
FAST
FORWARD

Preliminary Comparison of Space Express Project and SpaceWorks Commercial IAC Paper

Derek Webber

Amaresh Kollipara

- **This effort was focused on comparing the results and assumptions of the Space Express Project (SEP) and the SpaceWorks Commercial (SWC) IAC paper**

- **The comparison was done across a few dimensions:**
  - **Markets**
  - **Revenue Estimates**
  - **Cost Estimates**
  - **Technology Assumptions**

- **The main takeaways are:**
  - **The target markets were limited in the SWC Paper, in comparison to SEP**
  - **The SEP assumption around total number of vehicles is more than 10x larger, as this study considers many more markets**
  - **For cargo point to point, both studies estimated that the market could sustain approximately 30-35 vehicles**
  - **Both business cases are difficult to close**
  - **SEP model requires numerous markets and 450 vehicles**
  - **The estimated technology development cost for the SEP is 5x larger than SWC's estimate**

Comparison of Markets, Revenue Assumptions, and Vehicle Number

PAYLOAD	SUB-CATEGORY	SPACE EXPRESS ASSUMPTIONS	TOTAL SPACE EXPRESS	FAST FORWARD ASSUMPTIONS	TOTAL FAST FORWARD
CARGO	COMMERCIAL CARGO	Source CSTS Study considering "int'l freight market" ranging from 1 mill pounds/yr to 65 mill pounds/yr. at $62 / lb(2007). Assumed price increased to $84/lb for P tP.	30 Veh	Source Fedex data. 460 Kg per flight at 30 Flights per day. Assumed price $800/Kg (up from $476 per 0.6Kg box).	35 Veh
	NASA CARGO - EXPT & ASTROS	Not specified	2.5 Veh	None	None
HUMAN	USG/Military	Not specified	40 Veh	None	None
	NASA ASTRO Trg Plus Space Tourism	500,000 if price < $50,000	2.5 Veh	None	None
	Private High Speed "Corp Jet"	Market for 300-400 Supersonic Bus Jets (Source: Aerian and Supersonic Aerospace Int'l)	325 Veh	None	None
	Commercial Pass.	Concorde 2.5 Mill Pass in 27 yrs at $11,000 (2003) ticket price thus 100,000 /yr ie 1000 flights/yr. Assume 6000 pass/yr at $25,000/ticket.	50 Veh	None	None
TOTAL			450 Veh		35 Veh

Comparison of Cost and Technology Assumptions

Charateristics	Fast Forward Assumptions	Space Express Assumptions (Cruiser Flight Profile)
Estimated Payload Mass	1000 kg	3000 kg
Payload Density	45 kg/m^3	
Typical Flight Times	<2 hours	2 hours
Maximum Flight Range	12,000 km	
Approximate Flight Speed	>4700 km/h	4800 km/h
Turnaround Time	<20 hours	
Total takeoff weight	154,740 kg	125,850 kg
Development Cost ($ millions)	$4,460.00	$19,994.00
Acquisiton Cost per vehicle ($ millions)	$323.00	$169.08
Operating Cost per vehcile per year ($ millions)	$84.08	$91.91

Operating cost per vehicle per year is estimated for Fast Forward study. Development Cost for Fast Forward Study does not include some infrastructure and facility costs.