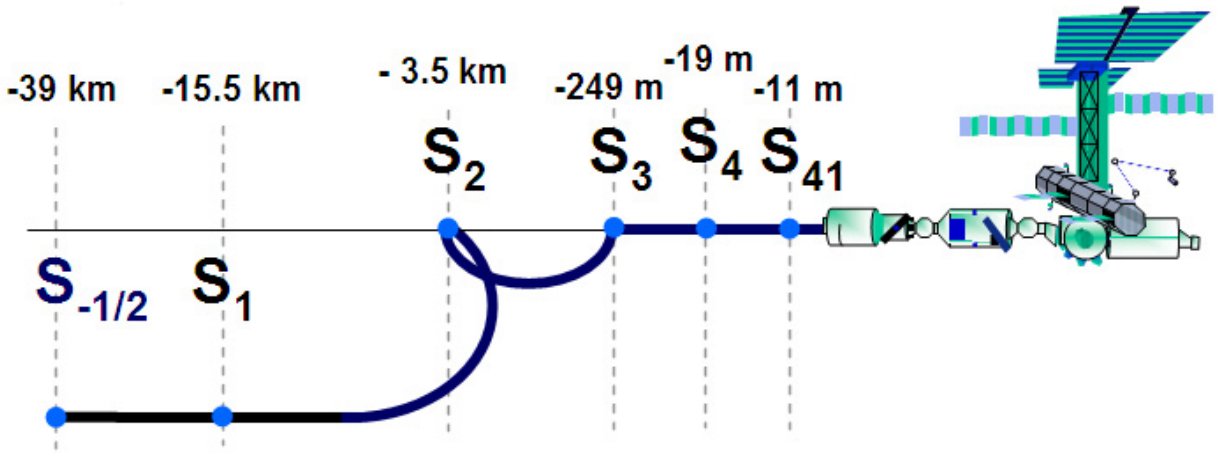
Rendezvous and Docking (3 April 2008)



Rendezvous and Docking Events

On 3 April 2008, Jules Verne ATV approaches ISS for the first docking attempt.

At point S3, at a distance of 250 m, the ATV computers use videometer and telegoniometer data for final approach and docking manoeuvres. The approach of ATV to the ISS slows down to 7cm/s. As Jules Verne gets closer to its objective, ATV Control Centre flight controllers direct ATV in a step-by-step predefined approach. The ISS crew monitors the approach using the Simvol screen inside Zvezda. If ATV moves out of predefined corridor, the crew initiates a CAM manoeuvre.

The approach requires authorisation from Russian Mission Control Centre in Moscow (MCC-M) because the ATV docks with the Russian Zvezda segment of ISS. An overall coordination with Mission Control Centre in Houston (MCC-H) is also required as they are responsible for the entire ISS. For each of these steps, ATV performs automated manoeuvres.

ATV Commands

HOLD – Generally reaction to a minor problem that can be solved in acceptable time. Hold will only be taken into account by ATV between S3 and S4. ATV-CC sends RESUME command to continue.
RETREAT – Can be commanded by ATV-CC and ISS crew between S3 and docking. ATV will always retreat to the previous Station Keeping point.
ESCAPE – Can be triggered autonomously by ATV, by ATV-CC or by ISS crew. Escape manoeuvre is a 4 m/s retrograde manoeuvre.
Collision Avoidance Manoeuvre (CAM) – Can be triggered autonomously on board ATV, by ATV-CC (ABORT command), or by the ISS crew (ABORT command, so-called 'red-button cam').

Rendezvous and Docking Schedule

Distance to ISS	Critical events
***S-1/2** (39 km behind and 5 km below)	ATV in waiting mode for final go ahead.
S1 (15.5 km behind and 5 km below) **S1 planned GO** 11:17 GMT/**13:17 CEST**	Homing starts.
S2 (3.5 km behind and 100 m above) **S2 arrival** 12:04 GMT/**14:04 CEST** **S2 depart** 12:36 GMT/**14:36 CEST**	External lights activated. Russian Kurs radar-based system activated - ISS crew can begin using this data. Closing begins using relative GPS.
500 m	Video system turned on for ISS crew to view ATV on Simvol screen.
S3 (249 m behind) **S3 arrival** 13:16 GMT/**15:16 CEST** **S3 depart** 13:52 GMT/**15:52 CEST**	Videometer and telegoniometer are activated. Go for Final Approach 1. Speed of ATV slows down from about 40 cm per second to 7 cm per second.
S4 (19 m behind) **S4 arrival** 14:13 GMT/**16:13 CEST** **S4 depart** 14:29 GMT/**16:29 CEST**	Close range videometer navigation is used. Pointing manoeuvre towards the Docking Port axis. Go for Final Approach 2.
S41 (11 m behind) **S41 arrival** 14:31 GMT/**16:31 CEST** **S41 depart** 14:37 GMT/**16:37 CEST**	Go to continue the Final Approach 2.
Capture 14:40 GMT/**16:40 CEST**	**ATV docks to Zvezda.**
Hooks closed 15:14 GMT/**17:14 CEST**	**ATV permanently connected to Zvezda.**