Equity Research

August 7, 2021

BSE Sensex: 54278

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Initiating coverage

Defence

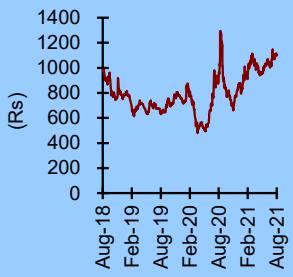
Target price: Rs2,618

Shareholding pattern

	Dec '20	Mar '21	Jun '21
Promoters	75.2	75.2	75.2
Institutional investors	20.0	21.2	21.5
MFs and others	3.7	4.5	4.7
Banks / FIs	1.1	1.0	1.0
Insurance Cos.	14.9	14.9	14.9
FIIs	0.3	0.8	1.0
Others	4.8	3.6	3.3

Source: BSE

Price chart



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INDIA

Hindustan Aeronautics

BUY

Orberbook driven growth visibility to drive rerating **Rs1,080**

Hindustan Aeronautics' (HAL) order inflows have meaningfully improved over the past year. Single biggest indigenous defence order worth Rs480bn was awarded for delivery of 83 Mk 1A light combat aircraft (LCAs). HAL's capability as a defence prime and a OEM for fighter aircraft/helicopters/trainers was always undisputed. Visibility on order inflow and a corresponding visibility on growth were the stunting factors. HAL's revenue was ~41% of the Indian capital budget for air platforms. Near stagnation of defence capital spending was adding to the uncertainty; exigencies and thrust towards indigenisation have allowed the same to change. We see HAL's potential book to bill at 5x at FY22E-end (Table 1) and will lead to a significant growth opportunity FY23E onwards. We initiate coverage on the stock with BUY rating and target price of Rs2,618/share(~140% upside).

- **The possible salience in defence budget with key platforms accruing to HAL.** HAL has been awarded with Rs480bn contract for 73 Tejas MK1A and 10 Tejas Mk1 recently. Increase in aircraft budget and increased headroom left post the induction of last batch of Su-30 MKIs leave potential order capture for HAL. Management has highlighted the possibility of i) Rs20bn of order for 15 LCH, ii) Rs70bn of HTT-40 orders, iii) Rs160bn of light utility helicopter (LUH) orders and iii) 12 Su-30 imported from Russia and contract manufactured in India worth Rs100bn. This will adequately offset the previous order of 272 plans worth Rs63bn of Sukhoi-30 MKI execution p.a coming to an end. Tejas Mk 1A order will also ensure adequate utilisation of Nasik facility as Su-30 MKI execution ends.
- **The future potential orders which may keep book to bill elevated for years to come.** The future development projects including Tejas Mk 2 (first prototype be rolled out in June 21), Advanced Multirole Combat aircraft (AMCA), unmanned systems controlled from mother aircraft i.e Combat Air Teaming system (CATS), unveiled in the recent Aero Show 2021 and Indian Multirole Helicopters (IMRH) will add to the orderbook. **HAL sees meaningful opportunity in helicopters**. While *RoH* forms a major part of the helicopter division orderbook (apart from **ALH** manufacturing order), HAL is going to be a big beneficiary of i) consolidation of attack helicopters in the portfolio of Indian Army/Airforce via LCH and ii) consolidation of transport and reconnaissance i.e multirole helicopters with IA/IAF via IMRH and ALH (non-weaponised version of LCH).
- **Cost optimisation and better growth may lead to higher margins.** We expect topline growth to pick up FY23 onwards and employee costs, which reduced to ~19-20% of revenue now from ~24-25%, 2-3 years back, is adding to visibility of higher margins as revenue growth picks up.
- **The only possible story in fighter aircraft OEM in India.** We believe HAL will be the only defence prime with any meaningful scale in the aerospace business in India. There is little scope of any meaningful competition till the time the current and the expected orderbook gets executed over the next 5-7 years. The key risk, as per us, to HAL's business model is increased acceptance of unmanned aerial vehicles or UAVs – if recent examples of Armenia Azerbaijan war or attack on Saudi Arabian oil-fields by *Houdi* rebels are to be cited.

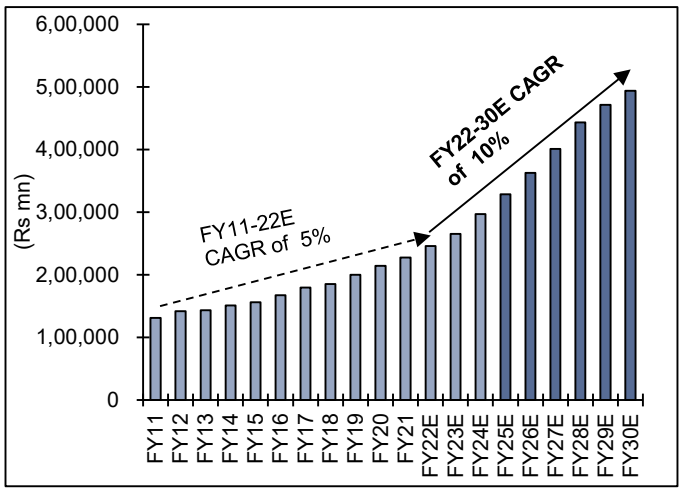
Market Cap	Rs361bn/US$4.9bn
Reuters/Bloomberg	HIAE.BO / HNAL IN
Shares Outstanding (mn)	334.4
52-week Range (Rs)	1294/661
Free Float (%)	24.8
FII (%)	1.0
Daily Volume (US$'000)	5,872
Absolute Return 3m (%)	12.7
Absolute Return 12m (%)	15.2
Sensex Return 3m (%)	11.6
Sensex Return 12m (%)	44.3

Year to Mar	FY20	FY21	FY22E	FY23E
Revenue (Rs mn)	214,382	227,545	248,262	267,747
EBITDA(Rs mn)	48,961	53,494	55,922	63,800
Net Income (Rs mn)	28,730	32,391	34,639	39,906
EPS (Rs)	85.9	96.9	103.6	119.3
P/E (x)	12.9	11.5	10.7	9.3
CEPS (Rs)	115.8	132.1	139.8	158.3
EV/E (x)	8.8	5.7	5.6	4.3
Dividend Yield	3.0	2.7	3.0	3.3
RoCE (%)	19.8	26.2	24.0	24.1
RoE (%)	21.7	21.0	19.5	19.4

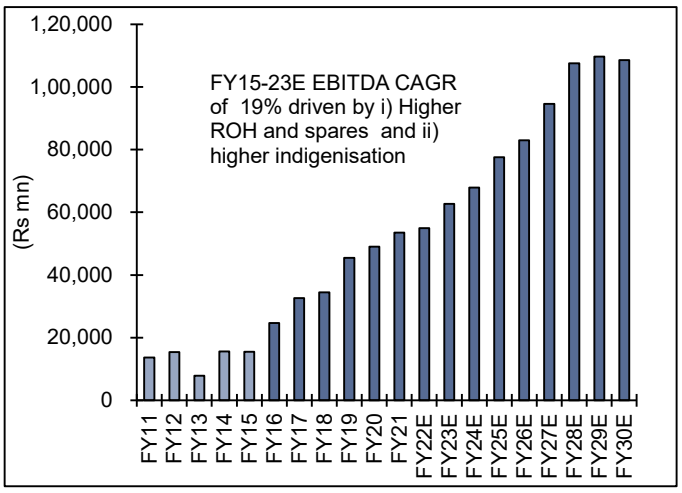
TABLE OF CONTENT

HAL's story in charts

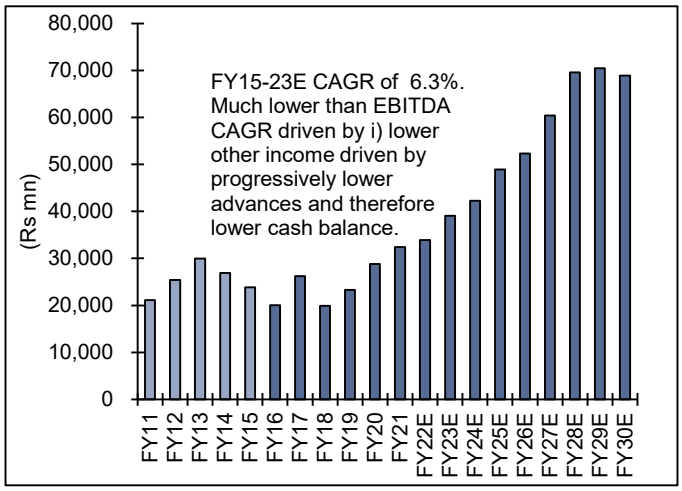
Revenue trajectory (past and present)



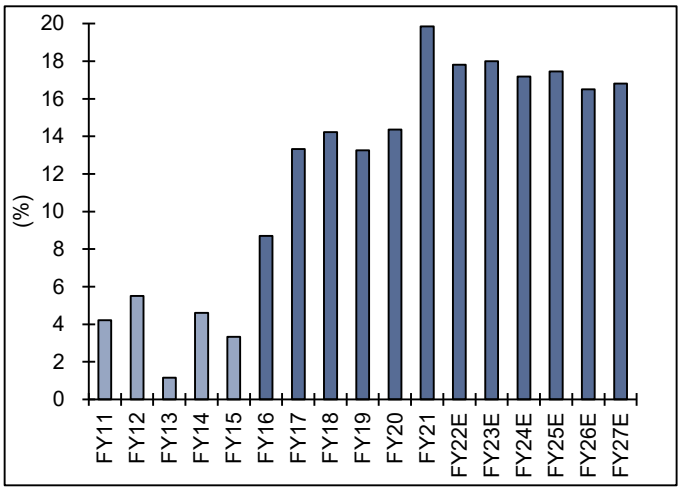
EBITDA and margin trajectory (past and present)



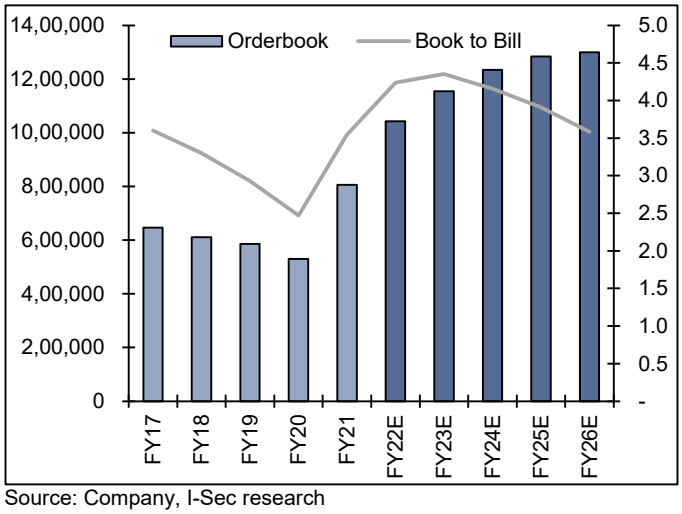
PAT trajectory



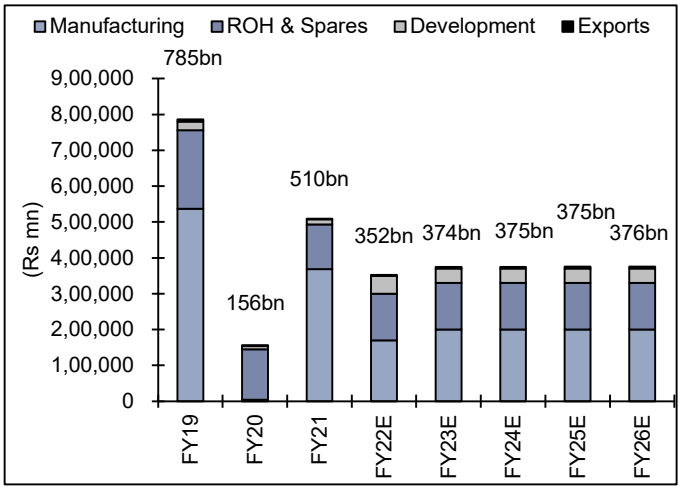
RoIC trajectory – 18-20% achievable



Book to bill comfortably above 3.5x even in FY26E



Order inflow – healthy and steady



Source: Company, I-Sec research

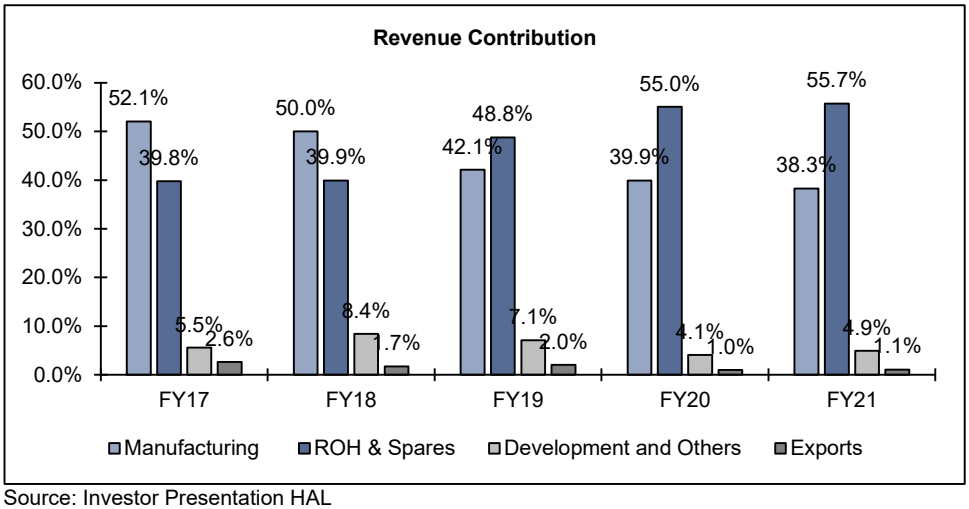
Company Profile

HAL, a defence public sector undertaking (DPSU), was originally incorporated in 1940 as Hindustan Aircrafts Limited with an aim to produce aircraft in India. In 1951, the company was placed under the administrative control of the Ministry of Defence, Government of India. Further, in 1964, the company got amalgamated with Aeronautic India Limited and after the amalgamation the company was named as 'Hindustan Aeronautics Limited'.

The company is engaged in designing and development, manufacturing, maintenance, repair and overhaul of aircraft, helicopters, engines, and other related systems like avionics, instruments and accessories. HAL's primary consumers are Indian Air Force, Indian Army, Indian Navy and Indian Coast Guard. The company has four production complexes - Bangalore complex, MiG complex (located in Nashik and Koraput, Odisha), helicopter complex (located in Bangalore and Barrackpore, West Bengal) and accessories complex (located in Kanpur, Lucknow, Hyderabad, Kasargod, Kerala and Korwa, Uttar Pradesh), along with a design complex (R&D centres jointly located with related manufacturing divisions). The GoI remains HAL's largest shareholder with shareholding of 75.15%.

The primary customers of HAL are Indian Air Force, Indian Army, Indian Navy and Indian Coast Guard. Ministry of Defence (MoD) contributes more than 90% of the revenue and exports contribution remained low at ~1.1% in FY21. Since majority of orders are from MoD, the collection efficiency remains a point of concern; however, the company was able to collect a record Rs345bn (including backlog of ~Rs110bn) in FY21 as against ~Rs180bn collected in the previous year. Current orderbook of the company stands at Rs806bn, which provides healthy revenue visibility for near to medium term.

Chart 1: Activity-wise revenue contribution



Source: Investor Presentation HAL

Tejas Mk1A – Single largest indigenous contract (Rs480bn) awarded till date

Key discussion points of the order

What is the total contract value and how is it broken into components? **Total contract value is Rs457bn.** Total contract value for planes is Rs365bn. This includes Rs225.9bn for 73 fighter aircraft and Rs28bn for 10 trainer aircraft. Ground handling and ground support equipment package is Rs110bn. There is an exchange rate variation (ERV) clause of Rs22.5bn and taxes and duties of Rs70bn which push up the contract value to Rs 457bn. On top of that, there are other infrastructures to be set up at IAF airbases (Rs12bn) and design and development cost for DRDO (~Rs 10bn).

What is the cost per aircraft? It starts at Rs2.8bn in the beginning year and escalates to Rs3.4bn in the sixth and final year of delivery. That takes the average cost of production to Rs3.1bn. Indigenisation/localisation levels will increase from 50% in the first year to 65% in the fourth/fifth year which will allow cost savings of Rs200mn towards the end of the contract.

Additional elements in Tejas Mk 1A compared to FOC LCA. Four new systems have been added: AESA radar, in-flight refueling and air-to-air refueling capability, integrated electro optics Electronic Warfare (EW) sensor, integration of BVR missiles like Astra and Derby. There are additional 44 changes made in the aircraft to improve maintainability and operational requirements. These are additional design elements being introduced by HAL with support from ADA.

Build rate and liquidated damages. First and second year build rate will be lower and will pick up to 16 Tejas Mk 1a from third year. Nature of liquidated damages has been similar to previous contracts capped at 5%, with 0.5% for a week subject to a maximum of 5%.

On liquidity. Budget allocation is separately available for the new contract that is at 15% on consigning of contract and 10% in case you release major POs before March 31.

Execution of Tejas Mk 1 and Tejas Mk 1A. Present order of final operational clearance for Tejas Mk 1 will be complete by FY24 before execution of Tejas Mk 1A starts. March 2024 is the targeted date for the rollout of the first Tejas Mk1A LCA.

Why taxes are at 18% of contract value while GST rate for aircraft is 5%? Basic customs duty on imported components has been kept separate. The BCD has been kept outside the cost of the aircraft and will be reimbursed at actuals. Also, a significant part of the contract is ground support equipment and ground handling equipment. While aircraft attract 5% GST, spares and other items can attract 18% GST.

Export opportunity – how does it compare to JF-17 or FA-40/FA-50? Both Chinese and Korean offerings are cheaper than Tejas Mk 1A (priced at US$42mn). Serviceability and maintenance of fleets allow better competition.

The order inflow visibility makes for a compelling revenue and profitability story for the next few years

The current o/s orderbook is ~Rs 806bn which includes 1) Rs457bn for MK1/MK1A, i) Rs49bn of existing LCH order, ii) Rs100bn order for 36 ALH, iii) Rs75bn MRO order and iv) Rs55bn for IJT and others. Key orders where accrual is visible in the near future post the addition of Rs457bn order for 83 Mk1/Mk1A LCAs are i) order worth Rs30bn for 15 LCH, ii) Rs70bn of order for HTT-40 and iii) 12 Su-30 imported from Russia and contract manufactured in India. Many fixed wing and rotary wing platforms have been under development, testing, certification for ages now. They meet requirements of the user given the current strategic requirements adhering to the budget constraints. This takes the projected orderbook to FY22E-end at ~Rs1,000bn at ~4x book to bill. Given the scale of the company (largest defence OEM in India by a margin), this is very impressive.

Table 1: Orderbook and projected addition

				Projected Addition	
(Rs bn)	**FY19**	**FY20**	**FY21**	**FY22**	**FY23**
Manufacturing	453	372	655	170	200
ROH & Spares	121	145	145	130	130
Development	10	11	14	50	40
Exports	2	2	1	2	4
Total			**806**	**352**	**374**

Source: Company data, I-Sec research

Table 2: Additional order visibility after receiving Tejas Mk 1A order

Main orders expected (FY22/23E)	**Value (Rs bn)**
15 LCH	30
12 Su- 30	100
70 HTT 40	70
ROH	90
Spares	40
Development cost of LCA Mk 2	25
LUH/AMCA design and developmental sale	20
Potential engine development orders	
AL 31SP for Su 30	60
RD 33 for Mig 29	25
Potential order (Beyond FY23E but before FY30E)	
Naval LUH	210
187 LUH orders (Replacement of Cheetah and Chetak Fleet)	165
197 Ka 226 T in joint collaboration with Russia	150*
147 LCH (additional)	300
180 LCA Mk 2 (Replacement of Mig 29)	11,000
300+ IMRH	7500

Source: Company data, I-Sec research

We believe HAL should be analysed as a rotary wings OEM. This is where we also expect to see significant export potential, meaningful domestic order visibility in near to medium term.

There are ongoing discussions for Super Sukhoi – upgraded version of existing Su- 30 MKI

IAF operates around 272 Su-30MKI. India is currently the largest operator of export-oriented Su-30 multirole fighters in the world. Indian Su-30 MKI consists of advanced Israeli avionics and EW systems. Christened as Super Sukhoi, the Su 30 SM is a modernised 4+ generation version of original Su-30 fighter aircraft. With high maneuverability, the upgrade will consist of equipping credible BVR engagement options. The Su-30 SM is expected to be standardised with 4++ generation Su-35

fighters by upgrading its onboard equipment and armament. This will bring another round of opportunity for HAL.

Rotary wing developments - HAL has ensured basic needs are met with indigenous solutions

The case study of Cheetah, Chetal highlights the invaluable role HAL plays in a budget-constrained environment. It has been observed that by the time a platform gets decommissioned from the IAF inventory, IAF invariably turns out to be the last user of those platforms across the globe. We have seen the same with Mig 27, Bahadur, which were finally decommissioned in CY19 after serving for three decades. We would see a similar record when the Jaguar sepecat of UK decommissions somewhere in early 2020s – the same was inducted in 1979. As one goes through the Allouettes case study, one finds a trend – the imperativeness of HAL to ensure safety and operability of these platforms as IAF would ideally like to stretch out their lives to the maximum extent possible. In rotary wings though, we not only see a support from HAL to enable the stretch out, but also creating a capability to fill in the requirement gaps progressively in a cost-effective manner.

A case study of HAL's invaluable contribution towards cost effective usable rotary wings

Some of the existing platforms like Cheetah and Chetal are extremely critical to ensure high altitude, SAR operations and to provide connectivity to Indian troops at the border frontiers of Leh Ladakh and **Siachen** Glacier. A C17 Globemaster (transport aircraft) can carry provisions till *Daulat Beg Oldi* – the operational air base at Ladakh. However, to make the last mile delivery or evacuation possible in an extremely rarefied atmosphere, Indian troops are still dependent on the *French Allouettes* **inducted by IAF in late 1970s**. HAL license built version was known as Cheetah, with MTOW (weight) of less than 2te. This was upgraded in 2005/06 into Cheetal, with improved **Turbomeca engine** of a French company Safran – to improve speed and range.

Indian Airforce is perhaps one of the last air force globally to use these 60-70year old machines. This highlights the critical role HAL plays in operational maintenance and upkeep of these platforms, as France itself has discontinued production and support of these platforms.

Current rotary wing orderbook of ~Rs100bn can only grow, consolidate as it's a near certainty now that the Cheetah and Chetal will be phased out progressively. There are requirements of ~387 LUH (light utility helicopter) being procured. 200 in the form of Ka 226 T, which HAL will be jointly manufacturing with Russia, a JV has been formed and named IRH. 187 LUH will be procured from HAL. There has not been any progress in awarding the Ka 226T order to IRH, while there has been definite progress towards HAL receiving the order of 187 LUH. HAL also plans to test the civilian market with LUH platforms.

Chart 2: Rotary platforms manufactured by HAL will be backbone of IAF maneuvers for long

Source: Company data, I-Sec research

Indian Navy continues to look for alternate options over inducting Naval ALH as replacement of ageing Chetak

The opportunity for LUH for HAL could have been bigger, as there is an impending need for IN to replace the ageing fleet of Chetak helicopters. IN has been pushing for Rs210bn of Make in India contract for Naval Utility Helicopters (NUH). IN is already operating ALH in a utility role but requires 111 helicopters for deployment onboard ships to carry out multiple roles, including surveillance and ferrying supplies. The requirement (as per published sources) is urgent and a specialised chopper is needed that can quickly be deployed and retrieved and can be stored in a space constrained hangar onboard all vessels.

IN has taken two MQ9 maritime surveillance drones (unarmed version of predator drones) to keep an eye on traffic in the Indian Ocean Region. Along with MQ9, IN may also look to lease out NUH variants from the market to make up for the current shortfall.

Future potential orders that may keep book to bill elevated for years to come

The future development projects including Advanced Multirole Combat aircraft (AMCA) and Indian Multirole Helicopters (IMRH) will add to the development projects orderbook. HAL sees meaningful opportunity in helicopters. While *RoH* forms a major part of the helicopter division orderbook (apart from **ALH** manufacturing order), HAL is going to be a big beneficiary of i) consolidation of attack helicopters in the portfolio of Indian Army/Airforce via LCH and ii) consolidation of transport and reconnaissance i.e multirole helicopters with IA/IAF via IMRH and ALH (non-weaponised version of LCH). We discuss one such order below – Tejas LCA Mk 2, which is scheduled to replace Jaguar, Mirage and Mig 29 squadrons). The first prototype will be ready for testing in June 22. The following excerpt is from the interview of **project director Mr. Madhusudan Rao** in the recently concluded *Aero India 2021*. It's clear now that Tejas Mk1A and Tejas Mk 2 will be mainstay of Indian air force for some time to come.

LCA Mk 2's basic inspiration was to replace Mirage, Jaguar, Mig 29. LCA Mk 2 meets all the three aircraft performances or supercedes.

Some of the specific parts metal cutting has started and its ahead of schedule. Final stage of cockpit configuration, masking studies completed for antennas, procurement of RM and availability has been completed, critical design review initiated. **The programme is undergoing finalisation of equipment SoP for the first flight, completion of detailed design and moving towards rollout in August 2022.**

Design elements. Aerodynamic design has been improved, improved the drag, improved the acceleration time with improved sensors like IRST, MAWS, and advanced EW suite with RWR, CMDS. The design has been configured with IRST on the right side of the dome and fixed probe.

Unlike Tejas LCA, there will be canards (small wings) added in front of main wings helping maneuverability. The engine will be more powerful and heavier GE-414.

Weapons. Western, Russian and indigenous weapons integrated. Standoff weapons – Spice 1000, SCALP. Air-to-air missiles like Astra, anti-radiation missiles like Rudram 1,2,3, air to surface missiles like Brahmos NG which will be integrated. Also, Tejas Mk 2 will integrate various indigenous bombs. All standoff weapons will be able to target 570km range. Hard point can carry 1,800kg of ammunitions.

Nose cone or radome will be 270mm smaller size compared to Mk1/Mk 1A, yet can accommodate bigger AESA radar with main antenna incorporating 992 arrays of TR modules instead of 780 arrays of TR modules found in Uttam radar found in Tejas Mk 1A. The radome dimensions have gone down to accomodate IRST.

Higher TR module in radar in a smaller configuration would demand additional power and cooling requirements - which LCA Mk 1 and 1A may find difficult to provide. As far as Radar cross section (RCS) reduction is concerned, LCA Mk 2 is not designed as stealth aircraft. Radiation absorbing material and paints on edge allow for better stealth and radar footprint as compared to Tejas Mk 1A.

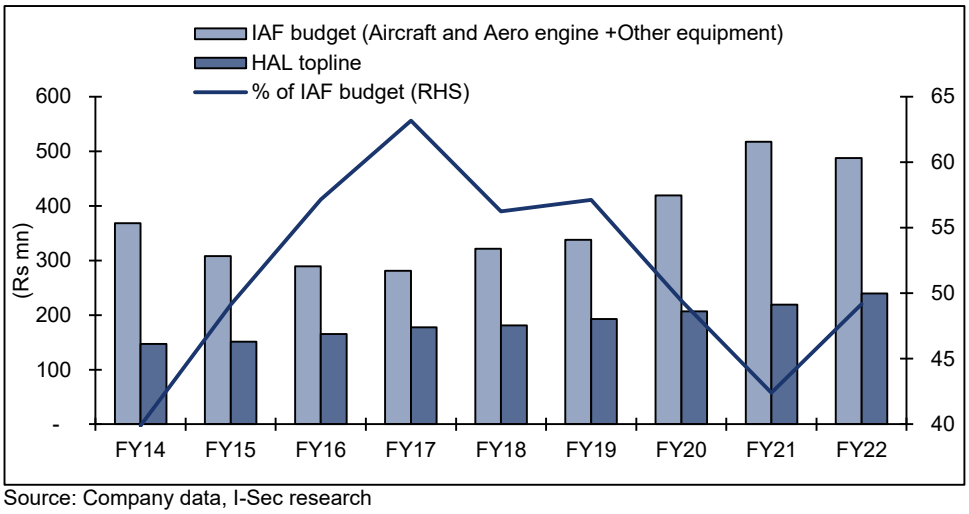
Chart 3: Key platforms with possible business values

Source: Company data, I-Sec research, 83 LCA order has been realised in FY21

HAL's revenue is expected to contribute to ~50% of IAF aircraft and aero engine + other equipment budget

As budget allocations for big-ticket imports – likes of S400 and Rafale 36 jets for a total cost of Rs590bn, gets consumed, current budget provides the opportunity for the topline of HAL to consolidate and grow. This also highlights in management guidance of mid-single digit revenue growth for the next couple of years and steady double digit revenue growth post that. This also gets highlighted in the orderbook guidance that HAL management has shared earlier.

Chart 4: HAL's revenue as a proportion IAF budget – past and future



Source: Company data, I-Sec research

Draft defence production and export policy; negative import list and budget allocations

The draft policy aims to reduce import dependency and create export market for Indian defence players. The policy aims to achieve revenue target of Rs1,750bn including export of Rs350bn in aerospace and defence goods and services by 2025. The draft policy is a part of multiple announcements made under 'Atmanirbhar Bharat Package'. This move will help domestic players increase their market share.

The GoI has allocated Rs4,781bn (13.73% of budget) for defence in FY21-22 which includes pension budget of Rs ~1,150bn. Currently, India is procuring ~Rs800-900bn worth of capital equipment and ~Rs250-300bn worth of revenue equipment every year. Also, ~Rs600bn worth of spares, parts, components and sub-assemblies are being imported every year. Even if we aim to manufacture half of the requirements, it will be Rs300-400bn opportunity.

Table 3: Global arms import

Country	Share of Arms Import %		Change (%)
	2011-2015	2016-2020	
Saudi Arabia	7.1	11	61
India	14	9.5	-33
Egypt	2.4	5.8	136
Australia	3.6	5.1	41
China	4.4	4.7	5.5

Source: SIPRI Arms Transfers Database

India's import from Russia was ~49%, France was ~18% and from Israel was ~13% during 2016-2020. The arms import from US has declined significantly by ~46% to during 2016-2020.

Further, in the Union Budget (2021), India has set aside Rs702.2bn or 63% of military's capital budget for 2021-22 as against Rs510bn allocated during the last year for buying locally produced weapons. The allocation will power the purchase of Tejas LCA, Mk1A jets, LCHs, trainer aircraft, Arjun Mk-1A tanks, Astra beyond visual range missiles, pinaka rocket mission and anti-tank missiles. Going forward, we expect, the company to remain a key beneficiary of GoI policies aiming to reduce import dependency and boosting self-reliance.

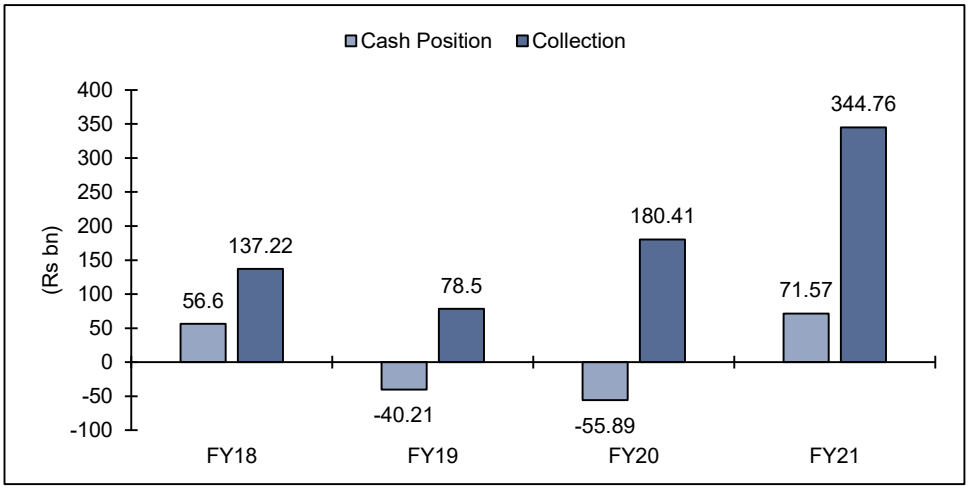
Additionally, the GoI on May 31, 2021 notified a list of 108 defence items that cannot be imported by the armed forces with the ban kicking off from December 2021 to December 2025. Earlier in August 2020, the government prepared a list of 101 items on which there would be an embargo on import to give a push to 'Atmanirbhar Bharat Abhiyan'. The second list consists of several military systems including specified types of helicopters, next-generation corvettes, airborne early warning and control (AEW&C) systems, tank engines, medium power radar for mountains, medium-range surface to air missile systems and anti-material rifles etc.

Cost-cutting measures coupled with operational efficiencies to improve margins, cashflow

The company has undertaken cost-cutting measures which include reduction in employee cost and overhead cost; on account of which HAL was able to save ~Rs3bn as employee cost and ~Rs2bn as overhead cost. Resultantly, margins and EPS have improved to some extent, which is likely to continue going forward.

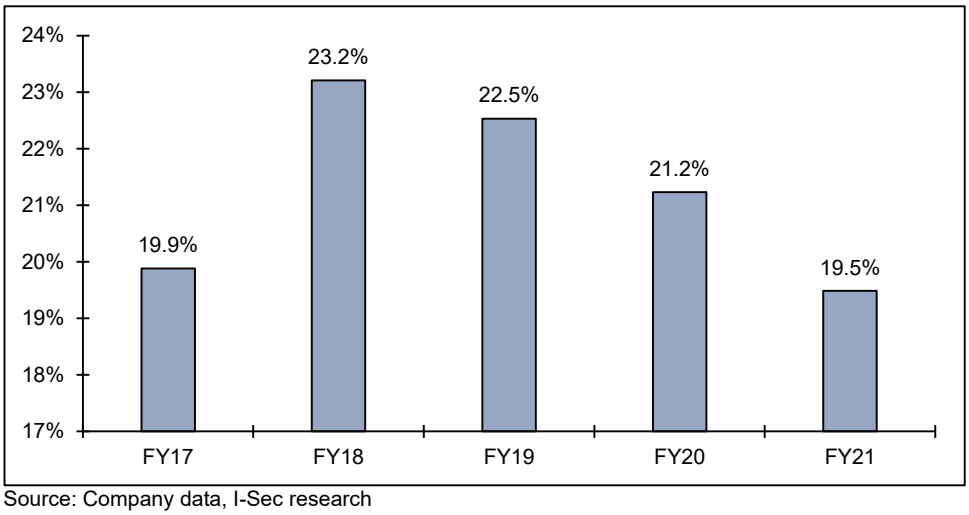
Further, the company reduced inventory days considerably over the past five years which has released the working capital back in the system. Also, the collection efficiency of the company has improved during FY21, as it has collected a record Rs345.0bn as against ~Rs180.0bn during the previous year. These measures have helped the company to get back in the cash surplus position. Hence, the debt dependency and interest cost will reduce significantly going forward.

Chart 5: Collections and cash position



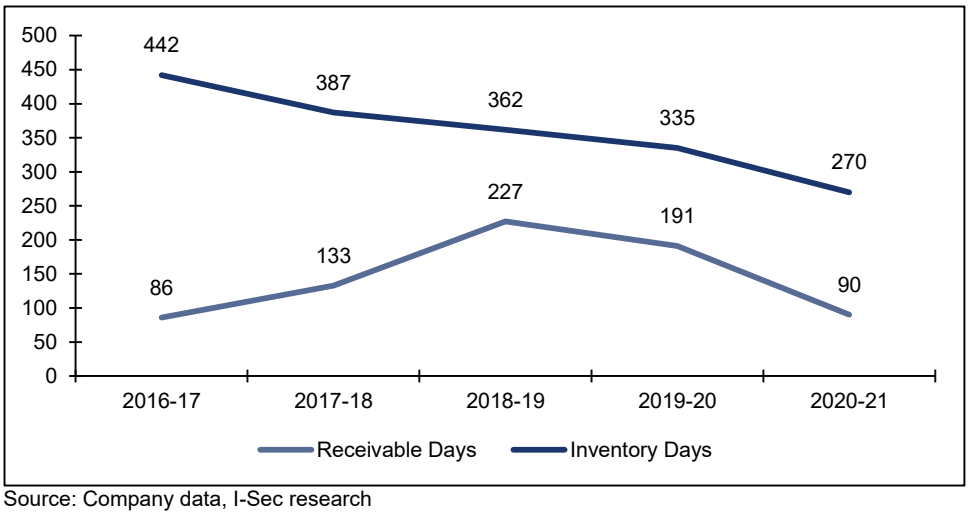
Source: Company data, I-Sec research

Chart 6: Manpower cost to revenue



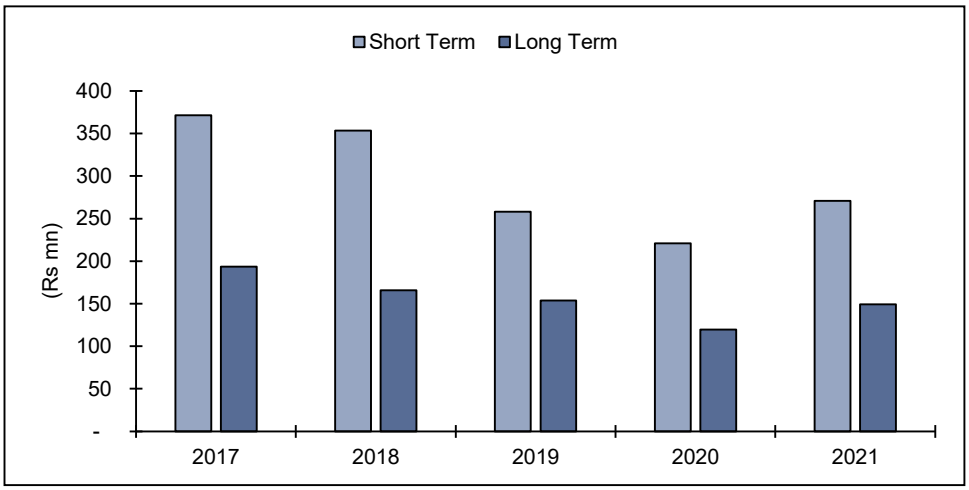
Source: Company data, I-Sec research

Chart 7: Inventory days and collection days



Source: Company data, I-Sec research

Chart 8: Customer advances days



Source: Company data, I-Sec research

Management commentary in the past concall

Q4FY21 conference call

Business Highlights

- Initial operational clearance (IOC) for light utility helicopter (LUH) for the Indian Army was received by the company at the Aero India 2021.
- The tail boom folding operation on advanced light helicopter (ALH) was successfully demonstrated on the ALH Mk-III helicopter. This would pave the way for naval operations. The company produced its first upgraded ALH Mk-III civil helicopter and it is now being used for obtaining civil certification.
- The company commenced its performance-based logistics with the induction of ALH Mk-III into the Indian Coast Guard fleet on 12th June, 2021.
- Orderbook position (activity wise) stood at Rs806.4bn as on 31st March, 2021, of which, manufacturing was Rs655bn, repair & overhaul (ROH) and spares added up to Rs145bn and remaining orders were from development and exports.

Orderbook breakdown:

- The orderbook includes 83 LCA of Rs362.7bn, past LCAs of Rs49bn (6 more to deliver this year; with that delivery of FOC will over leaving 8 trainers to be delivered), **36 ALH for Rs100bn**, Su 30 of Rs3.77bn, AL 31 engines of Rs17bn, IJT of Rs55bn, MLU of Rs10bn, Jaguar upgrade Rs21bn. Mirage upgrade of Rs7.8bn, aerospace structure Rs10bn, 8 Dornier of Rs3.6bn, MRO orders of Rs75bn, spares order of Rs70bn and design and development order of Rs14bn.
- Collection from defence customers stood at Rs345bn in FY21 as against Rs180bn in FY20. It turned cash positive to the extent of Rs72bn in FY21. **HAL has delivered 14 fixed wing and 20 of rotary wing last year**. With SU-30 deliveries nearly over, bulk of fixed wing deliveries in FY22 has to come from LCA. Few dorniers and balanced rotary wing aircraft will be there.
- Management expects to start production line at Tumkur facility (in Karnataka) by August 2022.

Future Outlook

- The management expects to maintain growth path with sufficient workloads in FY22. LCA deliveries are expected to start from March 24. HAL will start seeing double-digit growth from FY24.
- HAL expects to have a net cash surplus of Rs70-80bn in FY22.
- **Expected orderbook:** 70, HTT-40, with order value of Rs70bn, followed by 36, Su 30 12 nos for Rs100bn along with certain modifications, LUH 12 nos (order potential 187) - present fleet was 400 nos (200 by LUH and the rest by Kamov – Ka 226 T), 25 LUHs from Army. Large order for engines - AL 31SP for Su 30 – Rs60bn and RD 33 for Mig 29 fleet – Rs25bn. ALH – 300 has been delivered and 50 more will be delivered as per initial estimates but the actual delivery will be more. IMRH 325 numbers was the initial projection and now the Navy has joined the fray. Models are being developed for Army and Airforce and the other for Navy.

Key risks – armed drones or combat ircraft?

As India joins the Quad (Quadrilateral Security Arrangement) and visit of US Secretary of Defence, one of the first import deals to be signed is US$3bn contract for 30 drones (10+10+10 for Army, Navy and Airforce). Increased strategic importance of unmanned vehicles is a clear antithesis to necessity for fighter aircraft. This can bring the connotation of zero terminal value for OEMs like HAL. **We have a different view, formed over references from recorded interaction of successive *Air Defence Chiefs* – the force projection over the foreseeable future will be a combination of manned and unmanned vehicles.** We see HAL taking a predictable strategic step in coming out with an autonomous wingman drone design in Aero India 2021 – **CATS Warrior**.

CATS warrior, the unmanned wingman, will team up with the existing fighter squadrons of IAF which will act like its mothership. CATS warrior is primarily envisioned for IAF with a smaller version designed for Indian Navy. It will fly back for mission within the combat radius of 350km and for long range missions with combat radius of 800km it will sacrifice itself with a target hit. This has visual similarities with Boeing Airpower.

Attack on Saudi Arabia's oil facilities – asymmetrical warfare at its peak

Attack on Abqaiq, a crude processing centre and the Khurais oilfield with 10 drones (as subsequently claimed by Houthi rebels) highlighted the risk-reward benefit that such a drone attack can potentially enjoy. The cheap nimble weapon that can easily evade air defence warning systems posed a novel challenge to the world's largest oil exporter – also one of the world's biggest arm buyers. This was the third in a series of drone attacks witnessed in Saudi Arabia. The asymmetry between strike and response is notable. Israel e.g. has used Patriot missiles each costing US$3-4mn to take down quadcopter drones costing about US$1000. Anti-drone defence infrastructure is expensive to build, including GPS jammers to neutralise drone navigation, search and track facilities to identify incoming drones and missiles and radar-guided canon interceptor to destroy them. Saudi Arabia already had US-built Patriot anti-missile system. The incident perhaps highlights that protection on the scale of the Abqaiq facility which spans several kms is nigh impossible.

Conflict in Nagorno Karabakh and the asymmetry which Turkish drones brought to the table

Nagorno Karabakh (NK), a mountainous region in Southern Caucasus has seen periodic and sporadic fights erupting for long. Why the latest military standoff between Armenian and Azerbaijan forces in NK region stands out was the extensive usage of drones. NK was the fifth foreign conflict zone where Turkish drones were deployed in the recent years, with the country's UAVs also being used in Syria, Libya, Northern Iraq and Eastern Mediterranean where Turkey and Greece want to sort out maritime rights. Azerbaijan's military did publish footage of Turkish made armed drones hitting Armenian positions, sir defence systems, artillery units and tanks. It is not clear, whether TB2 drones that were deployed in NK are owned and operated by Azerbaijan's military or by their Turkish counterparts.

There are possible implications of drone-based warfare on OEMs like HAL. The recent standoff in Ladakh also, in our opinion, highlights the risk of a swarm drone attack rather than a conventional dog fight using combat aircraft. More and more budget will be drawn towards the same, mostly in the form of imports till we indigenise to the extent of self-reliance and the **HAL, Dynamatic and IAI JV will be the prime contender for such future opportunity.**

Valuation and key risk: Initiate coverage with BUY

We initiate coverage on the stock with BUY rating and target price of Rs2,618/share. This is based on DCF valuation. The implied FY23E P/E and FY24E P/E is ~25x and 22x, respectively. The biggest certainty to our valuation is the orderbook which is expected to cross Rs1,000bn by FY22E – **there are hardly any defence primes in the world which manufacture combat aircraft and have an equivalent book to bill** (e.g. Lockheed Martin has a book to bill of 2.2x based on CY20 order backlog and CY21 sales outlook as shared by the company).

The key risk to our understanding is lack of diversification. As cashflow accumulates, we are witnessing a trend of vertical integration (latest two examples are Lockheed acquisition of Aerojet Rocketdyne and merger between Raytheon and UTC). HAL may also have to think about business diversification sooner or later. Faster ramp-up of unmanned vehicles through the IAI, Dynamatic JV, focused entry into civilian space with LUH offering, trying to enter into MRO for civilian space, trying to leverage the knowledge of propulsion systems to move towards integration of the same in hypersonic missiles – those are some of the potential areas of diversification for HAL, apart from increasing the production rate of the existing platforms.

Table 4: DCF valuation yields target price of Rs2,618/share

(Rs mn)	FY22E	FY23E	FY24E	FY25E	FY26E	FY27E	FY28E	FY29E	FY30E
Sales	248,262	267,747	299,781	331,344	366,238	404,816	447,465	474,711	496,933
EBITDA	55,922	63,800	69,192	79,006	84,516	96,263	109,423	111,401	110,134
Tax	11,100	12,787	13,872	16,029	17,142	19,769	22,738	22,994	22,462
PAT	34,639	39,906	43,289	50,022	53,495	61,692	70,958	71,756	70,097
NOPAT	44,822	51,013	55,320	62,977	67,374	76,495	86,685	88,407	87,672
Working Capital Change	**(32,523)**	**7,210**	**10,781**	**6,495**	**301**	**7,079**	**7,753**	**(216)**	**(305)**
Capex	(12,000)	(12,000)	(12,000)	(12,000)	(12,000)	(12,000)	(12,000)	(12,000)	(12,000)
FCF	299	46,223	54,101	57,472	55,675	71,574	82,438	76,192	75,367
Terminal Value									845,786
Total FCF	299	46,223	54,101	57,472	55,675	71,574	82,438	76,192	921,153
Cost of Equity	12%								
WACC	10%								
Terminal Growth	2%								
NPV of FCFF (FY23E)	**781,454**								
Net Debt at FY23E	(93,837)								
Net Equity value	875,290								
Value per share	**2,618**								

Source: Company data, I-Sec research

We are looking at FY21-30E sales, EBITDA and PAT CAGR of 9%. This compares to 6/15/4% CAGR between FY11-20. The key reason for PAT to trail EBITDA CAGR is the decline in other income as advances from government witnessed progressive reduction in an uncertain budget and order flow environment. EBITDA witnessed meaningful uptick given higher percentage of ROH in execution as well as progressively higher indigenisation in programmes like LCA. **Gross margin increased from 36% to 56% in the past decade. We expect it to leave FY30E at 52%.**

Other key risks – Global aerospace defence primes like Lockheed Martin is rated in high risk category (Score of 30.6) by Sustainalytics with industry group rank of 15 out of 91. Similarly, we see Lockheed not selected in S&P 500 ESG index and the reason for exclusion shown as 'involved in controversial weapons' – similar predicaments for Boeing. MSCI on the other hand has assigned an A rating on Lockheed Martin, with 17% of the MSCI AWCI constituents in aerospace and defence getting an A rating. HAL is currently not rated by any agency.

Table 5: Trades at significant discount to global aero/defence peer group

Name of the company	EV/E (x)				P/E (x)				P/B (x)			
	-2FY	-1FY	+1FY	+2FY	-2FY	-1FY	+1FY	+2FY	-2FY	-1FY	+1FY	+2FY
Dassault Aviation SA	9.5	7.0	7.7	7.6	14.0	11.7	15.4	14.6	1.8	1.8	1.7	1.5
Airbus SE	11.5	9.1	15.3	11.2	25.3	18.0	48.1	25.4	6.1	7.1	10.7	8.0
Textron Inc	10.9	10.5	12.0	10.5	21.7	18.8	22.1	18.1	3.1	2.7	2.5	2.2
General Dynamics Corp	12.4	11.8	12.8	12.1	NA	15.8	16.8	15.3	4.2	3.9	3.2	3.0
Saab AB	9.9	7.2	6.7	6.2	NA	15.0	15.3	13.5	1.4	1.5	1.3	1.2
Hexcel Corp	12.0	10.4	30.3	17.9	NA	17.5	358.9	45.0	3.8	3.7	3.4	3.2
Lockheed Martin Corp	13.8	12.1	10.8	10.4	NA	17.6	14.2	13.6	100.0	25.0	12.2	9.1
LISI	7.4	6.7	10.3	7.8	NA	16.2	52.9	23.1	1.5	1.5	1.5	1.4
Korea Aerospace Industries Ltd	13.8	8.9	11.6	9.8	NA	14.7	39.0	28.2	2.9	2.7	2.6	2.5
BAE Systems PLC	9.7	8.5	7.5	7.3	NA	11.6	11.2	10.4	2.9	2.8	3.2	2.7
Moog Inc	11.1	9.7	10.5	9.8	NA	16.7	16.4	15.2	2.4	2.1	2.3	2.2
Hanwha Aerospace Co Ltd	20.1	11.3	8.1	7.5	NA	20.1	13.3	14.0	1.1	1.0	0.9	0.8
Thales SA	10.2	8.3	8.3	7.5	NA	13.5	14.9	12.6	3.2	3.0	3.2	2.8
Northrop Grumman Corp	14.4	14.4	11.3	13.0	NA	18.1	13.8	14.4	7.4	6.2	4.9	4.2
Meggitt PLC	9.4	8.9	13.7	11.1	NA	12.9	25.9	17.9	1.5	1.4	1.7	1.7
Kawasaki Heavy Industries Ltd	7.1	7.7	9.5	8.0	NA	18.5	25.9	14.1	0.8	0.8	0.9	0.8
Woodward Inc	22.9	15.9	18.3	15.6	NA	25.1	33.1	27.1	3.9	3.6	3.4	3.1
Rheinmetall AG	5.5	5.3	5.0	4.5	NA	11.9	10.4	9.1	1.7	1.6	1.7	1.4
Aerospace Industrial	12.2	12.6	31.9	15.2	NA	13.5	56.7	18.0	1.9	1.8	1.9	1.8
IHI Corp	6.5	8.2	7.2	6.9	NA	25.3	11.5	10.4	1.2	1.2	1.2	1.1
HEICO Corp	40.6	34.0	37.0	31.1	NA	60.4	64.7	52.1	11.0	11.3	7.1	6.6
Safran SA	14.1	11.5	17.4	13.7	NA	19.3	40.1	26.5	4.8	4.0	3.8	3.5
MTU Aero Engines AG	14.9	12.6	17.5	14.3	NA	20.2	35.1	26.5	4.9	4.6	4.1	3.7
Ultra Electronics Holdings PLC	11.1	10.7	11.5	10.7	NA	19.9	17.9	16.6	4.0	3.7	3.2	3.0
Kongsberg Gruppen ASA	28.4	18.3	10.5	9.2	NA	62.2	21.5	17.5	3.0	3.2	3.0	2.9
Honeywell International Inc	17.9	18.3	18.9	17.2	NA	27.1	27.5	24.3	9.0	8.7	8.2	7.9
Curtiss-Wright Corp	11.9	11.2	10.7	10.0	NA	16.5	16.3	14.9	3.2	2.9	2.4	2.2
Solar Industries India Ltd	30.2	31.6	23.1	19.3	NA	51.9	40.0	32.5	11.5	10.4	8.1	6.9
Bharat Electronics Ltd	17.0	17.3	12.4	11.0	NA	27.4	18.7	16.8	5.0	4.4	3.5	3.1
HAL	**8.8**	**5.7**	**5.7**	**4.5**	**12.9**	**11.5**	**11.0**	**9.5**	**2.8**	**2.4**	**2.1**	**1.8**

Source: Bloomberg, I-Sec research

Sensitivity to our DCF around WC scenarios - *what if* working capital progressively deteriorates

We have increased contract assets in proportion to increase in revenue under this scenario leading to material deterioration in working capital over FY21-30E. Yet we get a target price of Rs2,230/share. **We believe the worst of working capital for HAL is behind the company and the stress of FY18-20 will not be observed in future. This remains one of the biggest positive triggers for cashflow, dividend yield, reinvestment for further growth and eventual rerating of the valuations going forward.**

Table 6: DCF valuation under strained working capital assumptions

	FY22E	FY23E	FY24E	FY25E	FY26E	FY27E	FY28E	FY29E	FY30E
Sales	248,262	267,747	299,781	331,344	366,238	404,816	447,465	474,711	496,933
EBITDA	55,922	63,800	69,192	79,006	84,516	96,263	109,423	111,401	110,134
Tax	11,100	12,787	13,872	16,029	17,142	19,769	22,738	22,994	22,462
PAT	34,639	39,906	43,289	50,022	53,495	61,692	70,958	71,756	70,097
NOPAT	44,822	51,013	55,320	62,977	67,374	76,495	86,685	88,407	87,672
Working Capital Change	(32,523)	(3,538)	(2,293)	(9,178)	(20,216)	(15,826)	(19,314)	(29,091)	(8,563)
Capex	(12,000)	(12,000)	(12,000)	(12,000)	(12,000)	(12,000)	(12,000)	(12,000)	(12,000)
FCF	299	35,475	41,027	41,799	35,158	48,669	55,371	47,316	67,109
Terminal Value									855,642
Total FCF	299	35,475	41,027	41,799	35,158	48,669	55,371	47,316	922,752
NPV of FCFF (FY23E)	**637,800**								
Net Debt at FY22E	(83,088)								
Net Equity value	720,888								
Value per share	**2,156**								

Source: Company data, I-Sec research

Financial summary

Table 7: Profit and loss statement

(Rs mn, year ending Mar 31)

	FY20	FY21	FY22E	FY23E	FY24E
Net Sales	214,382	227,545	248,262	267,747	299,781
Total Revenue	**214,382**	**227,545**	**248,262**	**267,747**	**299,781**
Operating Expenses	165,421	174,052	192,340	203,947	230,589
EBITDA	**48,961**	**53,494**	**55,922**	**63,800**	**69,192**
% margins	*22.8*	*23.5*	*22.5*	*23.8*	*23.1*
Depreciation & Amortisation	9,985	11,783	12,105	13,029	13,953
Gross Interest	3,485	2,592	278	278	278
Other Income	2,939	3,582	2,100	2,100	2,100
Recurring PBT	**39,690**	**42,770**	**45,739**	**52,693**	**57,161**
Less: Taxes	10,960	10,379	11,100	12,787	13,872
Minority Int. & Asso. Profit	0	-	-	-	-
Net Income (Reported)	**28,730**	**32,391**	**34,639**	**39,906**	**43,289**

Source: Company data, I-Sec research

Table 8: Balance sheet

(Rs mn, year ending Mar 31)

	FY20	FY21	FY22E	FY23E	FY24E
Assets					
Total Current Assets	414,418	402,175	452,069	506,236	582,490
of which cash & cash eqv.	3,166	71,774	62,876	98,884	141,555
Total Current Liabilities & Provisions	265,295	267,174	284,968	302,368	333,628
Net Current Assets	149,123	135,001	167,101	203,868	248,862
Investments	9,908	10,555	10,555	10,555	10,555
Net fixed assets (including CWIP)	94,002	95,689	95,584	94,554	92,601
Deferred Tax Asset					
Other non-current assets	14,446	11,040	11,040	11,040	11,040
Total Assets	**532,774**	**519,459**	**565,732**	**622,385**	**696,686**
Liabilities					
Borrowings	64,386	5,047	5,047	5,047	5,047
Deferred Tax Liability					
Advance from customers	70,565	93,077	101,551	109,521	122,625
Minority Interest					
Equity Share Capital	3,344	3,344	3,344	3,344	3,344
Reserves & Surplus	129,141	150,779	174,299	202,067	232,004
Net Worth	*132,485*	*154,123*	*177,643*	*205,411*	*235,347*
Total Liabilities	**532,774**	**519,459**	**569,248**	**622,385**	**696,686**

Source: Company data, I-Sec research

Table 9: Cashflow statement

(Rs mn, year ending Mar 31)

	FY20	FY21	FY22E	FY23E	FY24E
Net Profit before tax	28,730	32,391	34,639	39,906	43,289
Depreciation	9,985	11,783	12,105	13,029	13,953
Working Capital Changes	(31,832)	91,682	(32,523)	7,210	10,781
Taxes Paid	(18,199)	(7,186)	(11,100)	(12,787)	(13,872)
Cash flow from Operating Activities	**15,274**	**152,627**	**14,499**	**60,423**	**68,301**
Capital Commitments	(13,807)	(13,173)	(12,000)	(12,000)	(12,000)
Free Cash Flow	1,467	139,454	2,499	48,423	56,301
Other investing cashflow	418	463	-	-	-
Cash flow from Investing Activities	**(13,389)**	**(12,710)**	**(12,000)**	**(12,000)**	**(12,000)**
Inc (Dec) in Borrowings	17,526	(58,628)	-	-	-
Other financing activities	(16,887)	(12,622)	(11,396)	(12,416)	(13,630)
Cash flow from Financing Activities	**639**	**(71,249)**	**(11,396)**	**(12,416)**	**(13,630)**
Chg. in Cash & Bank balance	**2,525**	**68,668**	**(8,897)**	**36,007**	**42,671**

Source: Company data, I-Sec research

Table 10: Key ratios

(Year ending Mar 31)

	FY20	FY21	FY22E	FY23E	FY24E
Per Share Data (Rs)					
Basic EPS	85.9	96.9	103.6	119.3	129.5
Diluted EPS	85.9	96.9	103.6	119.3	129.5
Cash EPS (Fully Diluted)	115.8	132.1	139.8	158.3	171.2
OCF per share (Fully Diluted)	(230.3)	45.7	456.4	43.4	180.7
Book Value per share (Fully Diluted)	396.2	460.9	531.2	614.3	703.8
Dividend	33.3	30.0	33.0	36.3	39.9
Growth YoY (%)					
Net Sales	7.1	6.1	9.1	7.8	12.0
EBITDA	3.8	6.0	6.0	6.0	12.0
PAT	23.4	12.7	6.9	15.2	8.5
Valuation ratios					
P/E	12.9	11.5	10.7	9.3	8.6
P/CEPS	9.6	8.4	7.9	7.0	6.5
P/BV	2.8	2.4	2.1	1.8	1.6
EV / EBITDA	8.8	5.7	5.6	4.3	3.4
EV / FCF	(4.7)	67.9	2.1	125.4	5.7
Operating Ratios (%)					
Raw Material/Sales	43.8	48.5	48.0	47.0	46.5
Other Income / PBT	7.4	8.4	4.6	4.0	3.7
Effective Tax Rate	27.6	24.3	24.3	24.3	24.3
NWC / Total Assets	28.0	26.0	29.4	32.8	35.7
Inventory Turnover	50.3	69.3	69.3	69.3	69.3
Asset Turnover	40.2	43.8	43.6	43.0	43.0
Net D/E Ratio (x)	0.5	(0.4)	(0.3)	(0.5)	(0.6)
Profitability Ratios (%)					
Rec. Net Income Margins	13.4	14.2	14.0	14.9	14.4
RoCE	19.8	26.2	24.0	24.1	23.0
RoNW	21.7	21.0	19.5	19.4	18.4
Dividend Payout	31.0	32.1	30.4	30.8	29.4
Dividend Yield	3.0	2.7	3.0	3.3	3.6
EBITDA Margins	22.8	23.5	22.5	23.8	23.1

Source: Company data, I-Sec research

Manufacturing locations and production divisions

The company has four production complexes - Bangalore complex, MiG complex (located in Nasik and Koraput), helicopter complex (located in Bangalore and Barrackpore) and accessories Complex (located in Kanpur, Lucknow, Hyderabad, Kasargod and Korwa); along with a design complex (R&D centres jointly located with related manufacturing divisions).

Table 11: Production complexes

Unit	Sub-divisions	Manufacturing activities
Bangalore Complex	Aircraft Division	Manufacturing of precision aero-structure components
	Engine Division	Manufacturing and overhaul of engines
	Overhaul Division	Repair and overhaul services for Mirage 2000, Kiran, Jaguar and Hawk Mk132, Jaguar Darin III, Mirage 2000 upgrade programmes and services various types of rotables of aircraft and helicopters.
	Foundry and Forge division	Manufacturing of rolled rings, castings, forgings, metallo-ceramic brake pads, bimetallic sector for brakes and rubber components
	Aerospace Division	Manufacturing of light alloy structures and assemblies for satellites and launch vehicles for ISRO's space missions
	IMGT Division	Manufacture, repair and overhaul of LM 2500, industrial and marine gas turbines used in power plants and marine vessels and industrial 501K engine and the industrial Avon engine
	Airport Services centre	Maintenance of air field, air traffic control and allied services at the HAL airport
	Facilities Management Division	Project management, facilities management, contract management, corporate social responsibility projects, renewable energy projects and estate management.
	Central Materials and Process Laboratory	Testing, research and development laboratories in five major areas with modern infrastructure with mechanical, chemical, metallurgical (including failure investigation), non-destructive testing and calibration sections.
	LCA-Tejas Division	Manufacturing Tejas aircraft
MiG Complex	Aircraft Manufacturing Division, Nasik	Manufacturing Su-30 MKI aircraft
	Aircraft Overhaul Division Nasik	Overhauls and customer service support for various MiG aircraft variants and the Su-30 MKI aircraft
	Engine Division Koraput	Manufacturing turbojet engines for MiG 21FL aircraft, RD-33 series 3 engines for MiG 29 aircraft
	Sukhoi Engine Division Koraput	Manufacturing of licenced AL-31FP engines which power Su-30 MkI aircraft
Accessories Complex	TAD-Kanpur Division	Maintenance, repair and overhaul of aircraft, its rotables and undertakes servicing of engines; hydraulic systems of UAVs and manufacturing of the civil variant of the Dornier 228 aircraft.
	Accessories Division Lucknow	Manufactures and carries out repair and overhaul of accessories, including hydraulic equipment, environment control systems, flight control systems, engine fuel control systems, and electrical equipment and cockpit instruments
	Avionics Division Hyderabad	Manufacture, repair and overhaul of avionics equipment, including airborne radars, communication and navigation equipment and on-board computers for aircraft and helicopters
	Avionics Division Korwa	Manufacture, repair and overhaul of a wide range of avionics equipment, including sensors, navigation system, display system, laser system and flight data recorders for indigenous upgrades of aircraft, including Jaguar, MiG 27M, Su-30 MKI, Light Combat Aircraft and Hawk aircraft
Helicopter Complex	Helicopter Division Bangalore	Production of ALH MK III, ALH MK IV “Rudra”, Cheetal and Light Combat Helicopter
	Helicopter MRO Division Bangalore	Maintenance, repair and overhaul support for all variants of Advanced Light Helicopters and other helicopters.
	Barrackpore Division	Inspection and servicing of the Cheetah, Chetak and Lancer helicopters
	Aerospace Composites Division	Manufacture composite parts for all platforms, for both aircraft and helicopters and for aerospace applications
	Helicopter Division Tumkur	A fully self-sufficient facility for manufacturing full range of helicopters from 3 ton to 12 tons category

Source: Company data

Table 12: Design complex

Design Centre	Activities
Aircraft R&D Centre, Bengaluru	Development of aircraft projects, such as the Naval variants of the LCA Tejas, Fifth Generation Fighter Aircraft and the HTT-40 basic trainer aircraft
Rotary Wing R&D Centre, Bengaluru	Involved in the design and development of the LCH with a capacity of 5.8 ton and LUH with a capacity of 3 ton
Aero-Engine R&D Centre, Bengaluru	Developing aero-engine test beds, auxiliary power units and turbo starter engines for the Indian Defence Services and development of the HTFE-25 and HTSE-1200 aero-engine
Mission & Combat System R&D Centre, Bengaluru	Developing systems for avionics upgrade for Jaguar, Mirage 2000, Light Combat Helicopter and other aircrafts
Gas Turbine R&D Centre, Koraput	Equipped with facilities for fatigue testing, ultrasonic testing and software for stress analysis
Aircraft Upgrade R&D Centre, Nasik	Product improvement and modifications to improve safety, reliability, maintainability, enhancement of operational capability by integration of new and advanced weapon integrations, life extension studies and indigenisation to enhance operational readiness of MiG variants and the Su-30 MKI aircraft
Aerospace Systems and Equipment R&D Centre, Lucknow	Research, design and development of major systems and accessories for aircraft, helicopter, space programme and engines for military and civil applications
Aerospace Systems and Equipment Research and Design Centre, Korwa	Developing flight data recorders for various aircraft, including the Light Combat Aircraft, Intermediate Jet Trainer, Jaguar, MiG 27 and Su-30 MKI
Strategic Electronic R&D Centre, Hyderabad	Development of more than 40 types of avionics systems for different aircraft and helicopter programmes including the LCA, ALH, IJT, Su-30 MKI, HTT-40, Jaguar Darin II, Darin III, LCH, LUH, and Hawk Mk132 aircraft
Transport Aircraft R&D Centre, Kanpur	Core competence in role modifications for transport, maritime and intelligence warfare aircraft, integration of mission system and avionics, aircraft upgrades, indigenisation, damage survey and assessment, development of repair and preventive maintenance technology, cabin furnishing and layout

Source: Company data

Management profile

Name	Description
Mr. R. Madhavan **Chairman and Managing Director**	• He is a graduate in Mechanical Engineering from NIT, Raipur and also holds post graduate degree of M. Tech from IIT Madras. Mr. Madhavan **joined HAL as a management trainee (Technical) in July 1982** and has been associated with HAL for over 36 years. Mr. Madhavan had served in various key positions across the different verticals within HAL.
Mr. Alok Verma **Director HR**	• He holds Bachelors Degree in Science from Patna University, Post Graduate Degree in Social Work, LLB from Jiwaji University and a Post Graduate Diploma in Computer Applications from Punjab Technical University. • He started his career with National Fertilizers Ltd. in 1987 and **joined HAL in 2006** as chief manager and elevated to director HR in Jan 2020. He played a key role in settlement of the Wage Negotiations between the HAL Management and the recognized Unions culminating in signing of the Memorandum of Understanding (MoU) with the Union in December 2019.
Mr. Arup Chatterjee **Director (Engineering and R&D)**	• He is a B.Tech in Mechanical Engineering from Jadavpur University, and has done M. Tech in Aircraft Production Engineering from IIT, Chennai. He has also done MBA from IGNOU. • **Mr. Chatterjee joined HAL as management trainee in the year 1982.** He had held several key positions in the Company prior to his elevation as Director (Engg. and R&D) in June 2018
Mr. C.B. Ananthakrishan **Director (Finance) & CFO**	• He holds a bachelor's degree in Commerce from Loyola College, Chennai, MBA in Finance from Madras University and is a Cost & Management Accountant. • He has over 30 years of work experience in Public & Private sectors with stints in merchant banking, pharmaceuticals, fertilizers, aerospace industry and has held various positions in HAL. • **He joined the company as chief manager (Finance) in March 2004** and elevated to Director (Finance) in August 2018.
Mr. M.S. Velpari **Director (Operations)**	• He holds a bachelor's degree in Mechanical Engineering from College of Engineering, Guindy, Chennai and did Masters from IIT Madras in Aircraft Production Engineering. • **He joined HAL in 1984** as management trainee and has about 35 years of experience in the areas of Manufacturing, Assembly, Design, Product support, customer support, Indigenisation and other Management functions, in various types of fixed wing and rotary wing platforms.
Mr. Chandrasekhar Bharti **Govt Nominee Director**	• He is an engineering graduate from Delhi College of Engineering, joined the Indian Administrative Services in September 1996. He has also acquired M.Sc degree in Public Management & Policy from London School of Economics & Political Science, UK. • He was appointed as Government Nominee Director of the Company in May, 2018.
Dr Tessy Thomas **Govt Nominee Director**	• She is a post-graduate in mechanical engineering with specialization in guided missiles from Institute of Armament and has also done MBA in operations management from Indira Gandhi National Open University. She has been awarded Doctor of Philosophy (Ph.D) in missile guidance by Jawaharlal Nehru Technological University, Hyderabad. • She was appointed as Government Nominee Director of the company in July, 2018.
Mr. Amitabh Bhatt **CEO, Bangalore Complex**	• He holds a B.Sc.(Engineering) degree in Mechanical Engineering from Regional Engineering College (REC), Rourkela and a Post Graduate Degree in Management. • He is Executive Director of LUH Project and has taken over as Chief Executive Officer (CEO) of Bangalore Complex in February 2020. He has two decades of experience in private sector and has **joined HAL in January 2006 as Deputy General Manager at Helicopter Division**
Mr S. Anbuvelan **CEO, Helicopter Complex**	• He is a graduate in mechanical engineering from Algappa Chettiar college of engineering, Tamil Nadu, and holds a Post Graduate Degree of MTech in aircraft production engineering from IIT Madras and Post Graduate Diploma in business management from XIME, Bangalore. • He joined HAL as management trainee (technical) **on July 21st, 1986** and has been associated with HAL for 35 years.
Mr. Dibyendu Maiti **CEO, MiG Complex**	• He completed graduation in Mechanical Engineering from REC Durgapur and M. Tech in aircraft production engineering from IIT, Madras. He did his MS in aeronautics & space technology from ENSAE, Toulouse France. • **He joined HAL as a Management Trainee (Technical) in 1985** and has 36 years of experience in various key positions in the company.
Mr. Sajal Prakash **CEO, Accessories Complex**	• He holds a degree of B. Tech in Mechanical Engineering from HBTI, Kanpur, a PG degree of M. Tech in Aircraft Production Engineering from IIT, Chennai and has completed Leadership Development Program at IIM, Ahmedabad. • He started his career in HAL **as a management trainee in the year 1986**. He has worked in various divisions and offices of HAL including TAD – Kanpur, HAL Corporate Office and Helicopter Division, Bangalore before taking over the Accessories Complex as CEO.

Source: Company data

Index of Tables and Charts

Tables

Charts

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