

**MICROWAVE SENSORS OF AN ELECTROPHYSICAL  
PARAMETERS OF FLAMES**

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In this paper author is going to present summarized results of investigations. They were made during 1997-2001 and dedicated to the microwave sensors of the processes of burning for power engines of flying machines.

Technical solutions suggested earlier (1982-1992) were based on the estimations of an aggressive action (influence of disturbances and erosion). These sensors have lots of advantages such as unperturbative and effective monitor, constructional connection with PE, stability to erosion. But from the other side our experiments have shown, that on the whole, they don't answer an aggregate of requirements to accuracy and monitor reliability. Posed purpose consists of a new schemotechnical and constructional suggestions search, their studying and optimization; and elimination of the found disadvantages. Main task is a heat consequences prevention with a different consideration of the nominal and emergency regimes of the power engines and for the different types of flying machines.

Stages of the work:

1. An electrical model of the sensor : main

equation, multi-link resonators, slit antenna, conversion coefficient and sensitivity; nonlinear distortions; stability of regime;

2. Thermophysical model of the sensor in static (or under the quasi-static heating): heat transmission equation, temperature of antenna; uneven heating of the resonator; thermostability condition; diode, requirements to the materials and constructions.

3. Thermophysical model of the sensor in dynamics: starting mode, heat transmission equation, temperature conductivity of materials and shapes of details etc.

4. Thermophysical model of the sensor under temperature fluctuations of flame: spectral densities, temperature, frequency etc.

5. Technical suggestions : multi-link resonator usage, resonator and other detail manufacturing from the melted (porous) quartz, bimetallic antenna usage and others

6. Experiment (erosion influence consideration etc.)

During last two years author has published 14 articles on this topic.