Enclosure design for a mobile communication and navigation terminal

Objective

Development of the enclosure design and structure for a special purpose navigation and communication terminal with a walkie-talkie function. The enclosure has to be shock-resistant.

Key parameters of the device:

- Dust and water resistant: IP65
- Enclosure dimensions: ~ 182 x 80 x 33 mm
- Sockets / slots for two SIM-cards

- LED indication and a flashlight
- Handsfree speaker 36 mm, 1W
- Control buttons: Power, alarm, PTT, 3 programmable buttons
- Switches: channel selection, volume
- Connectors: a professional POGO-connector, USB, a speakerphone, a microphone, channel switching, PPT
- Battery. The main battery, Lithium Polymer (LiPo) of higher capacity; an additional battery, LiPo of small capacity. Up to 12 hours in a high-power mode, with intervals of 5:5:90 with a replaceable battery, up to 5 minutes of operation with a built-in battery when replacing the main battery.
- Ambient temperature in the operational mode: −20 °C ...+ 50 °C (subzero temperature modes with a special battery only)

Solution

In the process of the exterior of the terminal, we proposed several stylistic directions. After three iterations we came to an agreed conceptual design, which served as the base for the development of the terminal's design.

Interim design options :

At the stage of the structure development, we selected the materials of the enclosure, the manufacture technology and components of the walkie-talkie controls.

The disassembled structure of the terminal:

At the final stage of the project, we made a prototype of the enclosure using FDM technology and tested it for assembliability.

A sample of the terminal:

Advantages

- Shock-resistant enclosure with protection against water and dust
- Low production costs due to optimization of the bill of materials and selection of standard manufacturing technologies