

FROM: Interagency Smokejumper Delivery System Working Team

TO: Smokejumpers

In December of 2001, the Directors of Fire and Aviation Management for the US Forest Service and the Bureau of Land Management chartered a working team to develop a recommendation for a new interagency smokejumper delivery system. The team has been tasked to develop a delivery system that improves current systems, that is acceptable to both agencies, and that facilitates accomplishment of the smokejumper mission. The team will then make recommendations to the directors of Fire and Aviation for both agencies. This team, the Interagency Smokejumper Delivery System (ISDS) Working Team, is co-chaired by Dan Torrence, USFS Redmond Air Center Manager, and Jim Olson, BLM Fire Management Specialist, Missoula Technology and Development Center.

The ISDS Working Team has developed two questionnaires to gather input from smokejumpers and smokejumper users. The first questionnaire, which is attached, focuses on smokejumper equipment technical issues and is being distributed to interagency smokejumpers. The second questionnaire focuses on field needs and operational use and will be distributed to agency administrators and program managers.

This questionnaire will be important in determining the future of interagency smokejumper equipment development. Please complete it and return it to Jim Olson in the enclosed self-addressed stamped envelope by January 31, 2003. Thank you for assisting with this effort.

Questionnaire contact information:

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Next Generation Smokejumper Parachute System Questionnaire

Which category best describes you?

Check one:

- Smokejumper
- Smokejumper Overhead; if Spotter, indicate number of seasons spotting_____.
- Base Manager
- Other

Please describe your experience level:

Check one:

- Less than 2 years
- 2-5 years
- 6-10 years
- 11 + years

Please describe your parachuting experience:

Please check the type of system with which your experience is associated and indicate the approximate number of live jumps and/or seasons experience for each type:

Canopy Type **Round** (____jumps / ____seasons experience)

- Freefall (____jumps / ____seasons experience)
- Static Line (____jumps / ____seasons experience)
- Drogue (____jumps / ____seasons experience)

Canopy Type **Ram-Air** (____jumps / ____seasons experience)

- Freefall (____jumps / ____seasons experience)
- Static Line (____jumps / ____seasons experience)
- Drogue (____jumps / ____seasons experience)

Section I

Smokejumper Parachute System Performance Requirements

The purpose of this exercise is to assist the committee tasked with development of the next generation smokejumper parachute system. The committee would like input from all respondents on what requirements should be used for developing this parachute system, and the order of importance of these requirements. This input will help the committee develop final requirements that will be used to procure, modify or develop the system that is best able to meet these requirements.

There are three parts to this exercise. The first (Part I) is to **rank** the requirements listed in your order of priority, from most important to least important. This will help the committee to focus on the requirements that are identified as being the most important. The second (Part II) is to **comment** on the preliminary requirements. The third (Part III) is to identify the **performance requirements** you feel are appropriate both in your local response area as well as nationally.

If there are any requirements or operational parameters that you feel are important, but are not listed, please include them, as well as reasons for their inclusion, in the comments and suggestions portion of this survey.

Part I Performance Requirements Ranking

Listed alphabetically below are tentative performance requirements for the next generation parachute system. Please **rank** them in order of importance, with 1 indicating highest importance. **Add** any requirements or **delete** any requirements that you feel should or should not be included. Please also add your **comments**.

1 = most important thru 11 = least important

<u>Rank</u>	<u>Requirements</u>	<u>Comments (can be continued below or at end of questionnaire)</u>
_____	Brakes	_____
_____	Forward Speed	_____
_____	Glide Angle upon Landing	_____
_____	Opening Shock	_____
_____	Rate of Descent	_____
_____	Rigging Complexity	_____
_____	Stability	_____
_____	System Reliability	_____
_____	Turn Rate / Turn Stability	_____
_____	Vertical Separation	_____
_____	Weight	_____
_____	_____	_____
_____	_____	_____

Comments (continued)

Part II

Parachute Systems Requirements

Listed below are performance requirements related to what smokejumpers may feel are important. We would like your input on the following:

Brakes

Brakes must reduce canopy forward speed to 0-2 mph. Braking action should be progressive from the $\frac{1}{4}$ brake position through the full brake position.

Check one:

- Requirement okay as written.
- Delete – Requirement is unnecessary or invalid.
- Requirement needs revision (please describe):

Forward Speed (Toggles up)

Desired Forward Speed (Full flight, no brakes):

Check one:

- 9-11 mph
- 12-14 mph
- 15-17 mph
- 18-20 mph
- 21-23 mph
- 24-26 mph
- 27-29 mph
- 30+, please explain

Comments: _____

Minimum Acceptable Forward Speed (Full flight, no brakes).

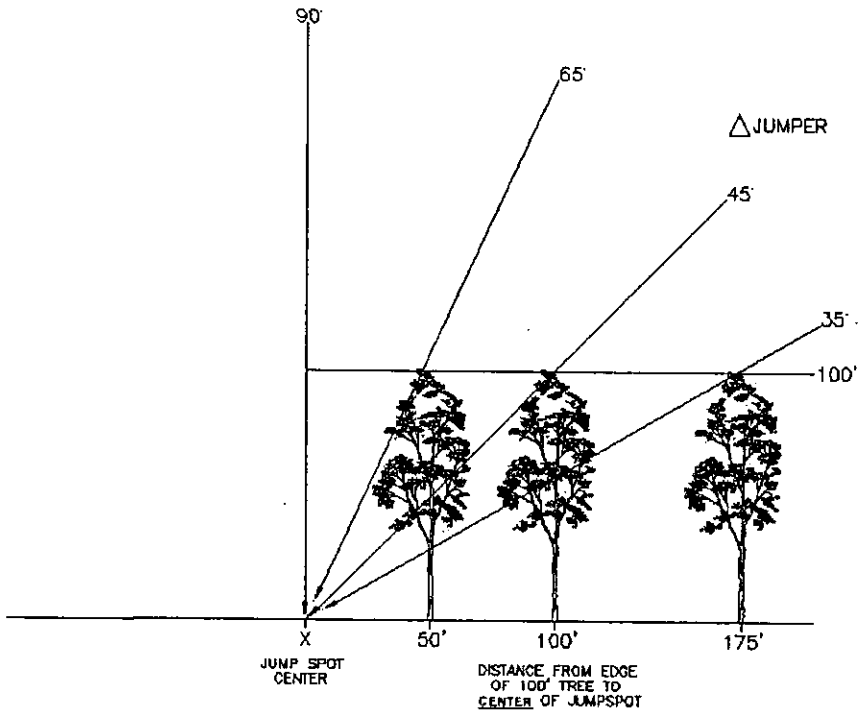
Check one:

- 9-11 mph
- 12-14 mph
- 15-17 mph
- 18-20 mph
- 21-23 mph
- 24-26 mph
- 27-29 mph
- 30 +, please explain

Comments: _____

Glide Angle Upon Landing (no wind)

(Example):



Draw in steepest glide angle and label, or write in: _____ degrees.

Opening Shock

Opening shock will not be greater than the highest opening shock on existing operational Forest Service or BLM parachute systems. Industry experts will be consulted to determine acceptable limits for opening shock on personnel parachutes.

Check one:

- Requirement okay as written.
- Delete – Requirement is unnecessary or invalid.
- Requirement needs revision (please describe):

Rate of Descent

The current rate of descent on the Forest Service FS-14 is approximately 14.5 to 15.0 feet per second (fps) for mid-range weight jumpers on the three sizes of canopies. *Note: Assume 215, 245 and 275 pounds out the door weights for mid-range weights on 3 sizes of canopies.

Rates of descent for **FS-14 medium canopy**, mid-range weight of 245 pounds, are:

Full run	14.6 fps
¼ brakes	14.4 fps
½ brakes	14.2 fps
¾ brakes	14.8 fps
Full brakes	15.8 fps

Rates of descent for **BLM's DC-7 canopy**, mid range weight of 255 pounds, are:

full run	12-16 fps
¼ brakes	11-14 fps
½ brakes	9-12 fps
¾ brakes	10-14 fps
full brakes	16-24 fps
stall	20-26 fps
landing flare	1-2 fps

The above rates of descent vary with temperature, wind, elevation and jumper weights.
Note: 17.5 fps was previously identified as the MAXIMUM rate of descent upon landing.

Indicate what you feel is the:

Desirable rate of descent immediately prior to landing: _____ fps.

Acceptable rate of descent immediately prior to landing: _____ fps.

Rigging Complexity

Must be highly resistant to rigger induced malfunctions. Must not require complex rigging precision to ensure reliability. Must not be significantly more complex to rig than existing Forest Service or BLM systems.

Check one:

- Requirement okay as written.
 - Delete – Requirement is unnecessary or invalid.
 - Requirement needs revision (please describe):
-
-

Stability (steady state, toggles full-up, ½ brakes, and full brakes)

FS canopy: 2-3 degrees stability
BLM canopy: 2 degrees stability, +/- 1 degree.

In steady state toggles setting, the canopy shall provide +/- 5 degrees stability with +/- 2 degrees as a desirable target.

Check one:

- Requirement okay as written.
- Delete – Requirement is unnecessary or invalid.
- Requirement needs revision (please describe):

System Reliability

What does **system reliability** mean to you, and how would you quantify that? What factors (reserve activation, malfunction rates, serious injury and fatalities, etc.) should be considered?

Turn Rate and Turn Stability

FS canopy: FS-14 360-degree turn, full arm extension 4 seconds +/- 1 second

BLM canopy: 4 seconds for first 360-degree turn

3 seconds for second 360

1.5 for third and successive 360's

For the entire range of jumper weights turn stability must be equal to or better than existing canopy systems in use by the smokejumper program. The canopy shall provide flat turns and rapid oscillation recovery.

Indicate what you feel is the:

Desirable Turn Rate: _____

Acceptable Turn Rate _____

Vertical Separation

Vertical separation refers to altitude separation between jumpers who are in the air at the same time.

How important do you consider Vertical Separation to be?

Check one:

- Very Important
- Important
- Not Important

Weight

Weights of current systems are:

FS system (harness, main and reserve): 35.3 pounds

BLM system (harness, main and reserve): 38.5 pounds

Indicate what you feel is a:

Desirable weight: _____

Acceptable weight: _____

Additional Performance Requirements (if Needed):

Comments/Suggestions regarding Performance Requirements:

Section II

Part III

Operating Environment for Smokejumping

Listed below are components of the operating environment for smokejumper operations. Please respond to each component as to whether the requirement is okay as written, should be deleted, or needs revision. Consider each component from both your local area of operation as well as other smokejumper operations in other parts of the country that you have been involved with.

Range of Jumper Weights: 190 – 325 pounds out the door weight

Check one:

- Requirement okay as written.
- Delete – Requirement is unnecessary or invalid.
- Requirement needs revision (please describe):

Altitude / Temperature: Sea Level to 10,000 MSL, 85° F or density altitude equivalent.

Check one:

- Requirement okay as written.
- Delete – Requirement is unnecessary or invalid.
- Requirement needs revision (please describe):

Air Turbulence: Light to Severe

Check one:

- Requirement okay as written.
- Delete – Requirement is unnecessary or invalid.
- Requirement needs revision (please describe):

Jumpspot Terrain: flat and open to rough and small (steep, rocky, downfall, timber)

Check one:

- Requirement okay as written.
- Delete – Requirement is unnecessary or invalid.
- Requirement needs revision (please describe):

Wind:

Canopy should be able to be jumped in wind speeds of:

Check one:

- 10 mph
- 20 mph
- 30 mph
- 40 mph
- other _____

Comments: _____

Maximum Stick Size

Check one:

- 1
- 2
- 3
- 4
- 5
- 6
- more than 6 _____

Comments: _____

Additional Operating Environment Requirements, if needed:

Additional comments on any aspect in this questionnaire:

