BRIDGE REPORT Bridge Salon

President Hiroaki Ohta

Autonomous Control Systems Laboratory Ltd. (6232)

Corporate Information

Exchange	TSE Mothers
Industry	Machinery (Manufacturing)
Representative	Hiroaki Ohta
Address	WBG Marive West 32F, 2-6-1 Nakase, Mihama-ku, Chiba-city, Chiba
Year-end	March
URL	https://www.acsl.co.jp/

Stock Information

Share Price	Shares Outstanding		Total Market Cap	ROE (Actual)	Trading Unit
¥3,020	10,559,564 shares		¥31,890 million	-	100 shares
DPS (Estimate)	Dividend Yield (Estimate)	EPS (Estimate)	PER (Estimate)	BPS (Actual)	PBR (Actual)
-	-	¥11.49	262.8 x	¥457.93	6.6 x

*Share price as of closing on November 29. The number of shares issued at the end of the most recent quarter excludes its treasury shares. ROE and BPS are based on previous term earnings results.

Non-consolidated Earnings Trends

Fiscal Year	Net Sales	Operating Income	Ordinary Income	Net Income	EPS	DPS
Mar. 2016 (Actual)	121	-6	0	-1	-	-
Mar. 2017 (Actual)	156	-533	-486	-488	-	-
Mar. 2018 (Actual)	370	-542	-454	-460	-	-
Mar. 2019 (Actual)	807	-330	-176	-183	-19.42	-
Mar. 2020 (Estimate)	1,418	9	187	119	11.67	-

*Unit: Million yen

*For the term ended Mar. 2016, two-month results are indicated, because accounting periods were changed.

*The forecasts of the term ending Mar. 2020 is estimated by the company

This Bridge Report reviews the first half of fiscal year March 2020 earnings results and fiscal year March 2020 earnings estimates of Autonomous Control Systems Laboratory.

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Key Points

- **ACSL offers solutions to operational streamlining, full automation, and adoption of IoT by utilizing full autonomous drones mainly in the field of "infrastructure inspection" and "logistics and mail transportation." The company's strengths are autonomous flying technologies including its original "Visual SLAM" which estimates the drone's location without the global positioning system (GPS) using image processing and capacity to integrate them into drone control.**

- **In the first half of the term ending March 2020, sales were 204 million yen (246 million yen in the same period last year) and operating loss was 299 million yen (232 million yen in the same period last year). Development of solutions (STEPs 1, 2) and sales of drones (STEPs 3, 4) exceeded the results of the same period last year, but sales of the national project, on which the company is making efforts to reduce dependency, decreased (65 million yen to 18 million yen). Full-year forecasts include sales of 1.4 billion yen (up 75.6% year on year) and operating income of 9 million yen (it was a loss of 330 million yen in the previous term). Acceptance and reception of products by existing customers for large projects are expected happen around the end of the fiscal year, and the company is estimating that sales will be over 1.2 billion yen and operating income will be over 300 million yen in the second half.**

- **Since the company's sales tend to be recorded in the second half, it is not possible to estimate the business status based on the progress rate against the full-year forecast. Most customers are considering using drones to address issues of labor shortage and reduce labor expenses from medium to long term perspectives, and contracts are usually long-term as they include experiments for various cases. However, inspections and acceptances are conducted on an annual basis, and recording of sales is concentrated around the end of the term (the business itself is leveled). If the number of customers in STEPs 3 and 4 increases and the drones can be delivered throughout the year, profits will be leveled out throughout the year, but for the time being, it is expected that results will continue to be recorded mostly in the second half. As of the end of the first half of the term ending March 2020, the sum of sales and prospects for project acquisitions was 615 million yen, and the progress against the budget is generally on track.**

1. Company Overview

Autonomous Control Systems Laboratory develops and sells fully autonomous drones (which can fly based on a preset program or the like without being operated by a person), which do not require the operation with a controller and automatically take off and return. The company targets the fields of "infrastructure inspection," "logistics and mail transportation," and "disaster prevention and control," in which high-level autonomous flying is frequently demanded. The drones of the company work on behalf of human workers in these fields. Accordingly, the business of the company is to not merely manufacture and sell machines, but also offer solutions for streamlining business operation, automating business processes, and adopting IoT. The company deals with tasks from planning, system development and installation, to after-sales services on a one-stop basis.

【Basic policy for business administration】

ACSL creates drone applications for the partner companies (core clients) that are anticipated to have a continuous business relationship in various fields to create actual economic benefits focusing on its autonomous control technology through the fee-charging proof of concept (PoC) projects by using original drones and system development capacities. It is also offering integrated services including PoC, system integration for implementation in customers' operation, and mass production (production of customized industrial products for which the pressure of replacement is low). This way, it aims to establish a business model that can promote technological innovation by maintaining high levels of profit and continuing investment in development.

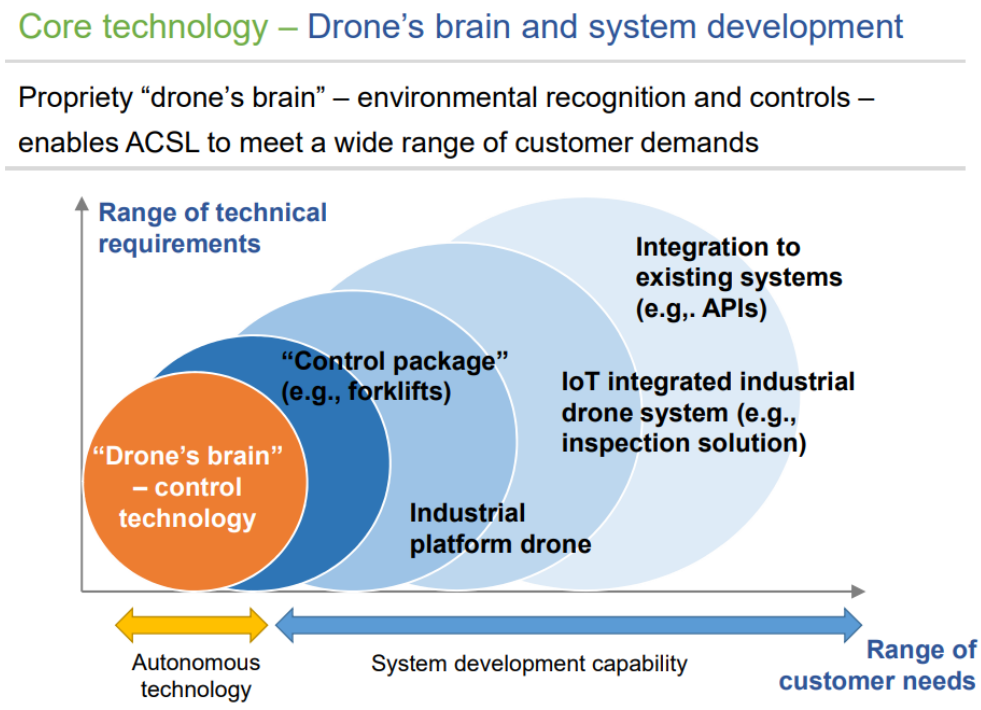
【Corporate History】

Autonomous Control Systems Laboratory has roots in Nonami Laboratory, Chiba University, which started developing the technology for fully autonomous drones in 1998. Nonami Laboratory accumulated research outcomes from fundamental research, and succeeded in actualizing autonomous control for the first time in the world in August 2001. Then, it was incorporated as Autonomous Control Systems Laboratory Ltd. (ACSL) in November 2013, so that its autonomous control technology could be used in a broad range of industries. In July 2016, Mr. Hiroaki Ohta (who is the present president) was appointed as COO, to establish management and development systems, and the company was listed in Mothers of Tokyo Stock Exchange in December 2018.

1-1 Platform technology

ACSL developed and commercialized necessary technologies for autonomous flying as platform technologies. They include the autonomous flying technology with GPS, the technology for estimating the drone's location, which realizes autonomous flying without GPS with image processing (Visual SLAM), original communications and cloud systems for accumulating and analyzing flight logs and image data of drones, AI for flight control, which can recognize people, passages, etc., and parachutes for enhancing safety.
By integrating these technologies, the company developed the platform drone, and based on it, it offers drones customized for each application.

Core technology - "Autonomous control technology for enabling drones to think and fly by themselves"



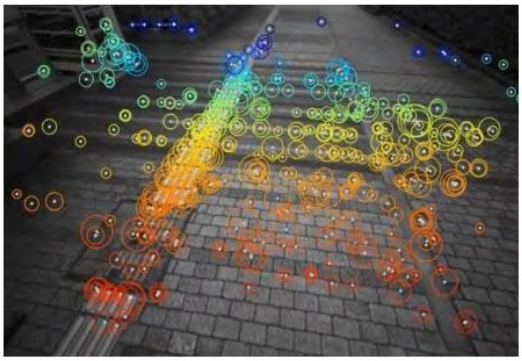
(Taken from the reference material of the company)

Cutting-edge cerebrum-like technologies - Autonomous flying technology "Visual SLAM" without GPS using image processing

"ACSL-PF1" can see and think by itself. Specifically, it is equipped with "SLAM monocular camera" that is set downwardly and "stereo cameras for distance control" mounted with two camera modules that are set forwardly. It estimates the location and direction of the drone with the "SLAM monocular camera" and measures the distance between the drone and target (horizontal and vertical direction) with the "stereo cameras for distance control." The built-in GPU analyzes (calculates) images taken by these cameras in real time to recognize the environment in which the drone is placed (an environment recognition technology "Visual SLAM"). The autonomous flight is realized by linking this analysis results with attitude control and flight operation control.

Visual SLAM cameras

Extraction of feature points



(Taken from the reference material of the company)

The company's strength is that it develops all necessary technologies including the environment recognition technology, attitude control, and flight motion control. Furthermore, while existing environment recognition technologies use GPS data (location information), a pressure sensor (measures barometric altitude) and a digital compass (measures azimuth), the company's environment recognition technology "Visual SLAM" does not require them. Because it does not require GPS data, it can safely fly autonomously indoors or near structures where GPS data are not available. In other words, it is a revolutionary technology that enables fully autonomous flight in a non-GPS environment.

1-2 Business model

The services of the company can be classified into Step 1, which conducts Proof of Concept (PoC) according to customer needs, Step 2, which designs and develops customized drones based on PoC, and Steps 3 and 4, which produce a small number of drones and apply them to actual tasks.

STEP 1	To meet customers' needs for adoption of drones, the company conducts PoC using its test drones for solving problems while charging fees. PoC means an experiment using available technologies in order to study the feasibilities of new concepts and ideas. The company checks whether it is possible to streamline business operation, automate processes, and adopt IoT, etc. with the minimum system configuration of drones, which are the purposes of drone adoption of customers. The company demonstrates that concepts and theories can be put to practical use.
STEP 2	The company conducts the design and development of the entire customized systems, including the integration of drones into customers' existing systems, and offers operation simulators required for installing drones safely and services of maintaining and inspecting drones (system installation and operation support).
STEP 3	The company carries out trial operation of customized systems developed at STEP 2 in customers' facilities, sells them for commercial use, and offers maintenance support after selling drones. Through maintenance support, the company receives drone maintenance fees, which arise regularly after sale, prices of supplies, and charges for on-site consulting services. In addition, it is continuously improving the practical design for each customer. Examples of usage of drones include inspection of factory facilities, buildings, bridges, etc., investigation of enclosed environments such as sewer pipes, commodity distribution and mail delivery, and initial grasp of disaster sites. Incorporating a drone into such projects will enable more efficient, unmanned, and IoT-enabled operations.
STEP 4	Definition of STEP 4 is production and supply of 10 or more drones every fiscal year. It is different from STEP 3, in that full-blown incorporation of drones into specific operations is assumed.

1-3 Cases of some users

Case 1: Rakuten Drone "Tenkuu"

Case 2: NJS "Air Slider"

Case 3: MORITA "Rei-Humming"

(Taken from the reference material of the company)

Case 1 "Tenkuu," a multicopter-type drone of Rakuten, Inc. for delivery
Drone-based distribution system promoted with the aim of solving the last mile problem around Japan

Case 2 "Air Slider," a drone of NJS Co., Ltd. for inspecting and assessing conduits and closed spaces
Inspection drone system for facilitating the rationalization of inspection of infrastructure in a closed environment, including sewers

Case 3 "Rei-Humming," a disaster response drone of MORITA CORPORATION
A disaster response drone system that is mounted on fire engines and can conduct surveys for a long period of time

2. Overview of the Financial Results for The First Half of Fiscal Year ending March 2020

2-1 Non-consolidated Business Results

	1H of FY3/19	Ratio to sales	1H of FY3/20	Ratio to sales	YOY
Net Sales	246	100.0%	204	100.0%	-17.0%
Gross profit	97	39.6%	77	37.9%	-20.6%
SG&A expenses	329	133.9%	377	184.5%	+14.4%
Operating income	-232	-	-299	-	-
Ordinary income	-86	-	-82	-	-
Net Income Attributable to Owners of the Parent	-87	-	-84	-	-

*Unit: Million yen

Sales were 204 million yen, and operating loss was 299 million yen (operating loss was 232 million yen in the same period last year)

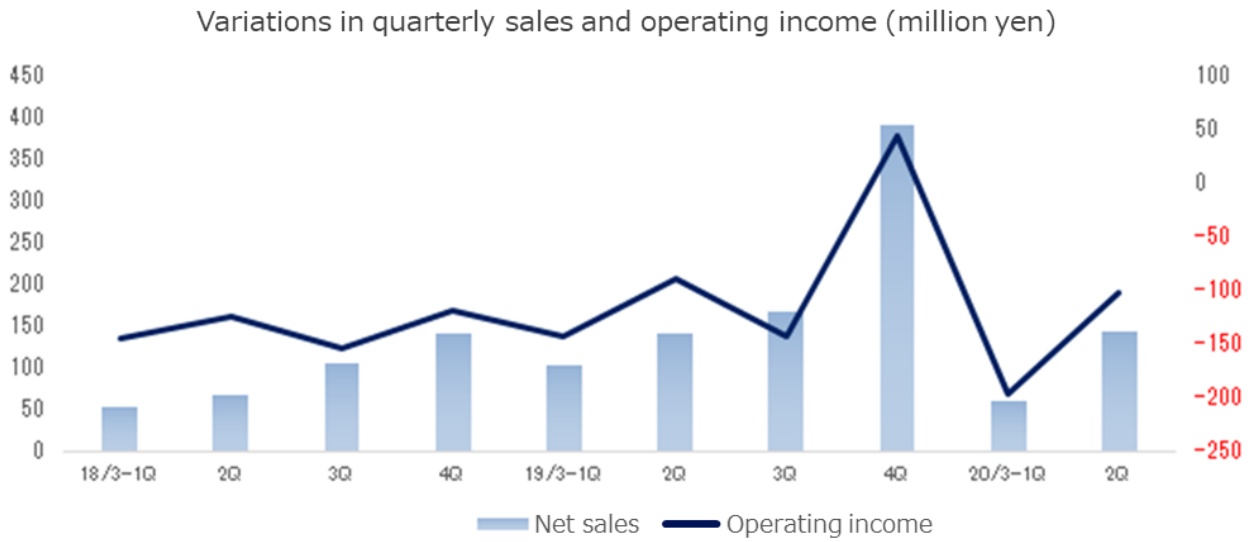
Sales were 204 million yen, down 17.0% year on year. Sales from development of solutions (STEPs 1, 2) and sales of drones (STEPs 3, 4) increased 1.9% year on year to 165 million yen, but the increase could not cover the decline in sales of the national project, on which the company is making efforts to reduce dependency.

Operating loss was 299 million yen. Gross profit margin declined due to a decrease in sales of the national project and a decrease in sales volume of mass-produced drones, as well as the fact that there were many small projects in the development of solutions (STEP1 and STEP 2). Meanwhile, SG&A grew as a result of increasing the number of engineers. R&D costs decreased 60 million yen to 120 million (it is scheduled for 366 million yen for the full year). Ordinary loss was only 82 million yen because a subsidy income of 221 million yen (148 million yen in the same period last year) was recorded as non-operating income.

Sales by Step

	1H of FY3/19	composition ratio	1H of FY3/20	composition ratio	YOY
STEPs 1 and 2: Development of solutions	84	34.5%	93	45.5%	9.7%
STEPs 3 and 4: Sales of mass-produced drones	78	31.7%	72	35.7%	-6.6%
Other	83	33.8%	38	18.8%	-53.9%
Total	246	100.0%	204	100.0%	-17.0%

*Unit: Million yen



The company records sales based on customers' inspections and acceptances, and the business results are heavily weighted in the second half. Many large projects are inspected and accepted around the end of the term, while many small or new projects are inspected and accepted in the first half. As projects become larger and longer, the recording of sales tends to happen more often in the second half.

2-2 Status by STEP

Development of solutions (STEP1, 2)

	1H of FY3/18	1H of FY3/19	1H of FY3/20
Sales (million yen)	-	84	93
Number of Deals	14	22	36

The company is developing all the software required for autonomous flight of drones. Therefore, it can flexibly respond to various demands from customers. Taking advantage of this strength, it flies drones (platforms) at specified locations as requested by customers, such as inspection of bridges and tunnels or delivery to remote islands, and demonstrate what customers have in mind on site. This is STEP 1, a consultation with a drone. In STEP 2, it develops a customized drone based on the results of STEP 1 (development of a drone tailored to the customer's needs based on the platform).

In the first half, for the development of solutions (STEPs 1 and 2), the company completed 36 cases that were inspected and accepted by the customers, and sales of 93 million yen were recorded. The number of cases increased as the number of new customers grew. Although there were large projects that were inspected and accepted in the first half (to be continued from the third quarter onwards), the unit price fell (from 3.8 million yen to 2.6 million yen) as there were many small or new projects.

Sales of mass-produced drones（STEP3, 4）

	1H of FY3/18	1H of FY3/19	1H of FY3/20
Sales (million yen)	-	78	72
Number of Units	17	28	18

In STEP 3, the company carries out the trial operation of customized systems developed during STEP 2 at customers' facilities, produces and supplies them for commercial use, and offers maintenance support after selling drones. Definition of STEP 4 is production and supply of 10 or more drones every fiscal year. It is different from STEP 3, in that full-blown incorporation of drones into specific operations is assumed.

In the first half, the unit price rose (2.8 million yen to 4.0 million yen), reflecting the sophistication of technical demands, but the number of units sold declined, since each project has yet to enter the mass production stage. Currently, there are many projects at the stage of refining drones (STEPs 1 and 2), but in the medium to long term, these projects will shift to STEPs 3 and 4, which will drive business development.

Others

	1H of FY3/18	1H of FY3/19	1H of FY3/20
Maintenance	-	18	19
National Projects	-	65	18
Total	-	83	37

* Unit: Million yen

The sales of maintenance services and the sales of national projects are categorized as others and are distinguished from STEPs 1, 2, 3, and 4. The maintenance service accounts for sales related to repairs and sales of parts for sold drones. In the future, development of STEPs 3 and 4 will provide a stable earnings base.

2-3 Financial Conditions and Cash Flow (CF)

Financial conditions

	Mar. 2019	Sep. 2019		Mar. 2019	Sep. 2019
Cash and deposits	4,465	4,063	Total current liabilities	225	85
Total current assets	4,858	4,375	Total net assets	4,701	4,666
Total fixed assets	68	377	Total liabilities and net assets	4,926	4,752

*Unit: Million yen

Total assets at the end of the first half decreased 174 million yen to 4,752 million yen. In the debit side, cash and deposits decreased due to an increase in working capital and acquisition of investment securities, while investment securities increased due to investment in AutoModality Inc. in the US (approximately 300 million yen). On the credit side, advances received and net assets decreased. Capital-to-asset ratio was 98.2% (95.4% as of the end of the previous term).

Cash flows (CF)

	1H of FY3/19	1H of FY3/20	YOY	
Unit: Million yen	-49	-134	-85	-
Operating cash flow (A)	-29	-316	-287	-
Investing cash flow (B)	-78	-450	-372	-
Free cash flow (A+B)	-198	49	+247	-
Financing cash flow	1,792	4,063	+2,271	+126.7%

*Unit: Million yen

Operating CF was negative 134 million yen as the profit before tax was negative 82 million yen (it was negative 86 million in the same period last year), accounts receivable decreased by 152 million yen (it was negative 61 million yen in the same period last year), inventories increased by negative 64 million yen (it was negative 51 million yen in the same period last year), and advances received decreased by 103 million yen. Investing CF was due to the purchase of investment securities, and financing CF was attributed to the exercising stock acquisition rights.

2-4 Business highlight in the second quarter (July to September)

In the logistics field, in addition to the progress of demonstration and practical use of the company's drones, it invested in a US company to accelerate technological development.

July	It was named as one of the Top 10 Drone Technology Solution Provider by APAC CIO Outlook.
	It realized two-line simultaneous beyond-visual-line-of-sight flights without assistants using a small drone in cooperation with ANA Holdings, NTT DOCOMO and Fukuoka City.
August	It invested US$2.8 million in AutoModality Inc. in the US. It is aiming for autonomous flight in the more advanced and complex non-GPS environments by incorporating the technologies of AutoModality.
	It established a logistics network using drones between inhabited islands in Goto City, Nagasaki Prefecture, and participated in a demonstration of goods delivery using drones aimed at improving the convenience for residents in remote island areas.
September	It collaborated with JSR and Accenture to develop a system to automatically determine the corrosion level of plant equipment utilizing aerial photo shooting technology of drone and AI's image recognition technology.
	It won the 9th place in the Growth Ranking among Technology Companies in the "2019 Japan Technology Fast 50."

In addition to the above, in October (in the third quarter), about 70 people of 40 households were isolated in Okutama due to typhoon No. 19. The company transported daily necessities and health supplements by a drone to the affected area. Furthermore, in November, its efforts of drone development of disaster prevention were featured on CNN's Innovate Japan.

Chosen to be in the Drone Ranking of APAC CIO Outlook

APAC CIO Outlook, an overseas magazine specialized in technologies, chose ACSL as one of the top 10 drone technology solution providers in 2019. APAC CIO Outlook is a magazine that aims to provide a platform for CIOs, CTOs and other senior level IT buyers and decision makers to share their experiences, wisdom and advice with enterprise IT community of APAC countries. In 2019, along with DJI China and nine other companies, ACSL was named as one of the top 10 drone technology solution providers. It was chosen because its drones capable of autonomous flight in a non-GPS environment utilizing Visual SLAM technology was recognized as innovative.

ACSL is working to enhance its name recognition by participating in exhibitions in Singapore and other countries. It also undertakes demonstration flights on site. These activities are being featured in journals. The company's sales team has also begun operations in North America and other places.

Investment in AutoModality Inc. in the US (Approximately 300 million yen)

ACSL made a minority investment of approximately 300 million yen in AutoModality Inc. in the U.S. The purposes of the investment are to incorporate AutoModality's "Perceptive Navigation" technology to the control technology of ACSL in a complementary manner to realize autonomous flight in more advanced and complex non-GPS environments as well as to establish a future sales system in the U.S. through AutoModality.

AutoModality Inc. has headquarters in New York and a research and development base in California. It carries out research, development and sales of drone flight software. In the past, it won or was placed highly in competitions in the U.S. This investment was made because ACSL determined it necessary to incorporate the technologies of AutoModality in the portfolio for the future.

AutoModality's "Perceptive Navigation" technology is complementary to ACSL's "Visual SLAM" autonomous flight technology (a technology that enables flight without GPS by recognizing space). "Perceptive Navigation" is a self-position estimation technology that focuses on object recognition utilizing remote sensing technology (LiDAR) using laser light. Since the estimation of the drone's position is performed by recognizing the relative position of the object, the accuracy is high, and the drone can be operated even in open spaces, for example, during bridge inspection.
When flying autonomously around a bridge, it is difficult to recognize the location as light is reflected by water under the bridge and recognition accuracy drops above a bridge due to the sky. Therefore, it is sometimes difficult to carry out perfect autonomous flight only with the "Visual SLAM" technology. For this reason, ACSL is intending to incorporate AutoModality's remote sensing technology (LiDAR) using laser light, "Perceptive Navigation" to complement "Visual SLAM." (LiDAR is the mainstream in autonomous driving, and image processing complements it.)

The key to differentiating ACSL drones from Chinese ones is "non-GPS." ACSL's drones fly without a pilot. ACSL is investing in development of its own "non-GPS" technologies, but it intends to actively incorporate other companies' superior technologies, and the investment in AutoModality is part of that initiative.

Complementary relationship between ACSL and AutoModality

	ACSL	AutoModality
Possessed technologies	・ Self-position estimation technology for the relative coordinate system in the entire flight environment using image processing (Cerebrum: Visual SLAM) ・ Autonomous flight technology using original flight algorithm (Cerebellum) ・ Peripheral technologies such as inspection camera, cloud, and analysis AI.	・ LiDAR-based self-position estimation technology for the relative coordinate system around the approaching object (Cerebrum: Perceptive Navigation) ・ Chinese company's flight controller for flight algorithm (Cerebellum) ・ Inspection camera from a Chinese company
System configuration	・ NVIDIA TX2 (Cerebrum) ・ Original flight controller (Cerebellum) ・ Original drone case (Body)	・ NVIDIA TX2 (Cerebrum) ・ Flight controller from a Chinese company (Cerebellum) ・ Drone body from a Chinese company (body)


Inspection, etc. of steel-framed bridges
(Source: AutoModality, Inc.)


Accurate flight in space with Perceptive Navigation
(Source: AutoModality, Inc.)

(Taken from the reference material of the company)

ACSL participated in an experiment of unmanned logistics between the remote islands in Goto City, Nagasaki Prefecture

ACSL provided a drone to a test of unmanned logistics between the remote islands in Goto City, Nagasaki Prefecture. The test was implemented by ANA Holdings and Goto City, and ACSL supported the operation as well. The Goto Archipelago has several islands with about two or three inhabitants, and these islands form Goto City. In addition to Goto City, many people live on remote islands that are a few kilometers away from each other across Japan, and disruption of logistics due to typhoons, strong winds and high waves is a concern. ANA Holdings is working on infrastructure development in these regions, and ACSL is participating in the initiative. This effort involves a beyond-visual-line-of-sight flight, and it is a good example to show the high level of technological completeness of ACSL. It already has a significant presence in the market as a leader in beyond-visual-line-of-sight flight of drones.

Development of a corrosion judgment system in cooperation with JSR and Accenture

Utilizing drones and the image recognition technology using AI, ACSL developed a system that enables automatic determination of corrosion level of infrastructure equipment of chemical plants, etc. by screening. The system uses high-precision AI technology such as deep learning to examine high-precision images taken by drones. This system enables quicker, more accurate and safer equipment inspection on a monitor in a control room, instead of the conventional visual inspection on site.

ACSL received a subsidy from New Energy and Industrial Technology Development Organization (NEDO) for the "AI System Joint Development Support Project." Through experiments that had been conducted at the JSR Kashima Plant since August 2018 and other experiments, the company developed drones that can fly autonomously in hazardous locations such as chemical plants under non-GPS environments and also established a system that connects aerial image data with the entire systems.
Meanwhile, Accenture built AI and developed an integrated application platform to determine corrosion spots by analyzing the images and data, utilizing the technologies and rich knowledge in the field of industrial security possessed by "Accenture Applied Intelligence," a specialized organization for AI and data science.

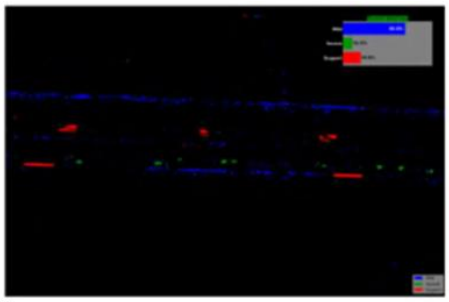
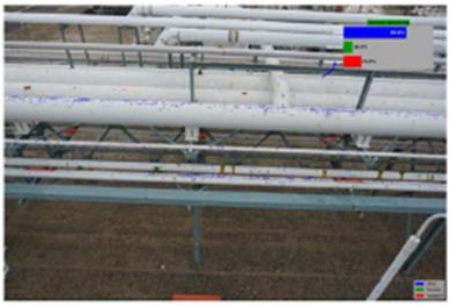


Image of corrosion assessment


Superimposing the captured image with corrosion assessment image

(Taken from the reference material of the company)

Transportation of goods to isolated areas by drones

In Okutama, about 70 people of 40 households were isolated after Metropolitan Route 204 was collapsed by Typhoon No. 19. ACSL delivered daily necessities and health supplements to the area by a drone. The goods were transported by beyond-visual-line-of-sight flight using NTT Docomo's LTE radio wave, and this project proved that ACSL has established technologies that enable the beyond-visual-line-of-sight flight by meeting national standards even in places where local radio wave is not available such as mountains. Although the weight of goods was 2 kg this time, it is possible to handle heavier goods in principle. In the future, once the battery performance is improved, transportation for longer distances will also become possible.

3. Fiscal Year Ending March 2020 Earnings Forecast

3-1 Fiscal Year Consolidated Business Results

	Results of FY 3/19	Ratio to sales	Estimate for FY 3/20	Ratio to sales	YOY
Net sales	807	100.0%	1,418	100.0%	+75.7%
Gross profit	403	50.0%	850	60.0%	+110.9%
SG&A expenses	733	90.9%	841	59.3%	+14.7%
Operating income	-330	-	9	0.6%	-
Ordinary income	-176	-	187	13.2%	-
Net income	-183	-	119	8.4%	-

*Unit: Million yen

Full-year forecast remains unchanged, and operating income/loss is expected to return to the black

Construction of high-quality solutions aimed at early industrial use of drones is believed to be increasing. Inquiries from business operators in the same industry that are studying the practical application of drones are increasing, as some of the company's customers are disclosing examples of their drone applications. In the second half, sales from ongoing large-scale projects will be recorded after inspection and acceptance by the customers. Furthermore, sales of new projects of 411 million yen acquired in the first half will be recorded.

In terms of profits, gross profit margin is expected to improve by 10 points to 60% due to a decrease in the fixed ratio associated with sales growth. The company plans to hire more than 10 employees, mostly engineers, which will increase labor expenses. It also included development costs (about 150 to 200 million yen) for two national projects in the estimates. However, operating income is expected to turn to a profit of 9 million yen, an increase from a loss of 330 million yen in the previous year, after absorbing the increases in SG&A expenses. Revenue from subsidies for research and development related to a national project conducted in the term ended March 2019 was 180 million yen, and as a result of recording the revenue, ordinary income is expected to be 187 million yen.

Sales of each STEP

	Results of FY 3/19	Composition ratio	Estimate for FY 3/20	Composition ratio	YOY
STEPs 1 and 2: Development of solutions	293	36.4%	572	40.3%	+95.2%
STEPs 3 and 4: Sale of mass-produced drones	384	47.6%	726	51.2%	+89.1%
Other	129	16.0%	120	8.5%	-7.0%
Total	807	100.0%	1,418	100.0%	+75.7%

*Unit: Million yen

KPI by STEP

		Results of FY 3/17	Results of FY 3/18	Results of FY 3/19	Estimate for FY 3/20
STEPs 1 and 2	Provide Solutions (number of deals)	12	60	81	110
STEPs 3 and 4	Mass Production (number of units)	40	40	106	220

Non-consolidated Business Results for the Second Half

	Results of 2H of FY3/19	Ratio to sales	Difference of 2H of FY3/20	Ratio to sales	YOY
Net Sales	561	100.0%	1,213	100.0%	+116.2 %
Gross profit	305	54.4%	772	63.6%	+153.1 %
SG&A expenses	404	72.0%	463	38.2%	+14.6%
Operating income	-98	-	308	25.4%	-
Ordinary income	-90	-	269	22.2%	-
Net Income Attributable to Owners of the Parent	-95	-	203	16.7%	-

*Unit: Million yen

4. Conclusions

Some new projects are completed in a short period of time, but even in such cases, full-scale development will begin afterwards based on the verification results. It seems that many customers continue STEP 1 and STEP 2 for several years to build their drones. Furthermore, the number of projects that end after STEPs 1 and 2 is decreasing. Customers who start using a drone with impromptu ideas often end the project in a short time, but most of ASCL's customers are considering using drones to cope with labor shortage and reduce labor expenses from a medium to long term perspective. With these customers, the cooperative relationships last long as various types of cases need to be tested. Having said so, inspections and acceptances are conducted on an annual basis. Therefore, recording of sales is concentrated toward the end of the term (the business itself is leveled to a certain extent). According to the company, many customers are carrying out STEP 1 and STEP 2 with increasing difficulty year by year for several years. If the number of customers in STEP 3 and STEP 4 increases and the drones can be delivered throughout the year, earnings will be leveled out. However, for the time being, it is expected that sales will continue to be heavily concentrated in the second half. For this reason, the company cannot estimate the business status based on the progress rate against the full-year forecast. Basically, it is focusing on acquiring projects and customers who are intending to proceed to STEPs 3 and 4. By doing so, the scope of research and development will not be unnecessarily spread widely, and the sales structure can be composed of a small number of elite workers. According to Mr. Ota, the company's president, "We are not intending to stay in the red. It is our duty as a listed company to make profits as a robot manufacturer and meet market expectations."

< Reference: Regarding Corporate Governance >

◎Organization type, and the composition of directors and auditors

Organization type	Company with an audit and supervisory board
Directors	6 directors, including 2 outside ones
Auditors	3 auditors, including 3 outside ones.

◎Corporate Governance Report (Updated on June. 28, 2019)

Basic Policy

Our mission is "Liberate Humanity through Technology," and our corporate value is "Pursue world-class autonomous technology and accomplish social implementation, to automate and unman human tasks and promote evolution of humanity." Under this corporate value, we believe that our duty is to foster and maintain trusting relationships with all stakeholders (i.e. including shareholders, employees, business partners, clients, creditors, and local communities) and conduct business administration putting importance on the interest of every stakeholder. To do so, it is indispensable for our business to grow stably and lastingly, and we recognize that it is important to strengthen corporate governance for improving the soundness and transparency of business administration, which would be the foundation for the growth, and we actively work on it. Concretely, we are striving to enrich general meetings of shareholders, upgrade the functions of the boards of directors and auditors, carry out timely, appropriate information disclosure and IR activities, and tighten internal control systems, to enhance corporate governance further.

【Reasons for Non-compliance with the Principles of the Corporate Governance Code】

Autonomous Control Systems Laboratory Ltd. has implemented all the Basic Principles of the corporate governance code.