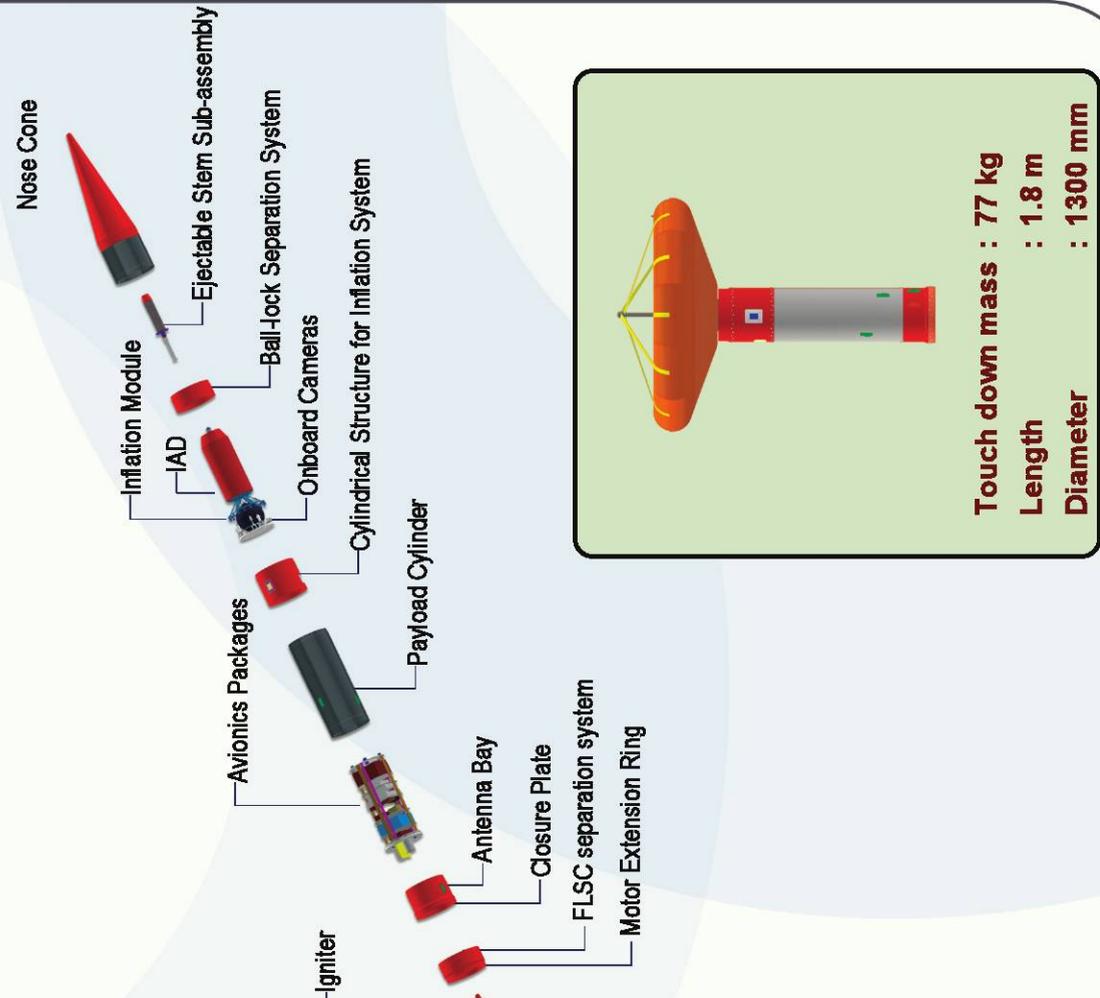
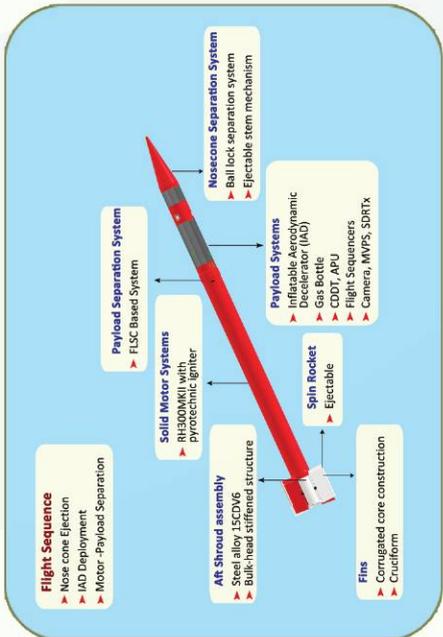


# EXPLODED VIEW OF RH300MKII-F22 IAD VEHICLE



**Touch down mass : 77 kg**  
**Length : 1.8 m**  
**Diameter : 1300 mm**

**Lift off mass : 552 kg**  
**Length : 6.3 m**  
**Diameter : 305 mm**



## RH300MKII-F22 IAD MISSION from TERLS



ADVANCED TECHNOLOGY VEHICLES AND SOUNDING ROCKETS PROJECT  
 ADVANCED TECHNOLOGY AND SYSTEMS PROGRAMME  
 VIKRAM SARABHAI SPACE CENTRE, INDIAN SPACE RESEARCH ORGANISATION  
 TRIVANDRUM-695022

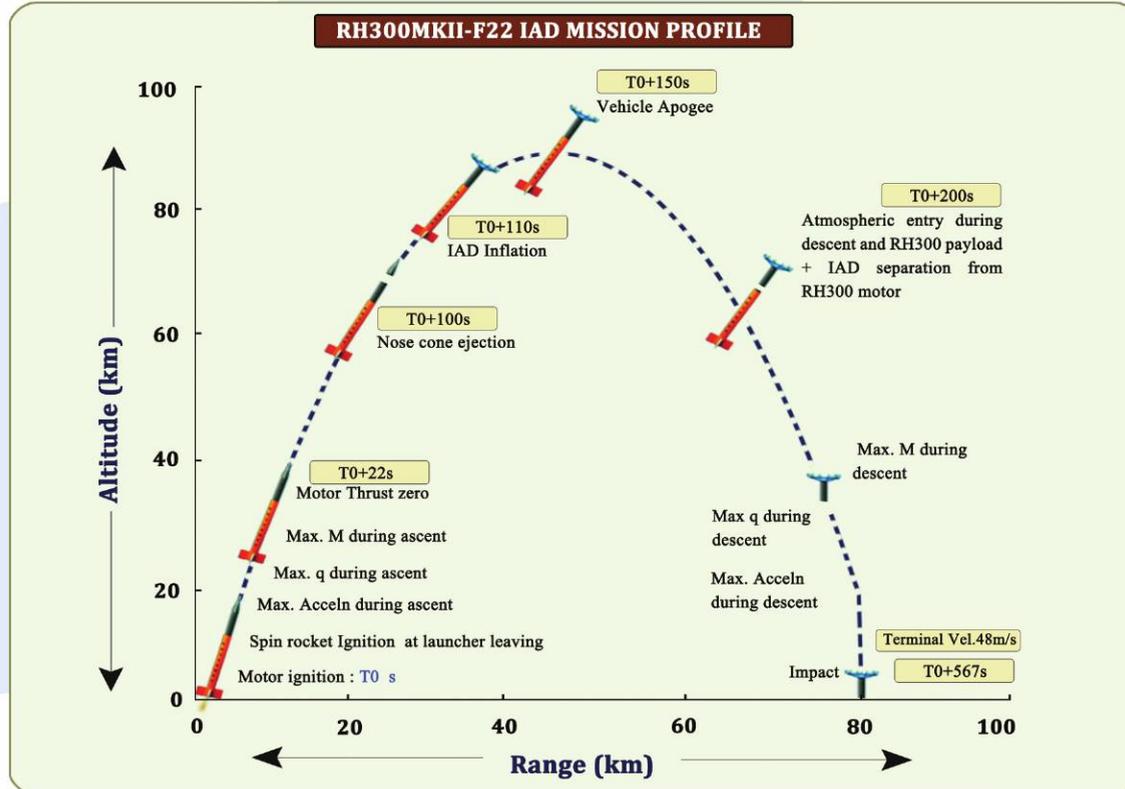
## RH300MKII-F22 / IAD Mission

Inflatable Aerodynamic Decelerator (IAD) is being developed for aerodynamically decelerating an object descending through the atmosphere. The main objective of this mission is to demonstrate IAD technology for application in spent stage recovery and planetary entry.

IAD is kept stowed in the nosecone of the single stage Rohini-300 (RH300MKII) Sounding Rocket. At 100 seconds after take-off, the nosecone is separated, followed by the inflation of IAD at 110 s, using compressed Nitrogen stored in a gas bottle.

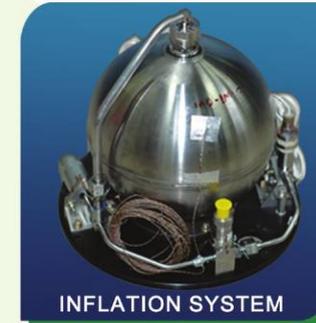
The payload is separated from the motor at 200 seconds after take-off, by using a FLSC separation system. The inflated IAD and the payload descend through the atmosphere, which will be tracked by 3 radars.

Sl no.	Flight Sequence	Time (s)	Altitude (km)	Range (km)
1	Motor ignition	00.00	--	--
2	Motor Burn out	22.00	15.47	3.68
3	Nose cone Separation	100.0	82.31	27.96
4	IAD deployment	110.0	86.57	31.06
5	Peak Altitude	150.0	94.06	43.46
6	Motor Separation	200.0	82.00	58.97
7	Peak Mach (Descent)	243.0	52.87	72.15
8	Peak Q	273.0	30.37	78.76
9	Settling at 180 deg	293.0	23.49	80.05
10	Touchdown	567.0	--	80.42



## Inflatable Aerodynamic Decelerator (IAD)

IAD is an inflatable structure, made out of Kevlar fabric, coated with Polychloroprene. Since it is made of fabric, IAD can be packed into a small volume of 15 litres, available in the nosecone of the RH300. When inflated, IAD takes the shape of three concentric toroids with an overall diameter of 1.3 m, as shown in the figure. This generates high aerodynamic drag and stability.



For inflating IAD, compressed Nitrogen gas stored in a gas bottle at 62 bar pressure is admitted to the packed IAD using a pyro valve. After inflation, the IAD will have 236 litres of internal volume and 1.1 bar pressure. After the IAD falls into the sea, it is deflated by firing a deflation pyro valve.

## Instrumentation

There are 44 channels of measurements, which includes various events, temperatures, pressures, acoustic levels, acceleration, spin rate, etc.

There are two on-board video cameras, which will transmit live videos of the IAD during flight at the rate of 15 fps. The on-board sequencer gives 4 command outputs which includes nosecone separation, IAD inflation, motor separation and IAD deflation. There are three telemetry links to stream the vehicle parameters and on-board video.

## New elements being tested in the mission

Apart from the main objective, this mission is a test bed for nine new elements developed in VSSC & LPSC. They are the following.

- Inflatable Aerodynamic Decelerator & Inflation system
- Micro Video Imaging System
- Software Defined Radio Telemetry-Dual Transmitter (SDRT-DTx)
- Acoustics Processing Unit with mini-IMAS (Indigenous MEMS Acoustic Sensors)
- New software for wind compensation for TERLS
- Modified nosecone separation system
- Modified FLSC separation system for RH300
- Improved 1s delay detonator for spin rocket separation
- Thermally conducting and electrically insulating potting compound ATCAP-75-7030