famous as the 'Dambusters' – in December 1944.

The tactical and technical deceptions had also worked well. Although Kammhuber and Generaloberst Hubert Weise, at the Luftwaffe air-defence command centre in Berlin, had both received their customary early warning of an impending attack, neither was able to respond effectively. Window had worked so well that not one ground-controlled interception was recorded as the main force made its way over the North Sea, Denmark, and the Baltic coast. Then, transfixed by the threat to Berlin, both commanders sent all available fighters there in time to meet the Mosquito diversion, which was mistaken for No 8 Group Pathfinders, and to patrol the sky above the capital against the anticipated arrival of the main force. Indications that there was activity over Peenemünde were discounted until very late, so that when the fighters were finally sent north only thirty-five were available, the rest having landed to refuel.

Although short on numbers, those thirty-five fighters nevertheless took a terrible toll of the bombers still at Peenemünde and accounted for most of the forty crews lost that night – almost 7 per cent of the total dispatched. No 6 Group, assigned to the last wave of attackers, suffered the heaviest casualties, with twelve of sixty-two sorties failing to return, a missing rate of almost 20 per cent. (Nos 419, 428, and 434 Squadrons lost three machines each, No 426 Squadron two, and No 427 one). Among the missing were the commanding officer of No 426 and five other veteran crews. 'I had never seen such a night before,' recalled Pilot Officer R.W. Charman, navigator in a No 427 Squadron Halifax: 'All over the sky, RAF planes were going down.'³⁹

The clearness of the night, which reduced the fighters' dependence on radar and so made Window less of a factor, was the major reason for the Luftwaffe's success. 'It was so easy,' Oberleutnant Friedrich-Karl Müller, an FW 190 Wilde Sau pilot, remembered.

I could see fifty bombers ... I chose a Lancaster. The tail gunner fired back, of course ... [but] it was a quick combat. He didn't take any evasive action. I tried to hit the tanks between the engines in the right wing, and I think I must have hit both engines on that side because I saw the propellers windmilling and he kept swinging to the right... he couldn't maintain altitude. I didn't see any parachutes and I watched him make a forced landing among the breakers a few yards off the shore. There was a great cloud of spray.

I flew back to the target area and found another Lancaster, easily visible against the smoke. I attacked again ... The right wing caught fire and, then, about a minute later, the wing fell off and he spiralled down ... I never saw a raid at such low level and in such clear visibility.⁴⁰

Walter Barte, an Me 110 pilot who made his way to Peenemünde from St Trond, Belgium, 'did not need to do any radar work; it was so light that the operator was helping me with visual sightings.'⁴¹ He shot down two machines, one a Halifax, before running low on fuel. Another crew from St Trond, new to the business of night-fighting, had a busier night still.

We picked up the first one by radar but the rest were all spotted visually ... We got [it] in the fuel tanks between the engines. One burst was enough ...

We saw the second one while the first was still going down, fifty metres below us and to the right ... We slowed down and one burst of fire caused the bomber to explode.

We climbed again and could see the target burning seven or eight kilometers away. We saw the third bomber below us. This one needed two or three bursts before it burned... Only a minute or two later, we made another attack; I believe this one went down but we didn't see it crash.⁴²

Despite its successes in the latter stages of the Peenemünde raid (and earlier the same day against the Americans at Schweinfurt and Regensburg, where the USAAF lost sixty of 376 machines, 16 per cent of sorties dispatched), the Luftwaffe was nevertheless reeling from the pressure of the Allied attacks mounted in July and August. Not only had significant damage been done to important targets, but losses, most of them due to flying accidents, were also heavy, amounting to 145 night-fighters (about 30 per cent of Kammhuber's front-line strength) and over 500 day-fighters, all in less than sixty days. This 'disastrous rate of attrition' – it would reach 141 per cent in the last three months of 1943 – cut deeply into the pool of experienced fighter crews and forced less-well-trained pilots into operations earlier than was good for them.⁴³

Depressed by Germany's manifest inability to thwart the ever-growing air offensive, knowing he had been partially to blame for the Luftwaffe's neglect of air defence, and hammered continually by Göring – 'A note lay by the dead man: "I can no longer work together with the *Reichsmarschall*"' – Generaloberst Hans Jeschonnek, the forty-four-year-old chief of Hitler's air staff, shot himself the morning after Peenemünde. More productively, Göring called a conference of his remaining senior commanders to try to find a solution. Repeating the message he had delivered just two weeks before, State Secretary Milch declared it was now time for the Luftwaffe to go over to the defensive, to concentrate on building up the fighter arm, sacrificing quality for quantity, and to put all its effort into defeating the enemy's bomber offensive by day and night. 'If we fail,' he warned, 'and the percentage of enemy aircraft shot down remains at the same level as up to the first half of July, we shall be crushed.'⁴⁴

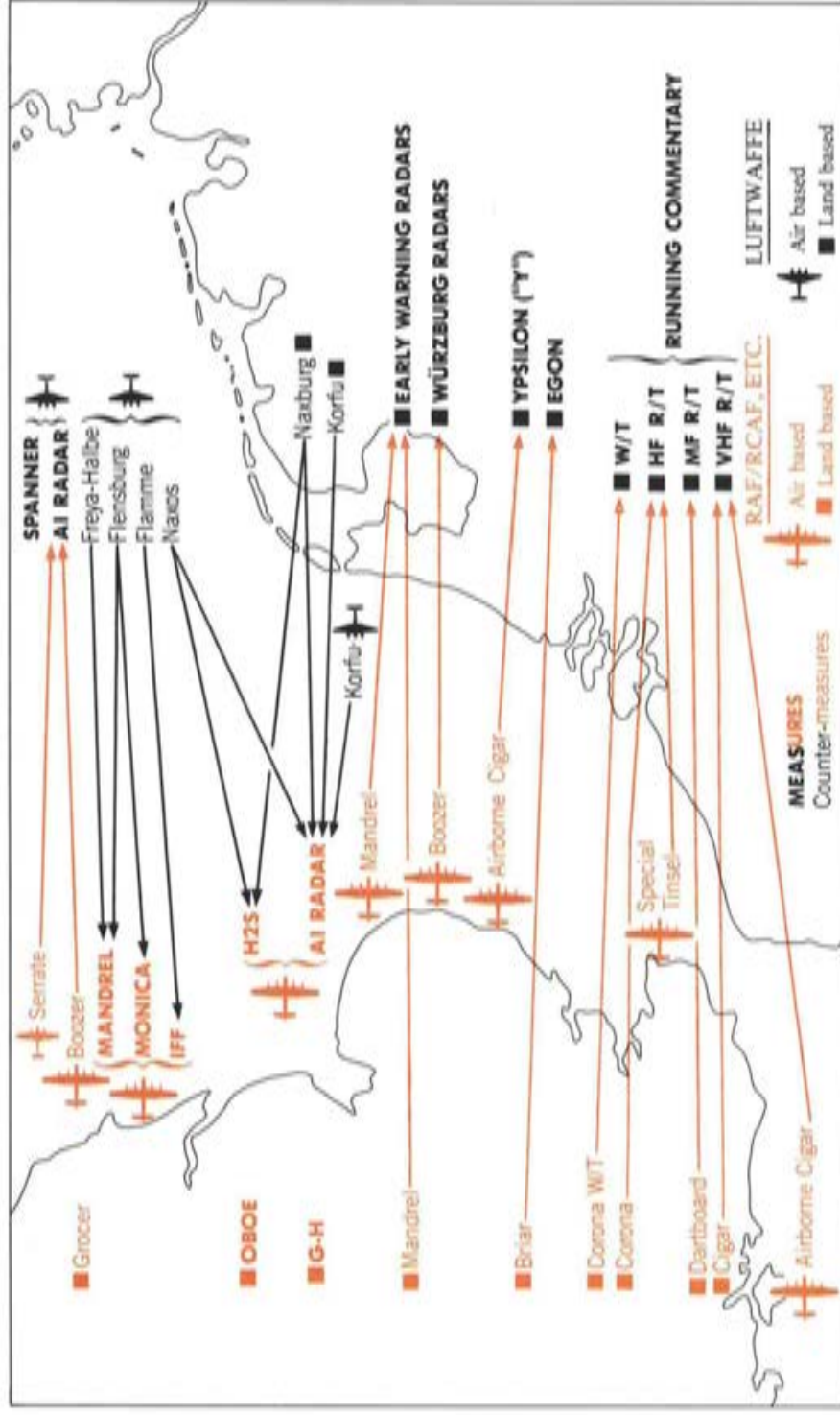
This time everyone agreed and, emboldened by the unity of purpose he saw around him, Göring went immediately to Hitler, seeking his approval to change production schedules in favour of the manufacture of fighters. The *Reichsmarschall* returned a short time later, staring straight ahead, talking to no one. After a few minutes an aide explained what had happened. 'During the course of a heated discussion,' Adolf Galland was told, Hitler had rejected 'all our suggestions [and] Göring had completely broken down ... The *Führer* had ... announced that the *Luftwaffe* had disappointed him too often, and a changeover from offensive to defensive in the air [war] against the West was out of the question.' Germany would fight terror with terror, Hitler insisted, and launch another Blitz on England. Instead of the 1600 additional night-fighters that

Kammhuber had asked for in May, scheduled production would barely keep up with losses over the last half of 1943.⁴⁵

Josef Kammhuber did not preside much longer over the night-fighter arm. Although he had shown some flexibility after the attacks on Hamburg, admitting that *Wilde Sau*, 'as it is now being carried out, is the only way we'll actually achieve success in [combatting] an attack on Berlin,' what most concerned his critics was his intense loyalty to the rigidities of *Himmelbett* and his incessant and hopelessly unrealistic demands for more and new equipment. Göring still regarded him as something of a megalomaniac, and could not forgive the way in which he had initially belittled Herrmann's *Wilde Sauen*, calling them a rabble 'shooting madly all over the place' and observing that 'the name "Wild Pig" was certainly aptly applied.' 'The entire night fighter system [has] degenerated into a state of stagnation,' the Reichsmarschall complained on 27 August, and it was only because of 'suggestions submitted by younger officers ... which had in fact all been rejected by their immediate superiors, that this state of stagnation has been overcome.' Three weeks later Kammhuber was removed from his command, and in December he was dispatched to *Luftflotte 5* in Norway, where he remained until early 1945.⁴⁶

Generalleutnant Josef Schmid, Kammhuber's successor at XII *Fliegerkorps* (soon to be reorganized as I *Jagdkorps*) was no admirer of *Himmelbett*. Its 'gigantic' infrastructure and 'oversized, overstaffed, overequipped' *Jagddivision* control rooms – 'battle opera houses' or 'Richard Wagner theatres' as they were widely and disparagingly known – were an 'excrescence' in Schmid's eyes precisely because they aimed at nothing more than leading a single night-fighter to engage a solitary bomber. But beyond freeing his crews from strict ground control and its susceptibility to jamming, Schmid was under no illusions about what he could do. Labour was in short supply, and adequately trained technicians to man, repair, and perhaps modify his radars were scarcer still; research and development of detection equipment capable of withstanding jamming seemed to be slowing rather than accelerating; and the mainstays of his *Nachtjagdgeschwader* were getting old. The Ju 88C-6, having 'lost much of its combat value on account of its weak engine,' was 'too slow,' while the Dornier Do 217 'scarcely ... rated' as a combat aircraft. To make matters worse, not only was fighter production falling, but with fierce battles raging on the Ostfront, the fall of Naples on 2 October, the growing threat of invasion in the West, and Allied success in protecting the North Atlantic convoys, night air defence was hardly the most pressing problem facing the *Oberkommando der Wehrmacht* as it sought to allocate resources.⁴⁷

There was some reason for optimism, however. Large-scale production of SN2 radar which, besides having improved range and a wider search angle, was immune to Window, was just beginning. Although only five sets had been supplied to operational units by mid-September, it was expected to be ready for most of the night-fighter force by late autumn and, believing it would take the British some time to discover its existence and produce the appropriate antidote, the Germans hoped to get good use out of SN2 while they tried to develop other counter-counter-measures. They were also experimenting with



THE ELECTRONIC WAR: MAJOR 1943 ADDITIONS (EXCLUDING WINDOW)

Neptun, a small and compact radar which could be fitted to single-seat fighters; Naxos, a portable variant of Naxburg able to detect H2S emissions from a distance of about thirty miles; and Ypsilon (Benito to the Allies) and Egon, two forms of Morse radio transmission significantly more difficult to jam than radio telephony and which promised much more sophisticated command and control. With Ypsilon, for example, ground controllers could vector as many as two hundred fighters into the bomber stream at one time. Egon, in contrast, employed an airborne transmitter that enabled loose combinations of fighters to be brought into the bomber stream by a scouting crew that had already linked up with it.⁴⁸

Once this equipment, and SN2 in particular, was available in quantity, Schmid intended to cease point-defence night-fighting, which was so vulnerable to deception, and to begin pursuit operations, the 'most elegant form' of air defence, on a grand scale. Fighters – preferably long-range He 219s* with their six 20-millimetre cannon and an IFF compatible with Würzburg – would be infiltrated into the bomber stream all along its path. For the moment, however, target-oriented night-fighting would continue to hold sway, by both the twin-engined Nachtjagdgeschwader and the single-engined Wilde Sauen, although Schmid did not expect much of the latter. Losses among Herrmann's original experienced and well-trained pilots had been heavy enough, but they were even higher among the less experienced replacements who, one cynic remarked, had more parachute jumps than victories to their credit as a result of losing their way and running out of fuel.⁴⁹

Schmid's problems and concerns would have come as welcome news at High Wycombe, where initial enthusiasm over the success of Window was beginning to sour. Although the Berlin feint mounted on the night Peenemünde was attacked had demonstrated that enemy fighters could be drawn away from the main force, the damage done by the thirty-five fighters that eventually arrived at the real target illustrated that Window was still an imperfect solution to the tactical problem of evasion: once night-fighters saw their prey, they did not need radar – and no amount of deception or jamming would help. Furthermore, the Luftwaffe's success against the final wave over Peenemünde had rekindled long-standing fears about the potential threat posed by freelance fighters exploiting the concentration of bombers in the stream to make several interceptions in short order. Those fears were heightened by the recognition that Window could actually help the enemy once it had switched over to pursuit

* Fast, manoeuvrable, and heavily armed, the Heinkel 219 was the only piston-engined night-fighter capable of meeting the Mosquito on equal terms, but it was never made available in sufficient numbers to have a significant effect on the course of the air war over Germany. For one thing, an air raid on Rostock in March 1943 destroyed over three-quarters of the almost completed blueprints of the He 219 operational prototype, slowing its development considerably. For another, Erhard Milch was increasingly unhappy with Dr Ernst Heinkel's apparently dogged pursuit of profit and would not approve the retooling required to increase production of the 219.

operations. Confirming the general whereabouts of the main force, the Window cloud would – and did – act as a magnet for fighters ordered in from all over Germany.⁵⁰ Three raids mounted in quick succession against Berlin illustrated the extent to which the Luftwaffe, under favourable circumstances, was anything but impotent even in the early stages of its recovery from the chaos experienced over Hamburg. A total of 727 aircraft took off for the German capital on 23/24 August, and fifty-six were lost – 7.9 per cent, and the highest total suffered so far in a single operation. The low-flying Stirling squadrons were worst hit, losing 13.2 per cent, while Halifax losses were 8.5 per cent. No 6 Group sent sixty-eight crews and lost five (7.3 per cent), but eleven (16 per cent) returned early. Six of these were from No 434 Squadron, which had only recently become operational, yet had already lost four crews.⁵¹

Berlin's Flak defences had always been formidable enough, but post-raid analysis indicated that despite heavy Windowing, it was the two hundred fighters called to the scene that did the damage. Provided with a running commentary from the time that the main force passed over Amsterdam, they were ordered to the capital forty minutes before the Pathfinders arrived there. The German controllers had guessed right, and in clear but moonless conditions electronic counter-measures were scarcely a factor. Enemy pilots and observers singled out their victims visually by the light of ground fires, searchlights, and Pathfinder flares.⁵² Hajo Herrmann, in his Me 109, found that flaming bombers 'were my pathfinders, so to speak.'

As I approached the bombers' route, I saw some of the 'torches' going down, bombers crashing ... On the frequency of my own unit, I heard Müller reporting that he had found a bomber about one hundred kilometers west of Berlin and another of my pilots reported the course was still due east. I heard the ground control order them not to attack but to fly with the bombers and plot the exact course of the bomber stream. We kept being told that the *Spitze* – the vanguard of the stream – had reached a certain point. Then, suddenly, I felt the turbulence of the bombers' slipstream and I knew that I had arrived.

They seemed to turn at Potsdam and go straight into Berlin from the south-west. I think I arrived a bit later than the others. I did not need the glare from the target; it was searchlight fighting that night. It was clear, no moon, and the searchlights were doing a good job. I tried for one bomber, but I was too fast and went past him without firing ...

I came up to the next one more slowly, level, from the rear, but before I could open fire another chap coming down from above me attacked the bomber and set it on fire ...

I circled back over the target and had no difficulty finding a third bomber. Normally, if a fighter wanted to attack a bomber in the searchlights, we should have fired a flare, so that the *Flak* would cease fire, but we Wild Boar men rarely bothered to do this. We usually waited until the bomber weaved or dived out of the searchlights and then attacked it. I shot that third bomber down.⁵³

The radar operator of an experienced Himmelbett crew who was participating, somewhat uneasily, in his first 'free-for-all' target-defence mission, confirmed how easy it was to pick out the enemy aircraft.

Radar had nothing to do with our success that night, only the Wild Boar method in the Berlin area. Our crews was somewhat reluctant to try this new method; a new crew, not so set in their ways, would probably have been more willing. I do not know who saw our first bomber; it was not me, I was looking out of the back. The pilot or the flight engineer saw the Stirling below, against the light of the raid. We were directly over Berlin. I turned round and saw it for myself, a silhouette about a thousand metres below. Frank throttled back and reduced speed. We lost height and attacked it – not in our normal method, *von unten hinten* [from behind and below], but in a dive from above, just like a day fighter, the first time we had ever attacked in this way.

The crew of the bomber must have seen us because it tried to evade us – but too late. When we were sure that its petrol tanks were well on fire, we left it; we knew it would go down and we did not want to follow it down into the *Flak*.

We caught the second one, a Halifax, at the same height and we attacked it from the right rear. Our fire opened ahead of the bomber and it flew right through it. The right wing caught fire and down it went ...

The situation over Berlin was hectic by then. We saw about twenty bombers in a short time; we could have shot down a whole squadron. We fired on three of them but we were being shot at by the gunners from some of the other bombers and we were not able to make careful attacks. We got out of it after a bit, pulling away to find a quiet corner for a while to check our oil and petrol. We went back again to the centre but it was about all over by then.

Yet despite their success, this crew was not altogether happy about the new way of doing things.

We did not have enough fuel to go back to our base so we landed at Brandenburg. We had no trouble getting down; it was well organized. We immediately asked for something to eat and where we could sleep. It was early the next day that we talked to the other crews about their experiences. There were also a lot of questions from senior officers about that first Wild Boar night. My own crew agreed that it had been a success, but we were really *Einzelkämpfer* – lone operators – and we still did not like being mixed up with this mass of other aircraft.⁵⁴

The aiming point was in the northwest part of Berlin and, with a southern approach, the anticipated creep-back was expected to cover the city centre. Things did not go as planned, however. Unable to determine where they were by H2S alone, despite the network of waterways that lay along the western edge of the city and the River Spree which ran through its centre from east to west, the Pathfinders marked an area considerably to the south and west; despite the best efforts of the master bomber for the night, John Fauquier, to

bring the bombing back on target, only five of the 468 bombing photographs plotted were within three miles of the aiming point. Still, there was considerable destruction on the ground. Thirteen industrial works and 2115 houses were totally destroyed, as were the barracks of the Leibstandarte Adolf Hitler (the German dictator's SS bodyguard), the officers' school at Köpenick, and buildings at Tempelhof airfield.⁵⁵ In the Steiglitz, Friedenau, Lichterfelde, and Marienfelde districts of the city, one survivor noted:

We came upon places through which it was impossible to pass by car. Craters filled with water, heaps of rubble, fire-hoses ... firemen and convoys of lorries blocked the streets, where thousands of those rendered homeless were searching the ruins, trying to rescue some of their possessions, or were squatting on the pavements and being fed from field-kitchens. Although eighteen hours had passed since the attack, fires were still burning everywhere.

The tramway lines had been destroyed. Burnt-out buses jammed the streets. Hundreds of trees had been shattered or bereft of their branches and foliage. Of one block of single-family houses all that remained was one solitary chimney ... In the pale, dust-laden sky, the red fiery ball of the evening sun glowed like the harbinger of the Day of Judgment ... The attack had been plunged into the heart of Berlin, like a knife in a cake, and had sliced out a great triangle ...

The question on everybody's mind is – was Monday's attack the beginning of the end, or was it merely a warning shot, designed to bring home to the Berliners the might of the Royal Air Force?⁵⁶

Another observer, this one Swiss, whose report made its way to London, confirmed the underlying tension brought about by these raids.

At the Alexanderplatz station women fought for places, because their children were already in the train and it was on the point of leaving. The urgent desire to get away from Berlin is enormous. Many people start off without knowing where they are going. Many workers have fled from their work and dare not return for fear of expected punishment. In some cases there have been death sentences. Schools are closed and it was planned that children and teachers would be evacuated together ... In many places there is a passive attitude, which is, however, countered with the greatest severity. Overtired office workers often fall asleep. Berliners hold very sober views about the end of the war. They do not, however, dare to think about what will come afterwards.⁵⁷

This was precisely the kind of reaction Harris was after. And it was one that frightened Goebbels, who (with Albert Speer) noted that the physical damage done to factories 'can be more easily repaired than is the case with the disorganization caused in the cities and especially in residential sections.' It did not help that, just as these raids began, the first severe cuts to rations had been made, and that much of the elasticity had recently been removed from the consumer sector of the economy as the Allied stranglehold on Germany began to tighten. Goods and services, including public utilities, whose availability at

near prewar levels had been taken for granted even at the beginning of 1943, now were increasingly unobtainable.⁵⁸

But Harris, Goebbels, and Speer had wildly overestimated the non-physical effects of bombing to date. It was only one factor in the general deterioration of civilian morale that took place in the latter half of 1943 – the loss of Sicily; confusion about Mussolini's ouster in Italy; the relinquishment of Orel, Khar'kov, and other Russian cities; and the failure of the great Kursk counter-attack being others. However, if Germans were becoming war weary by early autumn 1943, their attitude by and large was not yet affecting their behaviour in any profound or prolonged way. If absenteeism rose with the intensity of the bombing and workers left the most heavily bombed cities altogether, these were generally only passing reactions to momentary crises and disruptions; there was no mass neurosis or hysteria sufficient to threaten an internal collapse. Indeed, when order was restored in Hamburg, Schweinfurt, and other cities, most of the workers who had left returned home and resumed work. Only in 1945, as a 'result of several momentous and coinciding ... catastrophes' involving primarily the advance of the Red Army into Prussia and the Anglo-American thrust into the Ruhr, would morale break in the way Harris wanted and Goebbels feared.⁵⁹

Another raid on Berlin, involving 622 aircraft, came eight nights later, and once again the Luftwaffe reacted strongly, interceptions being recorded from the Dutch coast all the way to the target. Stragglers outside the protective confusion of Window again suffered the most. Over the target, meanwhile, the enemy employed a new tactic. Bomber crews now found themselves illuminated by brilliant white parachute flares released by enemy machines flying above them that made them easier targets for the fighters not equipped with AI radar. 'The psychological effect of this action cannot be described,' one No 405 Squadron pilot recalled.⁶⁰

Although the Germans estimated that 10,000 incendiary, 500 phosphorous, and 135 high-explosive bombs fell in the vicinity of Berlin, damage on this occasion was only slight. One factory was destroyed, and the death toll was fifty-eight, with a further nineteen killed in the surrounding countryside.⁶¹ The Pathfinders had begun marking too far south, and this pull away from the aiming point was reinforced when German night-fighters 'by chance shot down a Pathfinder which fell 20 km farther south, along with his whole cascade of marker bombs, and continued burning on the ground.'⁶²

Forty-seven aircraft did not return, 7.6 per cent of those dispatched, but seventeen of them were Stirlings (16 per cent of the number taking off) – further evidence that the type had outlived its usefulness on operations involving deep penetrations. No 6 Group contributed fifty-eight sorties and lost seven, at 12 per cent substantially higher than the average. More telling, the overall early return rate for the raid was 14 per cent, an indication, perhaps – given the good weather – that crews were not eager to take on Berlin again.⁶³

The corresponding figure for No 6 Group was just below average, but it included five of the eleven Lancaster IIs dispatched by No 426 Squadron: two because of intercom failure between pilot and rear gunner, two because of en-

TABLE 5
Anticipated Number of Squadrons, June–December 1943⁶⁴

Type	June	September	December
Halifax II/V	23	24	18
Halifax III	0	0	13
Lancaster I/III	20	23	29
Lancaster II	2	4	4
Lancaster X (RCAF)	0	0	1
Stirling I	13	13	17
Wellington X	12	12	13
Total	70	76	95

gine trouble, and one because its compass was unserviceable. Something was wrong – perhaps because Lancaster IIs were still relatively new to the unit – and following further instances of unserviceability and the testing of those that had returned early ‘to iron out the kinks which had caused the turnbacks,’ on 4 September ‘an operational stand-down was ordered and the efforts of all maintenance personnel were directed towards getting all A/C into a serviceable condition.’ Undoubtedly because of its recent heavy losses, No 434 Squadron sent only four crews to Berlin on 31 August: all four bombed the target and returned safely.⁶⁵

The third and last raid of the series occurred on 3/4 September and, reflecting what had happened to the Stirling and (to a lesser extent) the Halifax squadrons in the first two missions, was limited to 316 Lancasters and four Mosquitoes. It caused more damage than the previous attack and the loss rate fell to 6.3 per cent, but that was still too high for a sustained campaign; Harris, despite his preference for striking ‘just when everybody in Berlin ... had been thrown into a state of panic ... after the destruction of Hamburg,’ drew back from what may have been the start of his yearned-for offensive against the German capital.⁶⁶ He would wait, now, until the fall and winter, when the nights were longer and when more heavy bombers, particularly Lancaster IIIs, would be available (see table 5).

Within this framework, it had been intended that the three RCAF squadrons returning from the Middle East should receive Lancaster Is or IIIs; but with too few Lancaster-trained crews emerging from No 6 Group’s Heavy Conversion Units, it was agreed that Nos 420, 424, and 425 would receive Halifax IIIs, pending their ultimate conversion to Lancaster Xs. Although Harris warned the Air Ministry planners that ‘we must see to it that sufficient Canadian Lanc sqdns are kept up to absorb Canadian Lanc production as forecast, otherwise we shall get in wrong with Canada,’ he approved this allocation because Canadian output of the Lancaster was currently ‘infinitesimal’ and therefore, ‘for the present,’ the RCAF should not take umbrage. Since the production of as many as fifteen Lancaster Xs a month was not expected to begin until October 1943 (and did not, in fact, begin until June 1944), the Canadians would be in an awkward position for a considerable time to come. Despite the

TABLE 6
Mark II H2S Responses from Selected German Cities⁶⁷

City	Range and Quality of H2S Response
Berlin	Too large for the 10/10 scan, and the 30/30 scan must be used for bombing. The city gives a strong response visible for 20 miles. Lakes in and around the city are not dependable [and] the outline of the town cannot be used as a reference point ... because the apparent shape changes with the gain [scan] setting ...
Düsseldorf	Stands out well from other Ruhr towns ...
Hanover	... is visible at 23 miles range ... and gives a strong response ... however it breaks up under 5 miles range and accurate bombing is difficult ...
Kassel	Gives a strong signal visible up to 18 miles, but at short range is inclined to break up ...
Stettin	Is a good clear target with the lakes and edges of the town clearly defined ...
Stuttgart	Is a difficult H2S target surrounded by hills ... thus giving very short range – about 10 miles – and a broken response ...
Wuppertal	Gives a strong echo and is clearly defined ...

reneging on Lancasters, the prospect of receiving Halifax IIIs was welcomed by the RCAF Overseas. As recently as August, Air Marshal Brookes, having complained about the decision to form No 433 Squadron on obsolescent Halifax IIs 'cast off from other squadrons,' had been told to expect only a 'trickle' of Lancasters and Halifax IIIs for the foreseeable future. The new arrangement therefore represented progress.⁶⁸ 'From the morale point of view it has always been the object of this Group Headquarters to avoid having Halifax IIs or Vs on the same station or even in the same base with Lancasters [and Halifax IIIs.] The difference in performance ... is so obvious ... that [at Heavy Conversion Units] it is impossible to prevent an unhealthy regard for the Halifax II and V aircraft among the crews destined to operate these aircraft.'⁶⁹

There was another reason for Harris to wait for winter before attacking Berlin again. As we have seen, although the various aids and devices developed so far had improved both navigation and bombing accuracy, they had not been particularly successful against sprawling urban targets like Berlin. Even 10-cm Mark II H2S, with which main force crews in No 6 and the other Groups were now being equipped, was sometimes of only marginal value.⁷⁰

However, a new Mark III H2S was about to become available which promised to give a substantially clearer picture of large cities, especially where highlighting reference points such as lakes or shorelines was concerned, because of its shorter 3-centimetre wavelength and substantially narrower beam. With estimates suggesting that it would double, and perhaps triple, the number of Bomber Command's outstanding successes, there was good reason to await its appearance, even if, in the first instance, it could only be issued to Pathfinder squadrons. However, all crews were slated to be equipped with the

Ground Position Indicator (GPI), an attachment to the Air Position Indicator (API) which automatically took the navigator's latest wind readings into account and thus allowed him to plot more precisely where he was. The GPI nevertheless depended upon accurate wind readings; and at this stage fewer than half the operational navigators could assess wind velocities accurately enough to be within ten miles of the course set down.⁷¹

Finally, and most promising, was G-H. Essentially Oboe in reverse, an operator in the bomber transmitted a signal to two ground stations in the United Kingdom and then plotted his position according to their response. Theoretically accurate to within two to four hundred yards, G-H could be used by up to eighty aircraft for each pair of ground stations, and was to be fitted to all Lancaster IIs (including those of Nos 408 and 426 Squadrons) which could not be fitted with H2S because of their large bomb-bay doors, designed to accommodate 8000-lb bombs. However, G-H had two serious drawbacks. Its transmissions could be homed on by the enemy and, like Oboe, it was dependent on line-of-sight communications, which also limited its range.⁷² For that reason, G-H would be withdrawn from No 6 Group's Lancaster squadrons when they were committed to the battle of Berlin and allocated instead to medium bombers assigned to attack targets requiring only shallow penetrations.⁷³

That may have been a strategic error of considerable consequence. Perhaps heavy bombers equipped with G-H should have been directed against German aircraft factories within its range in the fall of 1943. For although they understood the significance of electronic counter-measures in evading night-fighters, a number of officials at the Air Ministry argued that such devices were nevertheless an unsatisfactory method of dealing with Bomber Command's main opponent. If enemy fighter strength grew, cautioned Air Vice-Marshal N.H. Bottomley, Harris would be 'unable to maintain the night offensive' no matter what jamming took place; and the DCAS therefore called for a sustained effort against aircraft manufacturing and assembly plants in Brunswick, Stuttgart, Hanover, Kassel, and Leverkusen, for example.⁷⁴

The director of bomber operations, now Air Commodore S. Bufton, *vice* Baker, concurred. Although he had not objected to the three operations against the German capital, hoping that Bomber Command could mount a successful repetition of the Hamburg raid 'on any industrial area, Berlin or anywhere else,' it was still essential that Harris 'start towards the specific targets [of Pointblank] eventually.' For if Bomber Command and the Americans did not between them destroy the Luftwaffe's capability to resist, he cautioned ominously, postwar analysts would regard the bombing offensive as a failure in the strategic employment of air power. Observing that it might be time to hold a conference with Harris and Eaker, Portal seemed to agree.⁷⁵

Harris himself was as unimpressed as ever with the targeting philosophy put forward by Bottomley, Bufton, or anyone else who thought that the destruction of a single sector of the German economy would produce decisive results – and who, though no more than staff officers, acted as if they were 'commanders in the field.' 'Panacea-mongers,' he called them, with considerable

distaste.⁷⁶ But given such external pressure (and since Harris did not want to attack Berlin for the moment anyway), over the next ten weeks Bomber Command conducted area raids against the cities the DCAS had mentioned.

Although it was unlikely that any of them would be defended as heavily as Berlin, the Luftwaffe still could not be ignored. However, the threat posed by both roving and point-oriented night-fighters could be countered, at least to some extent, in a number of ways. Diversions might be made more convincing; several targets could be attacked each night; or the main force could be broken down into smaller streams, each using a different route to the same target. It was also possible to attack the enemy directly, either by bombing and strafing bases and intercepting fighters as they took off, landed, or circled their beacons – Intruder operations – or by sending out fighters with the bomber stream to shoot down enemy machines en route to and from the target – ‘offensive’ night-fighting.

Intruder squadrons had initially been employed against the German bomber force as part of the air defence of Great Britain and were not turned loose on Flower missions against Luftwaffe night-fighter bases until the Cologne raid of 30/31 May 1942. One RCAF squadron, No 418, had been a participant from the beginning. Flying American-built Douglas Boston IIIs, its crews had maintained standing patrols over specified airfield for as long as possible (up to forty-five minutes) and had then dropped their bombloads on the main runways before making for home.⁷⁷

Though probably a source of irritation to the enemy, Flower patrols in 1942 achieved little in terms of the number of enemy aircraft destroyed, or even seriously inconvenienced. Blacked-out airfields were hard to find, the bombsights on the Bostons were not precise enough to ensure accurate results, and, without AI, they were ill-equipped for aerial hunting. In addition, they lacked the range to operate against many airfields in Germany. Better things usually happened when other kinds of targets were attacked and, thus, like all other Intruder squadrons, No 418 was soon spending at least half its time machine-gunning railway traffic in France and the Low Countries. By the end of September 1942 it had claimed at least twenty locomotives destroyed or damaged.⁷⁸

Interest in sustaining a night-fighter offensive against the Luftwaffe was rekindled in the spring of 1943 – in part because of rising losses during the battle of the Ruhr, but also because a night-fighter variant of the de Havilland Mosquito had begun to be made available. Armed with four machine guns and four 20-millimetre cannon, and able to carry four 500-lb bombs, it was faster than any German night-fighter except the He 219. Moreover, when equipped with auxiliary fuel tanks it had an operational range of more than 1000 miles, and so could escort the main force to Berlin and back or stand long watches over less-distant night-fighter fields. In addition, those supplied to the escort squadrons were equipped with AI radar and other electronic homing and warning devices. No 418 Squadron was understandably elated when it received its first dual instructional Mosquito in February 1943, but it was not until July

that all its Bostons were retired from operations. By then, the squadron was heavily engaged in the latter stages of the battle of the Ruhr, patrolling and bombing bases in France, Belgium, Holland, and western Germany. During the battle of Hamburg, the Canadians extended their operations far to the east, reaching as far as Stendal, Parchim, and Griefenwald in the final week of August in support of the initial raids on Berlin.⁷⁹

Despite the introduction of the Mosquito, the Air Ministry did not expect that Intruder squadrons would shoot down many enemy aircraft. Enemy fighters already in pursuit of the bomber stream would not be concentrated around their bases or at assembly beacons, and, given the presence of Mosquitoes over their home fields, they would presumably land elsewhere. Bomb-damage to runways, however, might prevent some pilots from taking off at a critical moment, and it was hoped that at least some disorganization would be caused as controllers tracked, identified, and passed on warnings about the Intruders. 'Jerry couldn't help but know that we were up there,' one crew from No 418 Squadron recalled, 'and that's exactly what we wanted.'

None of their aircraft were likely to take off or land while we were there. As it turned out, none did. Some must have thought about making an attempt to land, because on four different occasions on our 45-minute patrol the German ground controllers shot up a series of Very cartridges to give their aircraft the old *Achtung* sign – 'enemy aircraft in the vicinity.' If they [are] receiving the same reception at every drome they come home to, there must have been now several new members of the German Caterpillar Club* as well as bags of Jerry aircraft still grounded on the runway.⁸⁰

In September 1943 No 418 achieved some spectacular results. On the night of 5/6 September Squadron Leader R.J. Bennell and Flying Officer F. Shield were ordered to Worms/Biblis, where they found the airfield lit 'and at least twelve aircraft ... landing.' They attacked one, 'which exploded in mid-air and crashed in flames' and then moved on to Mainz-Ober-Olm, where they shot down a Do 217 'from dead astern.'⁸¹ Three weeks after that, Flight Lieutenant M.W. Beveridge and Sergeant B.O. Bays 'sighted several aircraft about to land at an aerodrome south-west of Stuttgart.' They attacked three and claimed two destroyed, the same results that had been achieved by Flight Lieutenant H.S. Lisson and Flying Officer A.E. Franklin over Hanover two nights earlier. By the end of the month No 418 had eight enemy aircraft to its credit.⁸²

But September's pace could not be maintained. Although Harris needed help (claiming that having played 'the best of our counter measure cards,' Bomber Command now risked 'prohibitive losses') and although the Intruder squadrons were willing to assist, they were at the mercy of the deteriorating autumn weather. Many sorties had to be abandoned or cancelled altogether, in part because there were no bombsights on Mark II and VI Mosquitoes but also because navigation was difficult, particularly beyond the range of Gee, the only

* The recognition given by the Royal Air Force to those who had made a successful jump by parachute from a fatally stricken aircraft.

electronic navigation aid these night-fighters carried. And since Intruder squadrons like No 418 did not have AI radars, they could not take full advantage of October's major intelligence coup, when information provided by a Belgian agent revealed the location of all the Luftwaffe night-fighter beacons in Western Europe. The number of enemy aircraft claimed by all intruder squadrons fell from twenty in September to just six over the next three months.⁸³

Weather had less impact on the offensive night-fighters which, equipped with AI, Monica, and Serrate – an electronic device which detected and provided a bearing to German AI radar transmissions to a range of one hundred miles – did not have to depend on clear skies to find the enemy. In time, Serrate-equipped crews flying in the bomber stream as part of the distinct No 100 (Bomber Support) Group formed in November 1943, and other Monica- and AI-equipped squadrons undertaking Mahmoud patrols around the enemy night-fighter beacons, would give the Germans a self-admitted case of Mosquitophobia from which they never totally recovered. But not in the latter months of 1943. With just five squadrons (including, very briefly, No 410) involved at various times, there were very few combats and only one confirmed enemy aircraft destroyed.⁸⁴ Evasion and tactical and electronic counter-measures, not fighter support, remained the keys to bomber survival.

Some, indeed, looked on evasion as their only hope. Not entirely convinced that there was safety in numbers, they chose to fly higher or lower (but usually higher) than their briefing called for, thinking they might avoid the main concentration of enemy fighters if they put some distance between themselves and the main bomber stream. A few were lucky, but others, having abandoned the protective Window screen, were not. Still others, while staying in the stream and remembering how many times they had been told that their task was 'to bomb and not to fight,' sought to make themselves as inconspicuous as possible by withholding fire when they saw enemy aircraft.⁸⁵

Harris had already issued warnings about the dangers of leaving the stream. Now he cautioned that, with the Luftwaffe well supplied with radar, the practice of withholding fire was 'timorous and deluding.' Enemy fighters were unlikely to attack a bomber that had demonstrated its 'alertness,' he explained, particularly if they found themselves in an 'unfavourable position.' The deterrent effect of defensive fire was not something that could be demonstrated in a convincing fashion, however, and eventually the AOC of No 5 Group, for one (Air Vice-Marshal, the Hon. R.A. Cochrane, *vice* Coryton), felt it necessary to instruct his crews to open fire on all enemy aircraft whether or not they showed signs of attacking. The Canadian group did not go so far, but there, too, an attempt was made to increase the aggressive spirit of bomber crews. While confirming that evasive manoeuvres were the proper course of action on being approached by an enemy, Allerton Hall announced that the purpose of evasion was not to 'lose the fighter,' but to present it with a 'difficult target' while providing the bomber's own gunners with a good field of fire.⁸⁶

There was every reason for those in authority to worry about crews leaving the bomber stream. Besides putting themselves at risk, the whole effort at achieving concentrated bombing would be undermined if the practice became

too widespread. Whether crews within the stream were well served by frequent use of their guns was another matter. Test interceptions conducted between a Halifax and the Lichtenstein-equipped Ju 88 which had landed in England in July 1943 indicated that a diving turn followed by a rapid climb of 1500 to 2000 feet not only presented the fighter with an extremely difficult deflection shot, but often enough ensured that it lost visual and AI contact as well, allowing the bomber to escape.⁸⁷ Furthermore, No 4 Group was soon complaining that 'there is quite obviously a considerable amount of indiscriminate firing taking place. Reports of Halifaxes being fired at by other Halifaxes and Lancasters are becoming much too frequent. While the safety of aircraft dictates that necessity of treating all approaching aircraft with suspicion, it is reasonable to treat a four-engined aircraft as friendly unless and until its behaviour becomes definitely threatening.'⁸⁸

In the light of this evidence, and following an analysis of recent aerial combats, High Wycombe acknowledged on 2 October that the 'timorous' crews might have been right after all, declaring that the use of guns 'must take second place' when enemy aircraft were seen. Subsequent investigations confirmed the wisdom of this instruction. Having looked closely at No 5 Group's experience during the period when its crews were ordered to open fire on all enemy aircraft, the operational research scientists concluded that the practice increased not only the likelihood of attack but also the chances of hitting friendly aircraft. Seen in this light, the ORS concluded (somewhat impishly) that Air Vice-Marshal Cochrane's 'aggressive' policy was something from which 'the Group as a Group has not benefitted.'⁸⁹

Gunnery was clearly not the answer – at least not so long as the .303 machine gun remained the only defensive armament carried, and so long as air gunners (many of whom were previously failed pilots, navigators, and bomb-aimers) were as poorly motivated and trained as recent evidence had suggested.⁹⁰ Until there were more Mosquitoes available to fly escort and Intruder missions, Bomber Command would have to rely on spoofs, diversions, and misdirection – much of it electronic – in order to maintain the offensive: and from late September 1943 such measures began to feature more prominently in its operations.

Because he still needed to mass his main force to ensure that a sufficient weight of bombs fell on the target, Harris chose first to mount relatively simple decoy raids in which a few Mosquitoes and heavy bombers used Window, flares, target indicators, and whatever ordnance they carried to simulate the approach of a major raid while the main force made a very concentrated attack elsewhere. This was one step beyond the Mosquito-only diversion attempted over Berlin when Peenemünde was attacked, and the first true decoy operation took place on 22/23 September when eight Mosquitoes and twenty-one Lancasters feinted over Oldenburg while the main force, over seven hundred strong, bombed Hanover, about eighty miles away. From the standpoint of results, the raid was a 'record flop' so far as Harris was concerned. Most crews had failed to make 'the slightest attempt' to approach the target on the course set down, and at one point, as No 6 Group confirmed,

'aircraft were bombing from all points of the compass.' 'Unless AOC's take a firm grip now & put this deplorably state of affairs right,' Sir Arthur cautioned, 'we are faced by the prospect of wasted effort, futile casualties, & consequent failures which cannot be.'⁹¹

Not everything about the attack had been negative, however. 'Some confusion was caused before the target was identified' by the enemy controllers, and the loss rate was under 4 per cent. More cautious, now, High Wycombe was loath to attribute the lower casualty rate solely to the Oldenburg effort. Still sensitive to the threat to Berlin, the enemy might well have withheld some fighters to defend the capital – something that could not be counted on every night. Moreover, the decoy had not worked indefinitely. Fighters had appeared over Hanover in strength before the last waves of the main force had departed, and they 'were apparently responsible' for most of bombers shot down.⁹²

Why the Oldenburg feint did not fix the enemy's night-fighters there for the whole night cannot be explained with absolute certainty but it seems likely that, with only eighty miles between them, target and decoy were simply too close together. Seeing an attack developing off to the southwest and freed from the old Himmelbett restrictions on taking the initiative, many night-fighter crews had simply moved to Hanover on their own. That was certainly what happened the next night, when the target (Mannheim) and decoy (Darmstadt) were only twenty-five miles apart – five to seven minutes flying time – and the loss rate was 5.1 per cent. Four nights later, when thirty miles separated Hanover and Brunswick, casualties rose to 5.6 per cent.⁹³ Perhaps having chosen to minimize the significance of Oldenburg in the first place, the staff at High Wycombe could not now draw the appropriate conclusion from follow-on raids. Unfettered by Kammhuber's dogma, night-fighters only a few minutes from the target were not going to remain as passive as they had near Cologne fifteen months earlier.

It probably did not help matters that the best example of what High Wycombe was trying (and so far failing) to achieve occurred on a night when there was no decoy operation at all. On 29/30 September the main force attacked Bochum while eleven Mosquitoes bombed oil facilities at Gelsenkirchen and fourteen Lancasters were Gardening in the Baltic. Yet the German controllers were completely baffled. The bomber stream followed a course which led the Luftwaffe to identify Bremen as the likely target, Window worked well enough to hide the turn towards Bochum, and all fighters were sent to the North Sea port. At that point the original error turned to self-deception. The Flak at Bremen began firing, responding, no doubt, to the presence of the night-fighters; flares dropped by the latter were mistaken for Pathfinder target indicators; and the main controller at 2 Jagddivision, whose headquarters at Stade was only forty miles from Bremen, announced that bombs were falling along the Weser when, in fact, the main force was over the Ruhr, 120 miles to the southwest.

The controller at 1 Jagddivision in Belgium tried desperately to correct his colleague's instructions, but with limited success because he was, in turn, countermanded by Stade. As a result, Bomber Command lost only 2.6 per cent

No one determined scientifically what 'non-random influences' were responsible for these misfortunes, but continuing high losses would earn No 434 an unenviable reputation as the RCAF's 'chop' squadron.

of the 352 bombers sent to the target. No 6 Group did not do nearly so well, losing three of thirty-nine crews, 7.6 per cent; and two of those came from No 434 – continuing a run of misfortune that, in October, momentarily led Air Vice-Marshal Brookes to consider replacing its commanding officer, a Canadian in the RAF unsympathetic to Canadianization. But despite the squadron's increasingly unenviable reputation, no operational fault could be attributed to Wing Commander C.E. Harris, who retained command until his tour expired in February 1944.⁹⁴

Aware from radio intercepts of the confusion caused in the enemy camp, the Air Ministry looked very closely at the Luftwaffe's response in attempts to divine what weaknesses in German air-defence organization unearthed that night could be exploited further. To R.V. Jones, who had pioneered the RAF's electronic intelligence gathering, the evidence suggested overwhelmingly that the enemy's defences were 'unstable,' and there were clear indications where they were most vulnerable. 'Once the controller has formed a picture of the situation it becomes increasingly easy for him to convince himself he is right. Having made his guess ... he sends his fighters to a convenient beacon. These fighters are then reported by sound observations [listening posts on the ground] and ... may be easily misidentified. The controller then interprets the observations as referring to British aircraft, and is thus confirmed in his initial misjudgment.'⁹⁵

The brilliance of Jones's deduction was that he avoided the obvious. What was critical in explaining the low loss rate suffered at Bochum was not that the enemy had been misled or had fooled himself, Jones observed, or even that his reaction depended so much on his initial guess, but rather that, by the time the German controllers had recovered, there were few British aircraft left over the target. And this had happened not because the deception, self-imposed or otherwise, had lasted longer than usual, but because the main force involved was small and had finished its work in less than thirty minutes. The advice he tendered to Portal flowed logically from that conclusion. Instead of wasting time and effort trying to lay on perfect diversions – which were probably impossible anyway – Harris should consider mounting smaller raids that took less time to carry out.⁹⁶ Perhaps, then, if the main force attacking Hanover on 22/23 September had not been so large and had done its business more quickly, there would have been no one left there for the fighters from Oldenburg to intercept.

Analysis of a number of operations mounted in early October suggested that Jones was, indeed, right. Raids featuring smaller, all-Lancaster main forces and taking a short time to complete usually suffered relatively low casualties: 0.8 per cent at Hagen on 1/2 October, 2.7 per cent at Munich on 2/3 October, and 1.2 per cent at Stuttgart on 7/8 October. But when Bomber Command went out in strength – five hundred aircraft or more – to one target, the loss rate averaged about 5 per cent.⁹⁷

Jones's hypothesis was not the only one which provided an adequate explanation for what was happening, however, and some of the others were naturally more appealing to Harris because they were in harmony with – or at least did not openly contradict – his determination to deliver the greatest

weight of bombs possible to every target. Weather was still a factor in determining loss rates, as was the depth of penetration into Germany, irrespective of the size of the main force. Leipzig, bombed by 358 Lancasters on 20/21 October, involved a longer approach over enemy territory than Berlin, and that gave the Luftwaffe ample opportunity to react. Sixteen machines were shot down, 4.5 per cent of the total.⁹⁸

One crew from No 426 Squadron was attacked no fewer than seven times before it reached (and bombed) the target.

The first ... was delivered at 1940 hours ... The enemy aircraft was first sighted by the rear gunner on the starboard quarter when he opened fire at 300 yards. The rear gunner ordered combat manoeuvre 'diving turn starboard' and opened fire. During this attack the enemy aircraft, which was identified as an Me 109, scored hits on the tail plane, fuselage, [and] wings, rendered the mid-upper turret unserviceable and wounded the mid-upper gunner ... The second attack was delivered on the port quarter down at 500 yards. Evasive action was taken and the rear gunner opened fire. The enemy aircraft closed in to 200 yards and broke away [on the] starboard beam. The third attack came from astern and again evasive action was taken, the rear gunner opening fire at 400 yards. The enemy aircraft closed in to 200 yards and broke away starboard beam. The fourth attack came from astern, ten degrees to port at 500 yards. Evasive action was again taken and the rear gunner opened fire simultaneously with the enemy aircraft. The attack was pressed to 200 yards and the enemy aircraft broke away and was not seen again. Shortly after the aircraft had set course it was again attacked by an enemy night fighter, identified as a Ju 88. The enemy aircraft was first sighted on the starboard quarter by the rear gunner at 700 yards. Our aircraft took evasive action and opened fire at 500 yards. The enemy aircraft fired a short burst and broke away at 400 yards on the port beam. The next attack came from astern at 500 yards. Evasive action was again taken and the rear gunner opened fire. The enemy aircraft fired a short burst and broke away at 300 yards. The seventh and final attack was delivered from astern and slightly to port. Successful evasive action was again taken and the attack was not completed as our aircraft entered cloud.

The mid-upper turret and pilot's windscreen had been shattered, the hydraulics and trailing aerial shot away, and the Gee, wireless receiver, starboard inner fuel tank, and starboard fuselage and wings all holed. Flight Sergeant F.J. Stuart nevertheless brought his machine back to Linton-on-Ouse and, although a higher award might have been more appropriate, received the Conspicuous Gallantry Medal.⁹⁹ He was killed over Frankfurt, six weeks later.

However, the most powerful argument against Jones's suggestion, and one which would support the continuation of large raids, was the fact that the evidence could be arranged and manipulated to show that deceptions had worked. For, in Harris's view, the principal lesson to be derived from the raid that had taught Jones so much was not that the operation was shorter than usual but that German pilots would 'take instructions [from] the controller giving the most convincing narrative.' The man at 2 Jagddivision who declared so emphatically that bombs were falling on Bremen, and had tangible evidence

in the form of flares and Flak to back him up, was substantially more persuasive than his counterpart at Deelen, who knew only that Bremen was not the target but had no dramatic alternative evidence to proffer. It seemed, therefore, that it was not essential to fool the entire German air-defence system but only one element of it, no matter how large the main force or how long it took to bomb.¹⁰⁰ Several of October's raids could be made to fit that model, at least superficially. On 3/4 October, when the target was Kassel and diversions were mounted over Hanover and Cologne, controllers in the west initially decided that Magdeburg, further east, was the real objective and, try as he might, General Weise in Berlin could not override them and divert to Kassel the twin-engined units assigned to cover northern Germany until many were low on fuel. There was similar confusion five nights later – the last time Wellingtons were sent to Germany – when Hanover and Bremen (just sixty miles apart) were bombed. Fooled by the complex route High Wycombe had laid down, the German controllers left their fighters to-ing and fro-ing between the outskirts of the two cities without actually contacting the raiders until relatively late in the night.¹⁰¹

In both these cases, however, the loss rate had to be ignored in order to make the perfect fit Harris thought he saw. Twenty-four bombers had been shot down on 3/4 October, 4.4 per cent of those dispatched, and when the enemy fighters finally did make contact on 8/9 October they shot down most of the twenty-seven Halifaxes and Lancasters that were lost. Here was additional evidence that time over the target was the critical variable – the main force had lingered at Hanover and Bremen so long that the controllers had finally been able to get a correct grip on the situation.

What clinched the matter, however, in determining whether Jones's advice would be taken was Harris's understandable desire to knock out his targets in as few raids as possible and thereby reduce the risk to his crews. When navigation and bomb-aiming left so much room for improvement, and when there were too few Pathfinders available for multiple, simultaneous operations, that meant launching a few very heavy blows to produce significant damage. It was purely a matter of scale. Better that half the bombs from eight hundred aircraft should fall on Berlin one night and Magdeburg the next than half from four hundred on each city over two successive nights, when the enemy might be laying in wait. For the foreseeable future, then, Bomber Command would continue to rely on one main penetration supported by one or more small diversions. Nevertheless, since the enemy could not be expected to err every night – controllers were bound to deduce the right target from time to time, even if for the wrong reasons – and since High Wycombe was also likely to get its diversions, spoofing, and main-force route wrong at least some of the time, it was absolutely essential to move ahead with plans to confound the enemy controllers' running commentaries.¹⁰²

As we have seen, the assault on the Luftwaffe's command, control, and communications systems had actually begun in December 1942, when Tinsel was used to disrupt Himmelbett ground-to-air transmissions by broadcasting engine

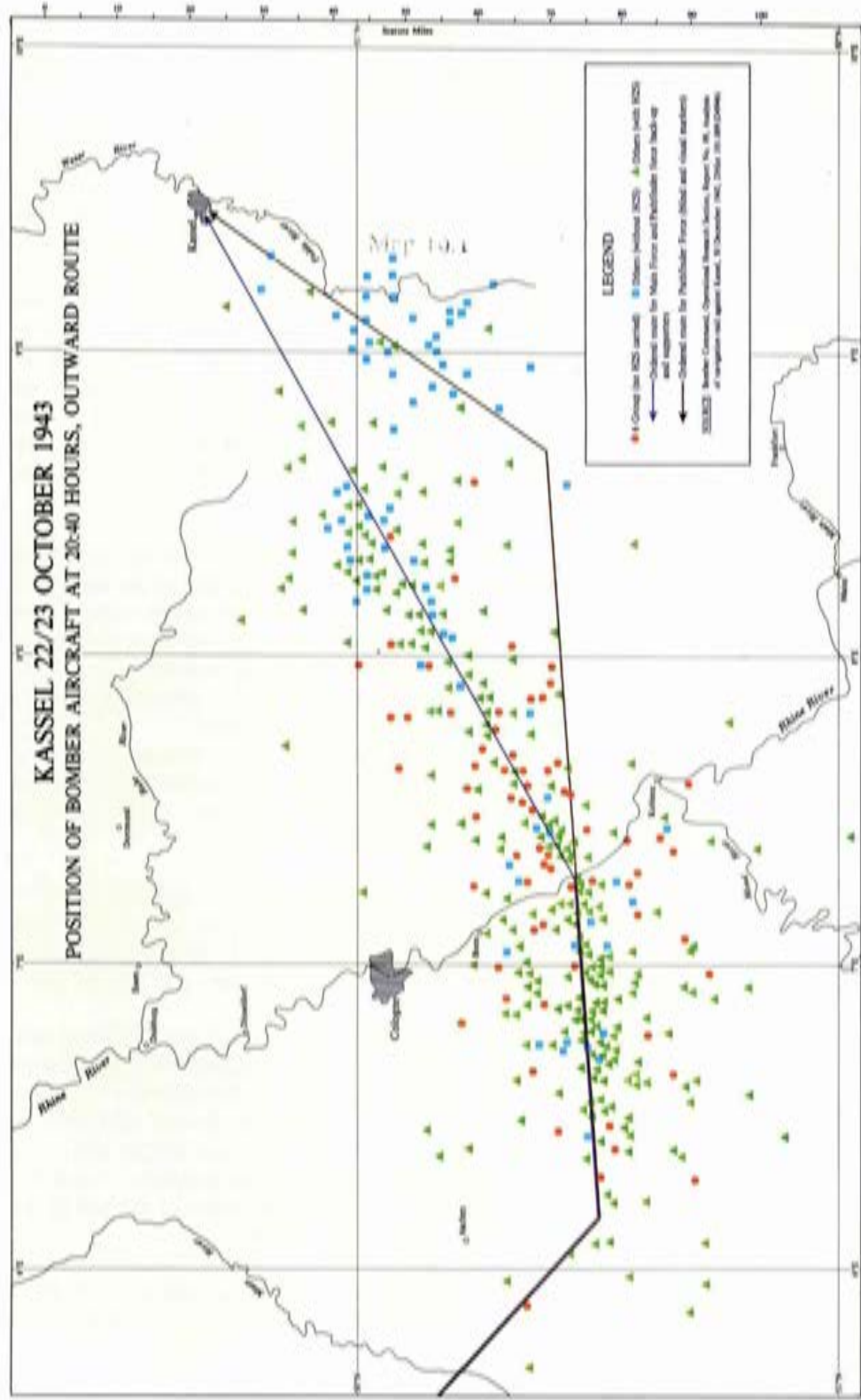
noise on the fighter-control frequency, and Mandrel attempted to jam the early warning Freya radars with only partial success. However, the transmitter power available in Tinsel aircraft was so limited that the interference it caused was easily countered by increasing the strength of the ground control signal, and Tinsel's range was too limited to jam the running commentaries broadcast by stations all over Germany once the Luftwaffe adopted that procedure. Cigar, a ground-based jammer introduced in July 1942, also targeted the enemy's VHF broadcasts, but with a maximum range of 140 miles it, too, was ineffective against most of the Jagddivision commentaries. Grocer, meanwhile, was designed to jam Lichtenstein B/C. Airborne variants of Cigar and Grocer were eventually introduced, but for the moment it was Corona, introduced on the 22/23 October raid on Kassel, that was the most imaginative and, for the time being, the most promising of all Allied radio counter-measures.¹⁰³

Conceived originally as a simple, high-powered jammer, it was soon discovered that, by superimposing a German-language commentary over that provided by the Jagddivision controllers, Corona could be used to deliver false information and fake instructions that might, at best, draw night-fighters away from the target and reinforce any diversion that was taking place and, at worst, introduce an element of uncertainty into the night-fighter phalanx. The bomber stream would not only be protected, it was felt, but the trust between the pilots and the ground-controllers that was so essential to night-fighter operations might also be broken down. The key to making Corona effective went far beyond providing a voice speaking idiomatic German, however; it required accurate renderings of Luftwaffe code-words and procedures while displaying a genuine controller's complete and intimate understanding of his own air-defence organization. The knowledge to accomplish this had been built up, painstakingly and piece by piece over the previous three years, by radio and electronic eavesdropping until, as we have seen, the last crucial gap was filled in October 1943.¹⁰⁴

The initial impact of Corona seemed impressive enough, throwing the main 1 Jagdkorps controller 'into an exceedingly bad temper ... At one stage [he] broke into vigorous cursing, whereupon the Corona voice remarked that "The Englishman is now swearing." To this the German retorted that "It is not the Englishman who is swearing, it is me."' But the deception, which aimed at identifying Frankfurt as the target and the Mosquitoes sent there as the main force, did not last. Having followed the bomber stream's progress across Western Europe with fighters employed in a shadowing role – whose AI, because they were travelling in the same direction as the bombers, was less affected by jamming – employing Würzburgs modified to resist the worst effects of Window, and with Naxos detecting (and measuring the volume of) H2S transmissions, the Germans identified Kassel as the objective the moment bombs began to fall there. They were soon giving accurate and unequivocal reports on the progress of the raid. So compelling were these reports that, by the end of the night, 193 fighters had been directed to Kassel, and forty-three bombers (7.6 per cent of the 569 aircraft dispatched) shot down. The loss rate in No 6 Group squadrons was higher still. Twelve of 107 crews failed to return

KASSEL 22/23 OCTOBER 1943

POSITION OF BOMBER AIRCRAFT AT 20:40 HOURS, OUTWARD ROUTE



(11.2 per cent), and of these four came from No 434 Squadron – whose crews were on time and on track – and three from No 427.¹⁰⁵

Although most interceptions took place in the vicinity of the target, the Germans also had considerable success against bomber crews who, because of icing and thick cloud and haze en route, had gone off track and were not protected by Window. In that respect, having to battle the weather longer and not yet fully equipped with H2S, No 6 Group crews had more difficulty than some of their colleagues in maintaining their course, and that may well explain why their losses were so much higher than the Bomber Command average.¹⁰⁶

Harris had reason to be satisfied despite the losses, however. Although the weather en route to Kassel had been difficult, the skies cleared over the target and the markers there were both accurate and well concentrated. The incendiaries took hold in the city centre, a small firestorm was created, and at night's end Bomber Command had produced the most destructive raid since Hamburg.

The bulk of this attack was concentrated in the highly built-up central part of the city, and ... the entire area was practically destroyed. It is estimated that 65 per cent of the weight of bombs over the target fell in an area of seventeen square miles in and around the centre of the town ... [and] that 50 per cent of the buildings in the zone of bombfall caught fire immediately and fired the adjoining buildings. The H[igh] E[xplosive] bombs loosened roof tiles and opened up windows so that buildings which were not hit were easily ignited by flying sparks and radiant heat ...

Communications and essential services were disrupted, as fires were of such proportions that no firefighting agency could cope with them. The firemen devoted themselves to saving lives and trying to check the fires at the perimeter. It was impossible to do any fire-fighting in the centre of the fire zone ...¹⁰⁷

Almost half of Kassel's houses and apartment blocks were damaged or destroyed, leaving upwards of 100,000 homeless; as many as 8500 were killed. The railway network around the city was heavily hit, and 155 industrial buildings, including the three Henschel locomotive, tank, and gun plants, were smashed or badly damaged.¹⁰⁸

The interpretation of these results quickly became the source of bitter controversy. Since September the Air Ministry's public relations branch had been increasingly emphasizing the industrial damage done by Bomber Command as an integral part of the CBO. The stories released about the Kassel raid were no exception. 'A great force of RAF and RCAF heavy bombers fought their way through many Nazi fighters last night,' the Associated Press reported, 'to deliver a concentrated attack on the German war industrial centre of Kassel in the ninth – and costliest – major British raid of the month.'

The heavy bombers again added their terrific punches at German industry to the night and day attacks that lighter RAF and American planes have been conducting against Nazi communications and fighter fields ...

Kassel, which is one hundred miles northeast of Cologne, is one of Germany's key aircraft towns and also site of the Henschel Locomotive Works, largest of its kind in Europe. The city has a big assembly works for Messerschmitt 109s.¹⁰⁹

To Harris, who knew what the aiming points in Kassel had been, such an account was a gross distortion and misrepresentation, and he said so. What was important about the raid, he told the undersecretary of state for air, was not that 'the Henschel locomotive works and various other ... factory premises' had been hit, but that 'Kassel contained over 200,000 Germans, many of whom are now dead and most of the remainder homeless and destitute.' Besides giving the wrong impression to the British people, who might be led to think that Bomber Command was primarily concerned with 'the bombing of specific factory premises' when its real goal was 'the obliteration of German cities and their inhabitants,' these stories also threatened morale within his squadrons. 'Our crews know what the real aim of the attack is. When they read what the public are told about it, they are bound to think (and do think) that the authorities are ashamed of area bombing. It is not to be expected that men will go on risking their lives to effect a purpose which their own Government appears to consider at least as too disreputable to be mentioned in public.' Moreover there was a risk that, by misconstruing what strategic bombing was actually achieving, others would 'steal credit' when the war was over. 'The fact that bombing has won the war and forced the German armies to give in to the Russians will never be accepted in quarters where it is important that it should.'

For a number of reasons, then, the AOC-in-C asked that the purpose of the bombing offensive, 'and the part which Bomber Command is required by agreed British-US strategy to play in it, should be unambiguously stated.'

That aim is the destruction of German cities, the killing of German workers and the disruption of civilised community life throughout Germany.

It should be emphasised that the destruction of houses, public utilities, transport and lives; the creation of a refugee problem on an unprecedented scale; and the breakdown of morale both at home and at the battle fronts by fear of extended and intensified bombing, are [the] accepted and intended aims of our bombing policy. They are not by-products of attempts to hit factories.

The successes gained should publicly be assessed in terms of the extent to which they realise this policy. It should be made clear that the destruction of factory installations is only a part and by no means the most important part of the plan. Acreages of housing devastation are infinitely more important.¹¹⁰

Harris – no mincer of words – was asking his government to confirm one of two things: either indiscriminate attacks were all that Bomber Command could manage for the moment; or, capabilities aside, they were what the British bombing offensive was really all about.

This posed something of a public relations problem for a government that, while acknowledging that 'heavy casualties to the civil population' were unavoidable, nevertheless desired, in the words of Sir Arthur Street, permanent

undersecretary of state for air, 'to present the bomber offensive in such a light as to provoke the minimum of public controversy and so far as possible to avoid conflict with religious and humanitarian opinion.' In fact, it had been a problem, to some extent or other, since the spring of 1941 when the bishop of Chichester had demanded to know (in the correspondence columns of *The Times*) how 'the bombing of towns by night and the terrorizing of non-combatants' could be excused; Dr Cosmo Lang, archbishop of Canterbury, had observed that although it was a 'very natural and human' reaction for Britons to want to repay the enemy in kind for 'the ... ruthless treatment' inflicted on London and Coventry, 'that view ought not to be allowed to prevail. It was one thing to bomb military objectives and to cripple war industries, and in so doing it may be impossible to avoid inflicting losses and suffering on many civilians; but it is a very different thing to adopt the inflicting of such losses and suffering as deliberate policy.' However, looking on the bright side, he did not believe that 'the great majority of British folk, even in the bombed areas, really want such a policy, and it is to be hoped that the Government, some of whose members have been using disquieting language, will resist any pressure [and instead] strive so as to be patriots as not to forget that we are Christians.'¹¹¹

Dr Lang thought too well of his fellow man, public and private. One member of parliament had asserted in May 1942 that he was 'all for the bombing of working-class areas in German cities. I am Cromwellian - I believe in "slaying in the name of the Lord," because I do not believe you will ever bring home to the civil population of Germany the horrors of war until they have become tasted in this way'; and the secretary of state for air, Sir Archibald Sinclair, had replied he was 'delighted to find that you and I are in complete agreement about ... bombing policy generally.'¹¹²

Moreover, although the government would never admit openly that civilian casualties were anything but an unfortunate by-product of attacks on industrial areas, there is little reason to believe that the general public would have complained had it been told otherwise.¹¹³ The press accounts of the fire raids on Rostock and Lübeck of March and April 1942 left little doubt not only that these were not precision raids, but also that the widespread damage caused was to be welcomed. A.C. Cummings, a Southam News journalist, had reported that 'Rostock is an empty shell of gutted buildings,' and added that he had been assured by 'the best-informed source here in London'

... that such bombings will be spread over a 2,000-mile front in western Europe and deep into Germany itself, where every city in any way helping Hitler to victory will be left in ruins.

'The Nazis will get it back,' I was told, 'with a greater weight of bombs, with greater accuracy, with greater force, until troops at the front in Russia and the people at home wonder what the end of it for them will be.'¹¹⁴

Such sentiments were not limited to those intimately involved with the bombing offensive. In far-off Ottawa, Mackenzie King noted in his diary that

'it was Hitler who started total war and [the] killing of women and children,' and he therefore had no sympathy for those suffering under the recent British attacks. Nor did most Canadians. A Gallup Poll taken at the turn of 1942 revealed that 57 per cent of them approved of 'bombing Germany's civilian population,' while only 38 per cent disapproved. 'Thus,' announced the Canadian Institute of Public Opinion, 'the ordinary citizens of Canada, who have never yet been called blood-thirsty, even by their bitterest enemies, give a majority approval of bombing civilians in Axis countries.'¹⁵ Interestingly enough, there was the usual split along language lines, however. While 60 per cent of anglophones approved – nearly 70 per cent in British Columbia – only 47 per cent of francophones agreed with them.¹¹⁵

Unlike many, B.K. Sandwell, editor of *Saturday Night* and 'the ears and voice of Canadian liberalism,'¹¹⁶ was worried about what men thought as they planned and undertook the business of mass killing. 'Should we go about that task in a spirit of vengeance, or of cruelty, or of vainglory and lust for power,' he cautioned, 'we shall be lowering ourselves to the level of the enemy and losing the right to regard ourselves as the agents of a more than mortal justice.' But in the end, like most of his contemporaries, liberal or otherwise, he had to side with killing. 'The defeat of Germany can only be brought about by killing Germans,' and if 'the object of these raids [is] to kill Germans ... it is a perfectly proper object ... The blood of such innocent persons as these is not upon us... The whole German people brought upon themselves whatever calamities may issue for them out of this war, when they put themselves under the kind of government which was bound to make such a war ultimately inevitable. It is our unavoidable task to make Germany suffer.'¹¹⁷

The politicians' tone changed somewhat as the tempo of bombing accelerated in 1943. When asked in the British House of Commons on 6 May whether the offensive against the Ruhr marked the end of attempts at precision bombing, Sir Archibald Sinclair (who had privately been 'delighted' with the idea of 'slaying in the name of the Lord' only a year earlier) flatly denied the allegation, observing that although 'it is impossible to distinguish in night bombing between the factories and the dwellings which surround them ... No instruction has been given to destroy dwelling houses rather than armament factories.'¹¹⁸ This impression was reinforced three weeks later when, asked the same question, Labour MP and deputy prime minister Clement Attlee replied emphatically that 'there is no indiscriminate bombing ... The bombing is of those targets which are most effective from the military point of view.'¹¹⁹

The Canadian press seems not to have been concerned with such niceties. In its editorial of 31 May 1943, the *Toronto Telegram* declared that, while bombing undoubtedly meant 'misery and death for the people of the Axis nations ... it is better that they should be blotted out entirely than that the world should be subjected to the rulers they have tolerated so long, and there are many who hold that they must be made to know in full the horrors of war

* Fifty-one per cent approved of bombing Italian civilians and 62 per cent approved of bombing the Japanese.

if a new war is to be avoided.' The *Winnipeg Free Press*, meanwhile, had already belittled the few who demanded limitations on bombing because they were asking 'air crews still more to endanger their own lives so that they may perhaps save the lives of workers in industrial war facilities or living in the immediate neighborhood of those targets.'¹²⁰

The aiming points that were selected for the battle of Hamburg belied Attlee's claim but, even though these were not public knowledge, the sheer scale of destruction achieved and bragged about was an open indication that bombing policy had changed, whether it was admitted or not. So was an Association Press report on 7 August which contentedly described the devastation inflicted on Düsseldorf. Making it clear that civilian casualties were heavy, the writer went on to explain that 'official ... totals can be multiplied three or four times without inaccuracy since only victims recognized during the most urgent salvage work are listed officially as dead. The stench in the streets is proof that many are never found and never listed.'¹²¹

However, it was one thing to 'de-house,' maim, and kill German civilians, and quite another, as Sinclair protested, to say publicly that 'the principal measure of our success' was defined in terms of the number of civilians killed and houses burnt and, moreover, that these were the premeditated and willful objectives of area bombing.¹²² Even 'acreage destroyed' – Portal's compromise suggestion as the way to measure Bomber Command's effort without upsetting public opinion – went too far for Sinclair, who maintained that the government must continue to 'lay the emphasis – rightly in my opinion – on the fact that our prime objective is German war industry and transport ... and that damage to the built-up areas, though inevitable and huge, is incidental.'¹²³ Perhaps the best that could be hoped for, in explaining what were (or were not) the collateral effects of bombing, was expressed by Air Marshal Sir Richard Peck when he suggested that all would be well once the British public had been educated to the point where everyone agreed with Harris that 'an industrial city is in itself a military objective.'¹²⁴ In that case, of course, the bothersome distinctions between civilian and military casualties and between intended and incidental damage would be blurred – sufficiently, he hoped, so as to become altogether meaningless.