

(Russian Aerial Fire Protection Service)
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In late February early March I went to Moscow, Russia, to meet with representatives of Avialesookhrana and various people involved there in parachute technology and development. The trip had three principle goals:

1. Look into Avialesookhrana's efforts to locate or develop a new parachute system for their smokejumpers.
2. Find information on Russian experience with developing and testing personnel drogue parachutes.
3. Look at automatic parachute activation devices produced in Russia.

The objective of the trip was to see what, in these three areas, might be applicable to BLM's ongoing efforts to improve smokejumper delivery systems and to evaluate whether further inquiry is warranted.

I. NEW PARACHUTE SYSTEMS

Avialesookhrana's 1500-2000 smokejumpers have been using the Lesnik-2 parachute system since the mid-1980's. It consists of a drogue-deployed 7-cell ram-air main canopy (280 sq. ft.) and a 538 sq. ft. round, chest mounted reserve parachute. There is no reserve static line system for automatic deployment of the reserve upon cutaway of a malfunctioning main canopy. New jumpers are trained on the round PTL-72, and jump that chute until deemed ready to use the Lesnik-2.

They would like to replace the round reserve with a ram-air for faster, more reliable opening and for safety in the event of a high-wind reserve landing. All their current parachutes are manufactured at the #3 government factory in Ivanovo, near Moscow.

There are two relatively new private parachute companies in Moscow. These companies, Paraavis and NPP Zvezda, were formed by people who formerly worked on parachute design at the state-run Scientific Research Institute in Moscow. Due to worsening economic conditions in Russia, many of the projects being developed by the Institute came to a standstill.

The Paraavis chute, of most interest to Avialesookhrana, is the "Vitiaz" which comes in two versions. They are 9-cell canopies with a ram-air reserve and can be used with the "Centure" backpack and harness designed for chest attachment of gear bags. The system is a piggy back

with the main canopy on top of the pack. The main is drogue-deployed and the drogue release is a free-floating 3-ring on the top edge of the pack. The manual drogue release is backed by a mechanical timer. The third option is release of the drogue by a second, emergency handle which releases the other end of a continuous loop, as in the BLM student rigs. The system can also be modified to be deployed by static line, soft pilot chute, or spring pilot chute.

Paraavis is willing to accommodate Avialesookhrana's wishes in any new design including developing a chute stable in vertical descent for dropping into tight forest spots.

NPP Zvezda is run by Sergei Kalabukhov, who also worked for the Scientific Research Institute. Zvezda's "Arbalet-2" is the system presently considered most promising by Avialesookhrana. The drogue release is the same as currently used on all current Avialesookhrana systems and the reserve canopy is identical to the main.

AVIALESOOKHRANA'S PLANS

Avialesookhrana would like to replace their present parachute system, but the controlling factor is money. Both the Vitiaz and the Arbalet systems sell for about \$3000 per unit. Regardless, Avialesookhrana plans to move forward with evaluation jumps with both systems, probably this summer.

The chief trainer in Moscow came to Boise and Alaska in the summer of 1999. His name is Anatoly Perminov and he will be overseeing the evaluations. He likes the Arbalet because it would provide the smoothest transition to a new system.

Russian smokejumpers gave up paracension for the same reasons we did; i.e. safety concerns.

II. DROGUES

The system of drogue deployment was first used extensively by the Russian military for ensuring stable, malfunction free deployment of round parachutes when jumping from high speed aircraft. Avialesookhrana adopted the system because it was in wide production for military use, even though they were using lower speed AN-2 and rear-exit AN-26 aircraft. When Avialesookhrana went to ram-air canopies in the mid-80's, it was simple to just put the new canopy in the old container. The Lesnik-2 canopy was developed specifically for jumping into forested areas, but the rest of the system is of military design.

The sail on the drogue serves mainly to reduce the length of the lines while keeping the drogue canopy at the proper distance from the jumper. Reducing the line length reduces the chances of their tangling or fouling. The sail also adds some stability to the deployed drogue.

I showed a video of our drop tests to personnel from both Russian parachute manufactures and invited their comments. They agreed that the length of the drogue is one of the most critical

factors, and it looked as if ours may be a bit short. Possibly some of the shaking and instability of the canopy may be due to turbulence close to the jumpers body. The Russians have found the most stable drogue shape to be an inverted cone rather than the globular shape we use.

Follow-up on the history relative to the development of drogues, particularly their testing in relation to the Lesnik-2 would be helpful. This information is located at the Scientific Research Institute and outsider access is limited.

III. Parachute Automatic Activation Devices (AAD's)

AAD's are produced at the Second Moscow Instrument Construction Factory in Downtown Moscow. Russian smokejumpers use the PPK-U model on all of their rigs. It has a mechanical timer with a range of 2-5 seconds and a backup barometric mechanism.

I could not arrange a visit to the factory, but did meet with two of its representatives at the Avialesookhrana base in Pushkino who explained how the device worked.

There were no reports of malfunctioning Russian AADs. The smokejumpers consider their PPK-U to be highly reliable and an essential part of their parachute systems.

CONCLUSIONS

There is a large pool of parachute expertise in and around Moscow. The emergence of private companies has energized the industry in recent years. Drogue-deployed systems have been used there for many years and the Russians have a great deal of experience in their use. The Scientific Research Institute doubtless has significant test and development data. I recommend a follow-up visit of BLM parachute specialists possibly in the fall after Avialesookhrana has had a chance to evaluate some of the innovations they are currently working with. They thought they could arrange a visit to the Scientific Research Institute but the process to gain access must be started early. If the planned exchange of Avialesookhrana jumpers occurs this summer possibly they could be asked to review the recent changes we have made to our system. Both the Russian and American smokejumper programs are at something of a crossroads concerning delivery systems. I believe it would be quite beneficial for our programs to maintain contact while we each work toward our future goals.