

Radio-controlled bird defense system

(Stefan System) (H. Fürbeth, FRG)

RADIO-CONTROLLED BIRD DEFENSE SYSTEM (STEFFAN SYSTEM)

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There are a number of measures to prevent bird strikes in air traffic. However, measures to chase off birds, technical measures such as bird traps, different kinds of scarecrows, pyro-technical bangs, ultra-sounds and electro-magnetic measures all turn out to produce little because they lack the striking power of the immediately effective operations.

The Steffan System can, due to its radio-control, be put to operation wherever birds settle or approach. Accustomization is impossible as the acoustic irradiation does not work prophylactically but only when specific dispersal is necessary. The Steffan System is used in civil and military areas.

The Steffan System consists of a central transmitter, which can, according to requirements, be installed in the tower or in the fire-station, and of a number of detonators triggered individually or in groups. The power supply system is based on a main circuit connection. Each of the detonators requires an acetylene gas container which services 8.000 to 10.000 rounds. The pressure supply of the Steffan System is provided by a leadplate battery with a solar cell. Inspection and maintenance is necessary every four to five years.

In the history of mankind man has always felt the acute need to expel birds as competitors for nourishment. In this attempt different methods were employed. Most effective was, at all times, the banishment by means of sound bursts with a high acoustic intensity, of noises intended to cause fright - from the clapping of hands to pyrotechnical explosions. As far as the effectiveness of the banishment was concerned the immediacy of the acoustic procedures rather than the frequency spectres played the decisive role.

In the course of the advancement of technical achievements the fright-intensive acetylene gas explosion with its semi-automatic sound devices - together with many other methods - increased in order to protect valuable agricultural areas. In vineyards and other special cultural areas the so-called carbide detonators were widely spread. These devices were, however, more or less locally restricted and thus effective only in a narrowly limited area. They demanded constant inspection and maintenance and consequently required immense personnel; above that they caused considerable annoyance to the populated environment because their operation covered large spans of time. As the devices were constructed for permanent employment the birds after some time got used to the acoustic disturbances. All installations operating on a permanent basis are known to produce such accustomizations. This applies to optical devices (scarerows) as well as to electro-acoustic or pyro-technical implements. The DAVVL pointed that out in a statement issued on March 15, 1987. Therefore, in order to avoid bird accustomization, the employment of detonator-, lightning-, and whistling-cartridges had to be arranged in changing positions, preferably in permanently changed locations as well. In the past one attempted - mostly without success - to avoid bird accustomization by positioning detonators where bird flights commonly appeared or where they preferred to settle; the position and the firing frequency of those devices was permanently altered and newly adjusted to the frequency spectrum of the birds' critical range of audibility. Attempts with infra- or ultra-detonators and frequency modulation used in larger areas turned out to guarantee no permanent and comprehensive success; the same applies to optical devices. Effects to disperse birds and intimidate them through such measures proved less strong than instinctive bird behaviour.

Only by introducing a radio-controlled, locally and temporally independent pyro-acoustic combination of devices operating network-

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free - the Steffan System - could the disadvantages of all previous system at once be eliminated. The system was developed for wine growing; for twelve years it has been successfully employed in large wine growing areas in times of grape ripening.

Since the air-crash of a US military plane in 1984 caused by bird strike the Steffan System has been in operation on military and civil airfields. It turned out that the Steffan System, constructed to disperse birds from airfields or parts of airfields, was particularly successful where measures applied by the biotope management did not work or were ineffective on account of reasons relating to servicing techniques or to phenology. This can be case where - even if only temporarily - unfavourable biotope situations near airfields can not be changed or when the agricultural utilization in the critical environment can not be adjusted to the demands of airfield ecology due to important reasons.

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In spite of the efforts of the biotope management there are, in times of increased bird activity, frequent and sudden bird gatherings on airfields causing considerable dangers to air traffic. The Steffan System is a useful complement of the efforts of the biotope management; it is indispensable where ecological measures to free air traffic systems and their critical environment from birds fail so that grave dangers to air traffic and passengers can not be ruled out. This applies particularly to airfields in agricultural areas, near shores, near natural anthropogenic waters, and near special camp areas. Additionally, the existence of dumps near airfields, particularly in starting and landing areas, can definitely necessitate the installation of the Steffan System.

A considerable number of examples in the application of the system both in military and civil air traffic has shown that the use of Steffan System on airfields and other areas freed those sites from birds even under complicated conditions thus meeting both the practical requirements in air traffic and legal demands in a satisfactory way. Legal matters are particularly important when damages or even accidents lead to compensation claims.

The Steffan System consists of a centrally operated radio-controlled transmitter. The number of detonators depends on the site and on the degree of danger. They also depend on previous bird observation, on the experience of the local experts, on scientific criteria and, if occasions arise, on the principles and recommendations

finally some technical details:

The Steffan System consists of a central control and, depending on the operating range, of a number of detonators triggered individually or in groups. Each detonator has four pipes so that the detonation produced is fourfold (Quattro-Bang). The system is operated by one person at the central control. The triggering of the individual devices or of groups of detonators follows the entering of the code and the radio signal. Then, within six seconds, the following control sequence takes place:

1. The reception of the signal
2. Transmitting time of impulse and automatic control service of the electronic data
3. Ingress of gaseous mixture into the firing chambers
4. Ignition and triggering of the Quattro-Bang (transposed time: 1 - 3 - 2 - 4; the frequency is variable)
5. System is released for further triggering.

The transmitting time of the impulse can be adjusted in a way that the triggering of one group produces a 'running fire effect'. The power supply system is based on a main circuit connection. As to the detonators, for each of them one acetylene gas container is required; it services 8.000 to 10.000 rounds. The pressure supply is provided by a leadplate battery with a solar cell. Maintenance checks are necessary every four to five years. Inspection and maintenance can be taken care of by qualified airfield personnel.

Translation Dr. Michael Stein.