

**WAR DEPARTMENT EXHIBIT AT THE ST. LOUIS FAIR.**

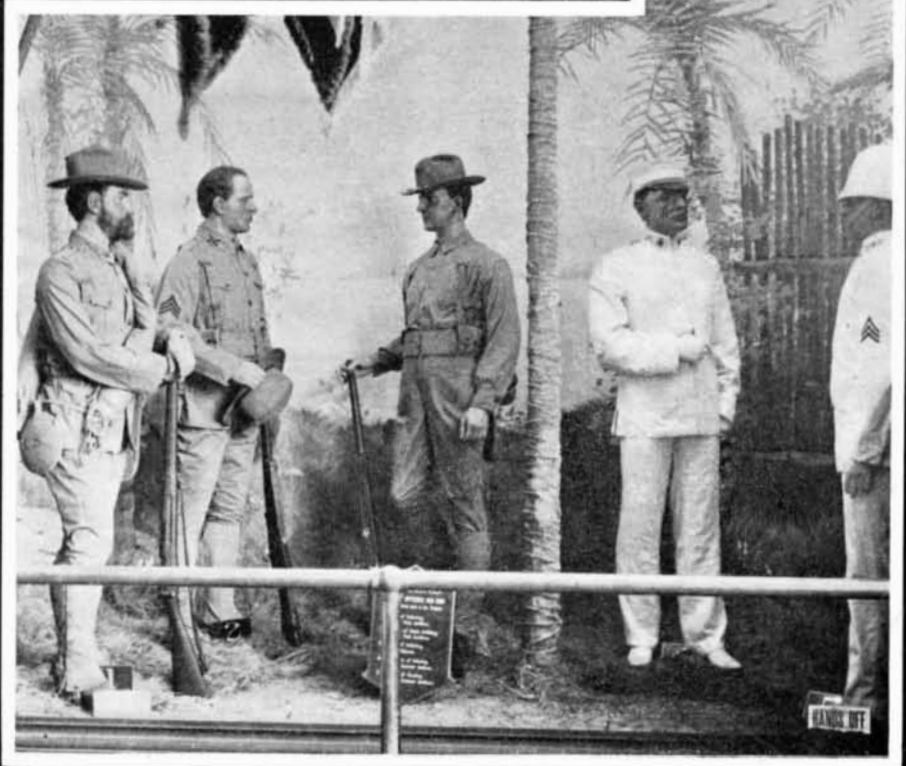
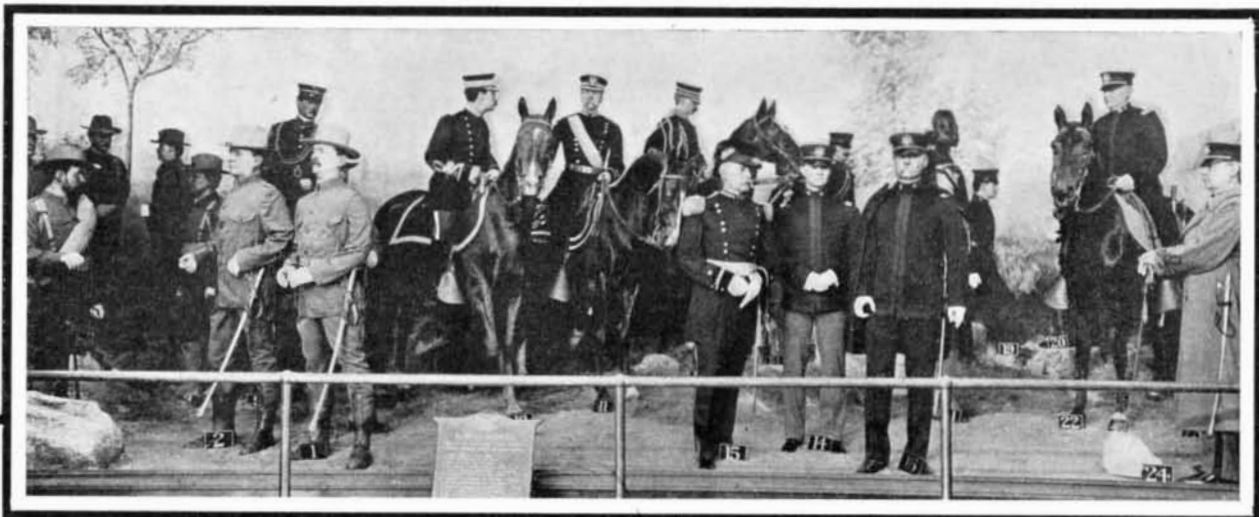
BY THE ST. LOUIS CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

The character of the displays which have been made by the United States government at previous expositions led the public to expect that the government exhibit at the present World's Fair at St. Louis would be exceptionally fine. The truly magnificent building of the government, with the very fine collection of exhibits within the building and surrounding it, have amply justified the expectation. Of the many departments that are represented, each in its own section of the building, perhaps the most popular and certainly the most

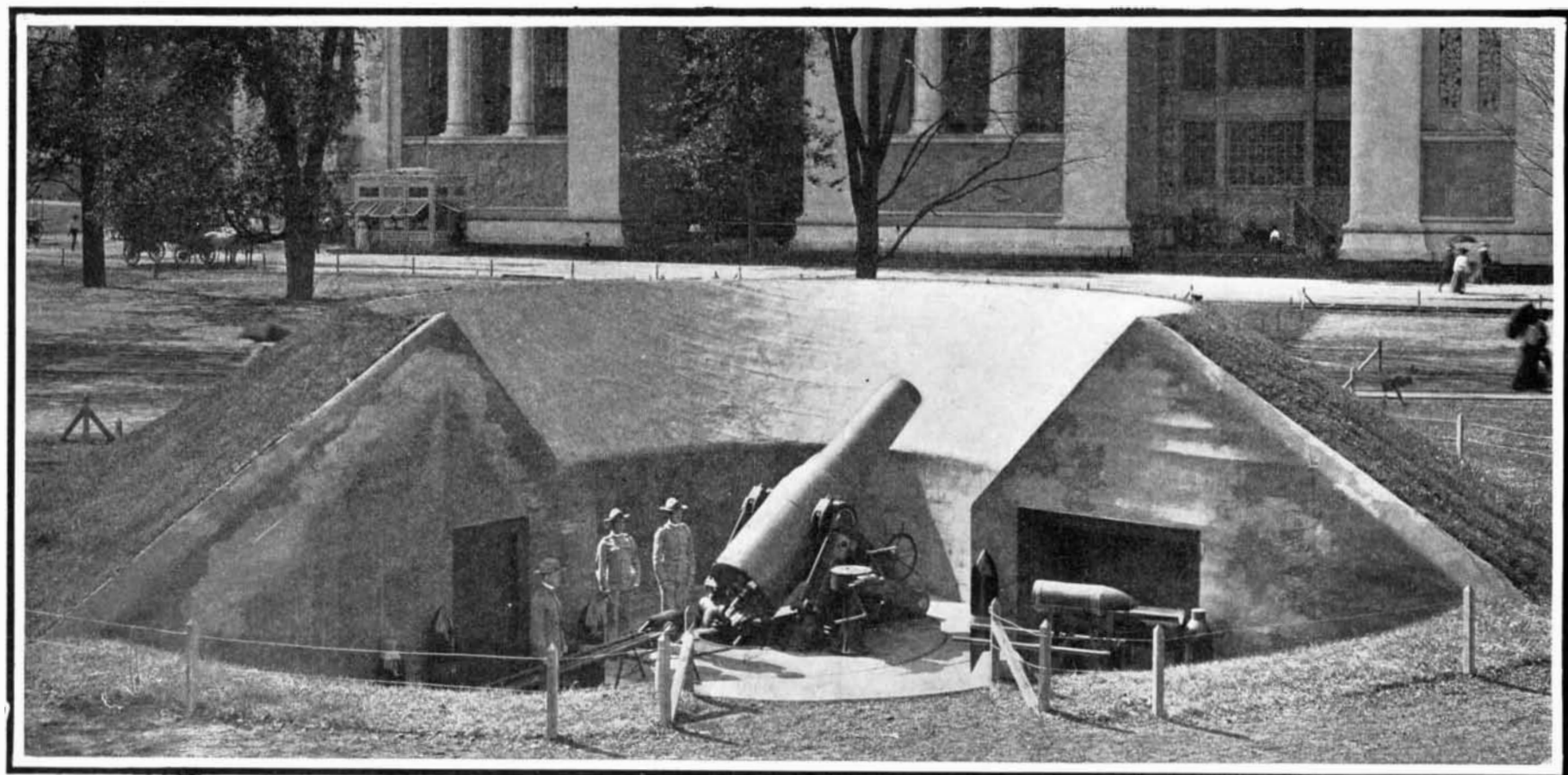
guns in their emplacements, one a 50-caliber, 6-inch, and the other, illustrated on our front page, a 42-caliber, 12-inch rifle. The 12-inch rifle, which was recently completed at the gun shops, is one of the model of 1900. The gun itself, which weighs 131,500 pounds, cost \$43,451 to construct. It is mounted on a

in practice) of 18 miles. This type of gun and mount has shown very good results in target practice; as at Fort Greble, R. I., where four shots were fired within five minutes, with four perfect hits. Another gun of the type fired five shots in four minutes and thirty-nine seconds during practice at Fortress Monroe, Va.

This type of disappearing gun carriage has been so fully illustrated in the SCIENTIFIC AMERICAN that no extended description is necessary here. In the front-page engraving the gun is shown in the firing position and, therefore, above the parapet. Normally the gun lies in the depressed position and entirely within the shelter



Groups of Thirty-three Lifelike Lay Figures, Showing the Uniforms of Officers and Men of the United States Army. To left and right the lower cuts show the uniforms worn in the Arctics and tropics respectively.



Twelve-inch Spring-Return Seacoast Mortar for High-Angle Fire, Gun has a record of 30 per cent of hits.

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Photos taken for the SCIENTIFIC AMERICAN.

striking is that shown by the War Department; and of the various elements of its display, the most attractive is the series of reproductions of coast defenses that are arranged around the western end of the main building. Facing the northwestern angle of the building are two emplacements—two reproductions of the actual fortifications—representing two disappearing

Buffington-Crozier disappearing carriage, which embodies the latest improvements of the type. The carriage with its gear weighs 411,826 pounds, and it cost nearly as much as the gun to construct, or \$41,000. The gun fires a 1,000-pound shell, with a muzzle velocity of 23,000 feet per second, and it has an extreme theoretical range (which, of course, will never be used

of the parapet, where it is loaded and sighted, the range being telephoned to the gunners from some distant point of observation in which the range finder is concealed. As soon as the gun is ready for firing, it is raised to the firing position by means of heavy counterweights, which are attached to the lower ends of a heavy pair of cast-steel pivoted arms, in the up-

per end of which rest the trunnions of the gun. When the piece is fired the energy of the recoil is sufficient to throw the gun backward and downward into the loading position. The traversing, elevating, and depressing of the gun are accomplished by means of electric motors, the controllers of which are seen in the bottom left-hand corner of the cut.

In addition to the two disappearing guns above mentioned, the outside exhibit includes a 12-inch breech-loading mortar, mounted in its carriage and shown in a reproduction of a mortar pit. In service this type of gun is used for attacking war ships, whether they are at anchor or in motion, at ranges between 3,000 and 12,000 yards. The mortar is entirely hidden in its deep emplacement and being elevated skyward, its shell is thrown several miles into the air and falls, literally "a bolt from the blue" upon the deck of the enemy. Side by side on another platform are a 7-inch breech-loading Howitzer and a

7-inch breech-loading mortar. The Howitzer, which is mounted on its carriage, represents a type of cannon used in siege operations against fortified places; while the field mortar is used exclusively for high-angle fire. On another platform is a 15-pounder, 3-inch rapid-fire gun, mounted on a barbette carriage, the province of this type of gun being to attack the superstructure of ships that may attempt to run past fortifications, and to protect submarine mine fields against the operations of the enemy. Adjoining the 15-pounder is a 6-inch 50-caliber rapid-fire gun, mounted on a pivotal barbette carriage provided with a new type of curved shield, which is finding considerable favor in the army. One of the most interesting features of this outside display of the Ordnance Department is the daily practice with the disappearing guns by detachments of sea-coast artillerymen. The whole process of loading, sighting, and firing the guns is gone through exactly as it would be

would land at Hastings-on-the-Hudson, 21 miles distance from the Battery. Alongside the gun are arranged samples of the projectiles and powder charges used in the army guns of from 6-inch to 12-inch caliber.

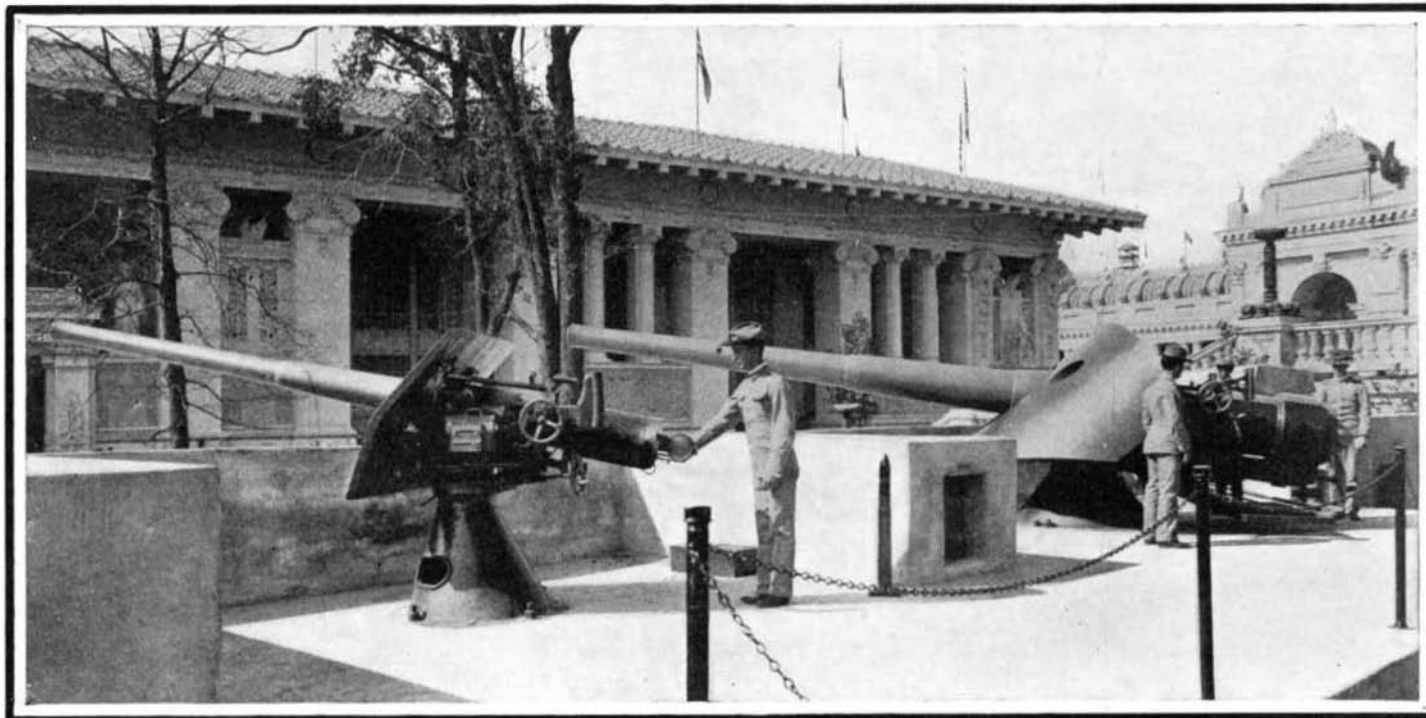
The Quartermaster's contribution to the exhibit is three cases containing full-sized models dressed in the various uniforms worn by the officers and men of the United States Army. The case to the left represents the clothing of furs, skins, etc., worn in the Arctics, the case to the right exhibits the light tropical dress, and the center case, which is the largest

means for visual signaling; various types of telephones, the telautograph, the typewriting telegraph, the wireless telegraph, etc. The Artillery Corps has built a model tank, that attracts large crowds of the visitors to this building it contains a miniature mine field in which is shown a floating model of the man-of-war. The whole exhibit, which includes a full-sized submarine mine, possesses special interest at the present time, when this type of weapon is demonstrating its terrific powers. Mention should be made also of the West Point exhibit, rich in historic interest, and the very fine exhibits, chiefly by means of relief maps, of the various national military parks.

An interesting discovery of the remains of a prehistoric animal has been effected near Peterborough (England). While engaged in some excavations at a depth of twenty feet in the Oxford clay, some workmen alighted upon the huge head of a monster of the alligator genus. The jaws were two

feet in length, and were firmly clenched together by the pressure of the earth through countless years. The bones, however, were in an excellent state of preservation. The creature has been determined as a member of the Steneosaurus family. Other interesting remains of a similar nature have also been unearthed in the same district.

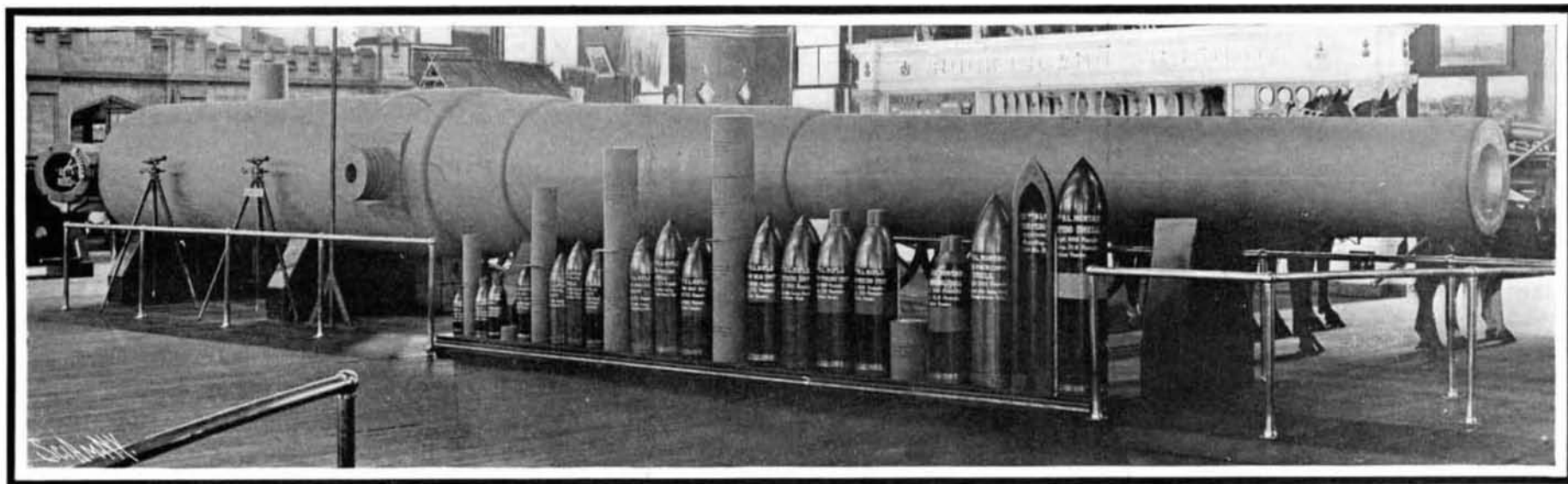
A paper was read at the last meeting of the Paris Academy of Sciences on "The Action of Terrestrial Magnetism upon a Tube of Nickel Steel (Invar) Intended for Use as a Geodetic Pendulum," by M. G. Lippman. The alloy of nickel and iron known as invar, which possesses a coefficient of expansion only one-twentieth that of brass, has obvious advantages for pendulum observations. This steel, however, is magnetic, and it was thought possible that the disturbing influence introduced in this way might be too large to be neglected. The magnetic moment of a tube of



Three-inch 15-pounder Gun to left; 6-inch, 50-caliber Gun, with New Type of Curved Shield, to Right, shown in barbette emplacements. These are the latest patterns of army guns.

and handsomest of the three, shows the various uniforms in use both by mounted and infantry troops. It should be mentioned that these figures are so perfectly modeled and are given such a natural coloring, that at first sight one can easily be deceived into believing that the models are live men instead of lay figures.

The interior exhibit includes a mountain gun and equipment packed for transportation on five lay figures of pack mules, while another of these guns is shown assembled on its carriage ready for firing. A similar exhibit is made of a Colt automatic machine gun. Nearby there are a 3-inch rapid-fire field gun, a Vickers-Maxim automatic gun, and two Gatling guns, all mounted on their respective carriages. A particularly interesting feature is a series of fifteen machines, shown in operation, making ball cartridges for the army rifle. The Springfield armory exhibits, in a very interesting display, the development of portable



Model of 16-inch Army Gun, with Row of Projectiles and Powder Charges for 6-inch to 12-inch Guns. Weight of 16-inch Gun is 130 Tons; Muzzle Velocity, 23,000 feet per Second, and Maximum Range 21 Miles.

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in war-time operations. The outside exhibit also includes the famous 12-inch Krupp plate which was smashed to pieces in the recent attack upon it by high explosive shells filled with maximite and dunnite.

The most striking feature of the indoor exhibit of the War Department is an exact model of the great 16-inch coast-defense gun which was tested recently at Sandy Hook. This gun, which weighs 130 tons, throws a 2,400-pound shell with a muzzle velocity of 2,300 feet a second. If it were set up at the Battery and fired with an elevation of 45 degrees, the shell

firearms, from a small iron tube fired from a support by means of a lighted match held in the hand, to the latest pattern of army magazine rifle; while arranged on the wall is a series of pictures illustrating the various stages of the manufacture of the service rifle, the carbine, and the officers' sabre and cadet sword.

Other sections of the War Department are the Medical Department, with its fine exhibit of a brigade field hospital; the Corps of Engineers, with its splendid array of models relating to river and harbor improvements; the Signal Corps, with its exhibit of

this material was determined, and the possible error on a pendulum observation calculated. It was found to be negligible, and hence invar can be advantageously substituted for brass in the pendulum.

Fifteen electric clocks at Paris take their time from the Observatory; and M. Bigourdan has succeeded with a wireless telegraph station in transmitting the beats correctly to two or three thousandths of a second to telephone receivers with an area of two kilometers radius.