

## Directions to the Club Meeting Location

**Where: South St. Paul Municipal Airport, a.k.a. Fleming Field,** located on the southern extremity of South St. Paul, south of I-494, west of Concord Street and East of Highway 52.

### If coming from the western Twin Cities going east on 494:

- Exit at the 7th and 5th Avenue exit (Exit No.65)
- Turn right (South) on 7th Ave and go approximately .6 miles to a 4-way Stop sign. This is South Street W. To your left there will be a McDonald's; to your right front there will be a Walgreen's.
- Turn left (East) at the 4-way Stop onto
- South Street W and go approximately .6 miles. Along the way you will encounter three more Stop signs—the third Stop sign (Henry Avenue) will be a "T" intersection. At the "T" intersection on your left will be homes and on your right softball fields.
- Turn right (south) onto Henry Ave. and go approximately .2

miles toward the Fleming Field airport terminal building.

### If coming from east Twin Cities on westbound 494:

- Exit at the 7th and 5th Avenue exit (Exit No.65)
- Turn left (South) on 7th Ave and go approximately .6 miles to a 4-way Stop sign. This is South Street W. To your left front there will be a small strip mall; to your right there will be an Amoco station.
- Turn left (East) at the 4-way Stop onto
- South Street W and go approximately .4 miles. Along the way you will encounter two more Stop signs—the third Stop sign (Henry Avenue) will be a "T" intersection. At the "T" intersection on your left will be homes and on your right softball fields.
- Turn right (south) onto Henry Ave. and go approximately .2 miles toward the Fleming Field airport terminal building.

The terminal is on the right with parking available.

Twin City Aero Historian  
Rick Schmierer  
1852 E. 39 Street  
Minneapolis, MN 55407

Return address requested

The Aero Historian is published monthly by the Twin City Aero Historians, Inc., a joint chapter of the American Aviation Historical Society and International Plastic Modelers Society/USA, for members and readers as part of their annual dues or fees.

The group is open to aviation enthusiasts from teenagers on up who are interested in aviation modeling, photography, collecting, art and writing. For more information contact Dave Nelson at 651-765-1914.

The Twin Cities Aero Historians (TCAH) meet the second Saturday of every month at 1:30pm.

See above for the new meeting locations and directions.

Mail Newsletter material and address changes to the treasurer.

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**DRAW DECALS**

# The Aero Historian



Volume 43 Number 11

Website: <http://www.aerohistorians.org>

November 2009



1/72 Mitsubishi A5M4 'Claude'  
by Bob Arko

**Mitsubishi A5M 'Claude'**  
by Peter Starkings  
Reprinted from 'JAS Jottings',  
Vol. 5, No. 2, 1999  
Used with permission

### BACKGROUND

The successful debut of the Mitsubishi A5M1 into JNAF service in early 1937 marked the culmination of five year's work. It had started in 1932 with the Navy's newly instigated continuous development program for operational aircraft design, when it was realized that monoplanes would have to replace biplanes in order to meet ever more demanding performance criteria. The first such opportunity for fighter aircraft arose when Mitsubishi and Nakajima were asked to compete

for a 7-Shi carrier fighter to replace the Type 90, then only just coming into service.

The Mitsubishi IMF10 entrant was a low wing design, the first such for the Navy, with a 780hp Mitsubishi A4 air cooled radial engine and a trousered undercarriage. The first prototype was ready for testing in the Spring of 1933, but it crashed when the tailfin failed during a test dive later that year. A second prototype crashed a year later after failing to recover from a flat spin. Although the design was rejected by the Navy because of poor controllability, it was considered advanced for the time. In particular, the aircraft incorporated a box-spar feature which, after later improvements,

was adopted by Mitsubishi and other manufacturers in several subsequent aircraft.

The Nakajima NKIF entrant was, in effect, a navalized version of their Army Type 91 Fighter with a slightly more powerful engine. The single prototype was tested by the Navy in early 1933, but rejected through failure to meet the required performance specification.

### A NEW SPECIFICATION

Following failure of the 7-Shi competition, Mitsubishi and Nakajima were asked to compete again in 1934 for a 9-Shi single seat fighter. Omission of the carrier qualification was deliberate in order

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## TCAH Officers

**President**, Dave Nelson  
**Vice-President**, Larry Donovan  
**Secretary**, Merrill Anderson  
**Treasurer**, Dave Hueffmeier  
**Historian**, Tom Norrbohm

## Newsletter Info

Article Submission Deadline: 22nd of each month.

Editor  
**Bob Arko**  
6417 Rice Court  
Lino Lakes, MN 55014  
651-481-8887h  
763-496-6742w  
boba@arkokraft.com

Distribution Editor  
**Rick Schmierer**  
1852 E. 39 Street  
Minneapolis, MN 55407  
612-721-8787  
rmschmierer@comcast.net

Send articles to:  
**Bob Arko**  
6417 Rice Court  
Lino Lakes, MN 55014  
boba@arkokraft.com

Send Change of address notice to:  
Dave Hueffmeier

## TCAH This Month

The monthly meeting will be held Saturday November 14, at Fleming Field, South St. Paul, beginning at 1:30 pm. Vendor baiting will begin about 12:30, so come early.

Picture your model someplace in the Newsletter!

## From the Vice President by Larry Donovan

I will keep this short and sweet this month...hard to believe no rambling and blithering about, eh! It happens.

Number one on the agenda is that dues are due...regular dues are \$10; with youth and seniors being \$5. I am really happy that there will be no increase for next year. Remember dues support the news letter, maintaining and paying the website, and other expenses that occur through a year. So campers bring your checkbooks to the November meeting.

Secondly November is the election of officers for the next year. Ballots will be past out by the Secretary at the beginning of the meeting. As of this writing the following have been nominated: President-Larry Donovan; Vice-President-Merrill Anderson; Treasurer-Dave Hueffmeier; and for Secretary-Mark Jaques. We will open nominations again before voting. Please vote so that we continue the tradition of excellent leadership in club that we have had in the years past.

NOW the fun part about November...yep it is AUCTION DAY!!!! We all have bunches and bunches of kits, decals, books, resin and etch stashed away in the attic, garage, spare bedroom(s), and whatever storage areas. Now c'mon, let's be honest to ourselves. Are you REALLY going to live to be 656 years old to finally go through your stash. So clean out those storage areas, especially the ones with cobwebs worthy of Halloween House of Horrors. SO BRING YOUR KITS, DECAL SETS, BOOKS, DVDS, RESIN AND ETCH SETS TO THE NOVEMBER MEETING!!!!. Oh and bring cash and checks. It's interesting how I usually bring home (sneak home) more kits and etcetra than I brought to the meeting originally. Hopefully I'll hit 657 years old to finish 'em.

Upcoming at the December meeting will be the Second Annual Club Contest. It is open to any model you have made in 2009; so get finishing.

Finally (about time, huh!), in the October SAMI with pictures from the US Nats was a certain airplane slash tank...way to go Kyle for the unique idea and great finish and presentation of your work. If anyone else recognizes other members entries in the Nats from SAMI or any other magazines please forward them to the club so we can recognize these gentlemen for the great work!!!

See you at the November meeting: bring stuff for the auction, vote early and often, and don't forget the dues!! Until then happy modelling!!



## Treasurer's Report by Dave Hueffmeier

At the meeting on Saturday, October 10, the attendees voted to maintain the TCAH annual dues at last year's levels: \$10.00 for members, with \$5.00 annually for "Seniors" (65+ years) and for "Junior" members. Dues may be paid in person at the November meeting, or by mailing payment to my address (please see the roster).

Final results for NordicCon 2009 will be available as soon as the membership votes on the amount of the donation to be made to the Knights of Columbus hall for the use of their facility.

For preliminary NordicCon results, or if any member has any questions about TCAH finances, please feel free to contact me at "strider55106@yahoo.com" or telephone me at 651-772-4562. (We decided at the October meeting that we would prefer not to post any financial data on our website or publish it in the newsletter, as both are open to nonmembers.)



(Continued from page 6)  
introduction of it.

The A5M4 was fitted initially with the Kotobuki 4 engine, but later examples had the improved Kotobuki 4Kai, indistinguishable externally. It was produced in greater numbers than any other variant, but it is not possible to determine the exact number. Mitsubishi themselves built approximately 715 and the 21st Naval Arsenal 161 of Models 22 and 24, whilst Watanabe built 39 Model 24. The total number made of all Models (including prototypes, but excluding the A5M4-K) was 988, production ceasing finally in early 1942.

Two matters of nomenclature are worthy of note. The JNAF Model designation system was changed slightly in the late 1930s and the later system applied retrospectively has been followed in this Article as it is more familiar from use during the Pacific War period. Under the earlier system various Models were designated 1,2,3 and 4 with some differentiation between sub-variants. For example, Model 4 with the Kotobuki 4 engine was designated Model 41 and with the 4Kai, Model 42.

The other matter relates to the Allied coding CLAUDE. At some stage the A5M4 was incorrectly reported as a Type 97 instead of 96 and thought to a new aircraft altogether, hence a different code SANDY. This was dropped as soon as the mistake was discovered.

## (A5M4-K)

A two seat trainer version of the A5M4 was developed by the 21st Naval Arsenal in 1940 to a 15-Shi specification. It was essentially an A5M4 airframe with Kotobuki 4 engine, but fitted with tandem open cockpits (the front one being relocated slightly), a large turnover pylon between them and a large rear cockpit headrest. Small horizontal fins were added on each side of the rear fuselage to aid spin recovery and wheel covers were removed.

Later production aircraft had a small mud scraper added to the undercarriage legs front and often the fuselage tail cone was removed.

The A5M4-K was accepted into service in 1942 and 103 were manufactured by the 21st Naval Arsenal between then and early 1944.

## COLOURS AND MARKINGS

In its heyday the A5M served at a time when colorful markings abounded. Most of these were in red, white and black which, against a grey background (more of that anon!), showed up particularly well. Even those finished in the "China" green/brown scheme, when markings were not so prominent, look relatively attractive.

Reverting to grey, discussion still continues on what that color really was for both the A5M and A6M, which is beyond the scope of this article. For the A5M suffice to say that Models 1, 21 and 22 (early) have been portrayed in natural metal, light grey and light greenish grey, with Models 22 (late) and 4 in natural metal, light grey or both of these with an amber varnish coating. As nothing appears to be definitive, modelers will have to rely on their preferred source of information!

## A5M IN ACTION

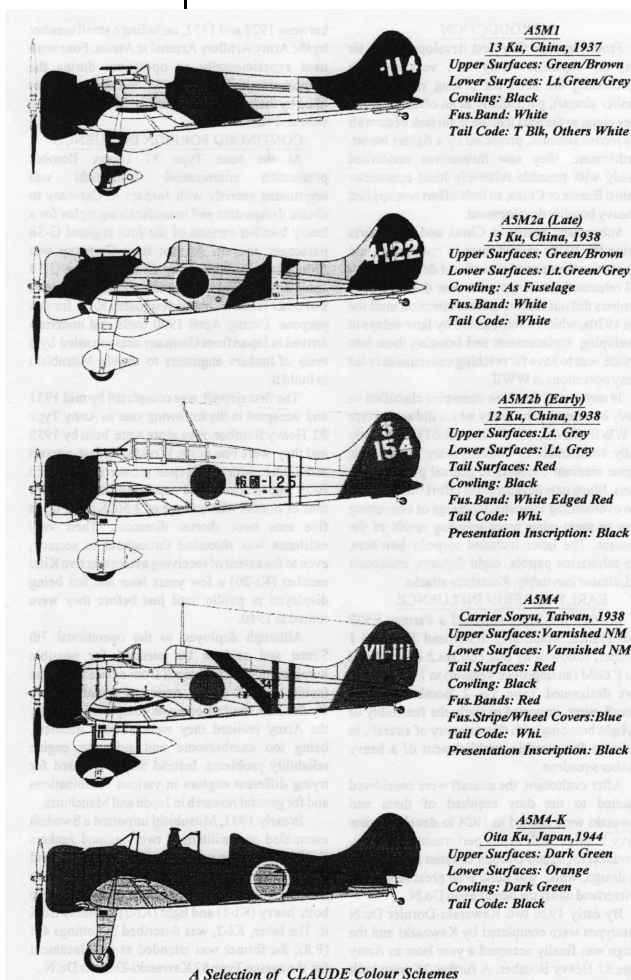
All A5M Models made their mark for several years in China from both land and carrier bases (see above), their successes and development largely unnoticed by the Western Powers. In early 1941, Model 24 equipped eight aircraft carriers although, as with land bases in China, replacement by ZEKES

was then taking place. At the start of the Pacific War only carriers *Hosho*, *Ryujo* and *Zuiho* still flew them, intended to cover Taiwan based bomber attacks on the Philippines. In the event, long range escorting ZEKES did this and, apart from one attack there, no A5M took part in front line combat against the Allies.

Thereafter, all A5M Models reverted to a training role for the rest of the war. Some still left in 1945 took a final one way trip....

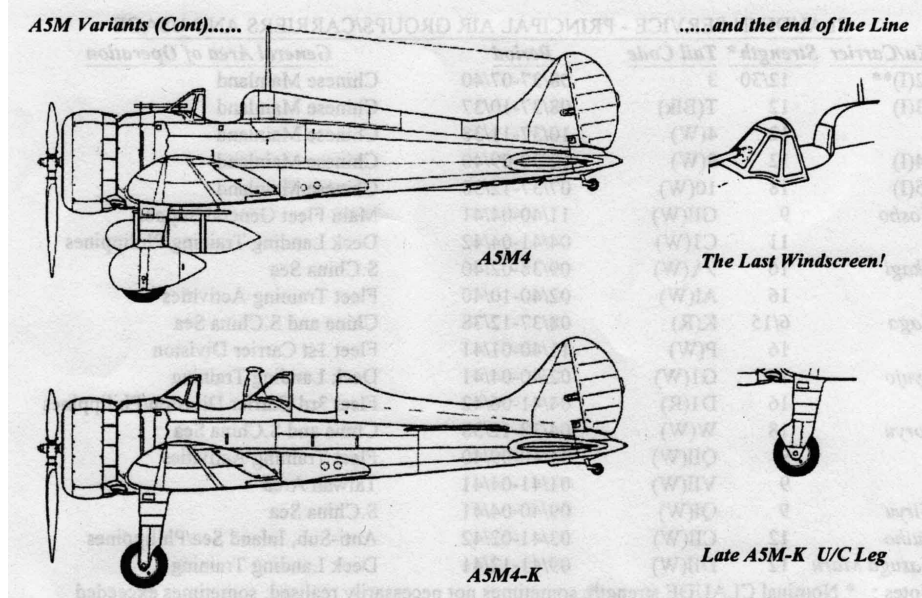
## REFERENCES

- #1 Encyclopaedia of Japanese A/C, Vol.1, 1966
- #2 Koku-Fan Monthly, 4,5,6/'76 and 11183
- #3 Japanese A/C of the Pacific War, Francillon, '79
- #4 Maru Mechanic 49 1984
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- #7 Model Art 510,1998



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craft had a thicker, taller, strengthened fuselage spine, thus obviating need for the extending turnover protection shoe, accompanied by slight



modification to the windscreen panel shapes. These later aircraft were the definitive Model 21, but the alterations were not marked by any further designation change.

Model 21 did not last long overall on the production line either, because onset of Winter in 1937 brought demands from China for better pilot protection from the elements. After 44 had been built, it gave way in late 1937 to Model 22.

Model 22 (A5M2b)

Model 22 incorporated the 640 hp Kotobuki 3 engine as tested on the second Ka-14 prototype, but fitted with a more slender NACA cowling incorporating cooling gills and driving a three bladed propeller. The cockpit was completely enclosed by a new three panel windscreen and sliding canopy, with rear view side glazing incorporated in a modified fuselage spine front. Other modifications comprised moving the telescopic sight rearwards to come through the windscreen, installation of radio equipment necessitating a forward sloping aerial mast located just behind the cockpit glazing and fitting a jettisonable 160 L auxiliary

fuel tank shaped like a large bomb without fins. Provision was also made for a 30 kg bomb rack to be fitted under each wing just outboard of the straight centre section.

In spite of having requested it, pilots did not much like the restricting cockpit enclosure, many sliding canopies and rear glazing panels soon being removed in the field. After producing approximately 35 of Model 22 with an enclosed cockpit, subsequent aircraft reverted to the open cockpit and the fuselage spine was again altered in outline similar to that of the late Model 22, but with the front slightly less deep. At the same time the aerial mast was moved forward to just behind the pilot's headrest and made vertical.

By now demand for Model 22 output had exceeded Mitsubishi's manufacturing capacity and an assembly line was started at the 21st Naval Air Arsenal, Omura. They produced 16 with the enclosed cockpit before continuing with the open cockpit version.

Almost needless to say, the open cockpit windscreen was also changed twice in quick succession after production started. At first it was the same as that for the enclosed cockpit; then the single side panels were replaced by two

smaller ones sweeping round, whilst the front panel was extended upwards slightly. Finally, a new small horizontal panel was added to the front extended panel, with the side panels enlarged and taken up to meet it. Once again reversion to open cockpit and associated modifications were not marked by any further designation change.

It has not been possible to determine how many Model 22 were produced in total before being replaced by Model 24 in roughly mid 1938, but before continuing with that variant, a brief look at the experimental Model 23.

Model 23 (A5M3a)

In 1935 Mitsubishi imported two Dewoitine 510J fighters, one of which was made available to the Navy which they evaluated as Navy Type D Interceptor Fighter, AXD 1. The most interesting feature to them was the Hispano-Suiza in-line engine containing a 20 mm cannon firing through the propeller hub. Two of these engines were purchased separately and fitted experimentally to Model 2a airframes.

The resultant A5M3a was slightly faster than any other A5M variant, but general handling suffered because the heavier and longer engine moved the aircraft's centre of gravity too far forward. Moreover, the Navy did not want to become dependant on a foreign supplier, so the experiment was abandoned.

Model 24 (A5M4)

Model 24 was the final A5M variant, having an identical airframe to the Model 22b (open cockpit), but differing from it by having a 710 hp Kotobuki 41 engine - and yet another slightly different windscreen! Its introduction also saw advent of a new 240 L cylindrical jettisonable fuel tank, thus increasing the range still further. This type of tank can also be seen carried by some examples of Model 22b, which might be a retro-fit or suggest even earlier

(Continued on page 7)

**Airline Chatter**

by Terry Love

Airbus A-320 series is selling very well. Therefore, Airbus has given a very low priority of designing its replacement. Airbus says at least 15 years before it will fly.

Boeing 737-800 series is also selling very well. So Boeing is saying the same thing that a replacement will not be available until after 2020. This opens up the market for airliner builders from Brazil, China, Canada, Japan, and Russia to design a replacement for the 100-150 seat narrow body airliners to leap ahead.

Airbus says that 25,000 new airliners are expected to be delivered in the next 20 years. Airbus says Asia/Pacific airlines will take over 30%, Europe will take about 25%, North America will take over 20%, India will take about 10%, and China will take about 10%.

United Airlines furloughed another 290 pilots on October 1. Airline employment is now at a 16 year low for a total of 386,000 full time employees with airlines in the United States.

Airbus will deliver 13 Airbus A-380 super jumbo airliners this year.

Boeing latest version of the 747 is now being made ready for test flying. The 747-800 has 105 on order costing about \$300 million each. The 747 has been around since 1969. Boeing has built 1419 of them, with about 800 still flying. Most of the earlier -100s and -200s series have been retired, or scrapped, or parked. Boeing says that 70% of the technology is new. The new -800 series should give the 747 another 20 years of production life, giving it a total of 60 years of building the 747. That is an amazing feat!!!!

United Airlines retired its last Boeing 737 on October 28, after 41 years of operating the 737. As of

now, United Airlines has 1100 pilots laid off. The bottom pilot on the seniority list was hired in 1999.

Delta Airlines has two Airbus A-319s in permanent charter configuration for sports teams. They are N354NB, fleet number 3154, and N362NB, fleet number 3162.

Midwest Airlines was recently purchased by Republic Airways. Now Midwest will park all of the fairly new Boeing 717s (the latest version of the DC-9), and replace them with Embraer 190, and a few Airbus A-319s from Frontier Airlines, which was also recently purchased by Republic. Thus, Midwest will lay off all Boeing 717 pilots along with about 50 other employees. Republic is considering a shift of from 150 to 400 jobs from Frontier in Denver to Milwaukee - headquarters for Midwest. Also some jobs will go to Republic's headquarters in Indianapolis.

Delta Airlines parked former Northwest Airlines Douglas DC-9-31, N8929E, fleet number 9948, msn 45866, on September 29. Also Delta Airlines parked former Northwest Airlines Airbus A-330-323, N804NW, fleet number 3304, msn 0549. N804NW will be parked until January 2010 when it will be ferried to Singapore for its heavy maintenance check.

Delta Airlines recently reconfigured five Airbus A-319s temporarily for the NBA season for charters. They were Airbus A-319, N328NB, fleet number 3128, N330NB, fleet number 3130, N331NB, fleet number 3131, N351NB, fleet number 3151, and N352NB, fleet number 3152.

British Airways will lay off 1700 employees in England, and there will be a two-year freeze on pay for cabin crews.

Aer Lingus will cut 676 jobs by the end of the year.

SAS says its traffic fell 17.7%

from last year.

TACA and Avianca, both vintage Central American airlines, are going to merge bolstering its clout in Latin America.

Airbus sold two aircraft in September, but received four cancellations for a net loss of two. For the year, Airbus now has 123 orders. The cancellations came from Kingfisher Airlines of India. Boeings' net orders for this year are 79. Airbus delivered 38 airliners in September, bringing their total deliveries for 2009, as of October 1, to 358.

Republic Airways bought 10 Embraer 190Ar airliners from U S Airways for \$35 million.

Southwest Airlines earned \$23 million in the third quarter of 2009.

Japan Air Lines could go into bankruptcy if nothing is done.

Delta Airlines says that they are NOT going to paint all ex-Northwest Airlines Douglas DC-9-30s, DC-9-40s, and Boeing 757-200s, since they are going to be parked or scrapped soon. The only ex-Northwest Airlines aircraft that have not been painted in Delta Airlines markings are one Douglas DC-9-50, nine Airbus A-330s, and seven Boeing 757-300s. The bulk of what is left are Airbus A-319s and A-320s.

Boeing says that the new high tech Boeing 787 Dreamliner WILL fly before the end of the year.

United Airlines lost \$57 million in the third quarter of 2009. Last year in the third quarter, United lost \$792 million.

Continental Airlines lost \$18 million in the third quarter of 2009. Last year, Continental lost \$230 million.

Air Tran Airlines earned \$10.4 million in the third quarter of 2009. Last year, ATA lost \$94.6 million.



## Election Platform

by Larry Donovan

Firstly I really appreciate your nomination of me for the office of Club President. I really want to help lead the club in the coming year achieve it's goals expressed by you the member of the Club. While the role of President is important, more vital is the contribution of each and every member of TCAH.

For those who do not know me or are new to the club, here is some background info. Like many members I started off modeling at about 6 or 7 years old and continued until school, girls, and cars took precedence in my teens. After graduating from college (Creighton University, the Harvard on the Missouri River) I started and stopped modeling several times. In about 2000 I wandered into a hobby store and got hooked again. I mostly build "from the box" but will be attempting some resin and etch in the next year. I have a bet with my wonderful spouse that if I build at least one model per month for the next year and a half, I can go the Nats in Omaha....those who know me know this is a HUGE challenge!

My experiences in TCAH leadership has been extremely rewarding to me. I have been involved with registration for Nordic Con for the last five years, most recently in the last three year as in charge of the registration table. I have been very grateful to have been the TCAH secretary for three years, and Vice-President for the last year---how time does fly!!! I was involved in the Club Constitution and By-Laws update several years ago, I have started the Seminar program to increase every members' knowledge of modeling or Aviation history. I have also tried to keep the club aware of the many contests and shows, and club activities in our meetings and in the newsletter. I have tried to listen to you if your having an issue, like not getting the newsletter, and really do try to resolve the issue ASAP.

I guess as a platform I believe the following is as close to the one I have:

1. Keep the club fun! This is a hobby and coming to a meeting should not be a drudge! Let's not approach events like doing a Nordic Con as a chore but as a fun event--maybe have one of us do a seminar, open the competition to new ideas.

2. Maintain and build the membership. We have traditionally one of the largest clubs, in IPMS at least. But let's reach out and attract new members. Maybe it is someone who has seen your collection and comments positively---bring him or her to the next meeting. Again by keeping the meetings fun and enjoyable we will keep visitors and change them into members. The more people who are in the club, both current and new, will be bringing great ideas, wonderful models for show tables and contests and a wonderful vitality to the club.

3. Continue and expand the current Seminars. I would like to see more of us be involved in doing a seminar...maybe several members can present a seminar on a topic. Our members who are or have been veterans of the Armed Forces (god bless them for their selfless service!!!) have a unique view on "things as they happened".

4. Find options to speed the process of registration at future Nordic Cons....maybe some computer registration other club's use for their contests. Also start publicity on Nordic Con ASAP when dates and locations are decided. I also would like to see those dates ideally locked in by January of the year of the contest.

5. Assist and identify future Nordic Con sites, as we all know the current facility maybe only available for 2010 Nordic Con.

6. With the support of the club members and the executives, most importantly the Treasurer, in the safeguarding of the TCAH treasury. That does not mean we have to be

miserly with our funds but insure that when we invest them in some way the whole club is benefited.

Sounds like lofty goals but with your support I am sure we can reach everyone of those goals in the coming year. Again I want to express my deepest gratitude for my nomination as President of the Twin City Aero Historians. Thank you for taking the time to read this!



(Continued from page 1)

to allow initial maximization of performance unrestricted by carrier operation considerations. These performance requirements were exacting for the time, namely a maximum speed of 350 kph at 3,000 m, climb to 5,000 m in 6.5 minutes, armament two 7.7 mm machine guns and dimensions not to exceed 11 m in span or 8 m in length.

The Mitsubishi Ka-14 entrant was a low wing monoplane with fixed undercarriage and a 550 hp Nakajima Kotobuki 5 engine with a two bladed propeller. Although retractable undercarriages were being introduced on contemporary foreign designed fighters, the Mitsubishi design team preferred to avoid the complication and weight of a retraction mechanism. They concentrated instead on all metal construction, a fuselage of slim cross section and minimising drag by having smooth exterior surfaces. The wing had an elliptical planform with an inverted gull centre section, whilst flush rivets and fasteners were used throughout the airframe for the first time in Japan.

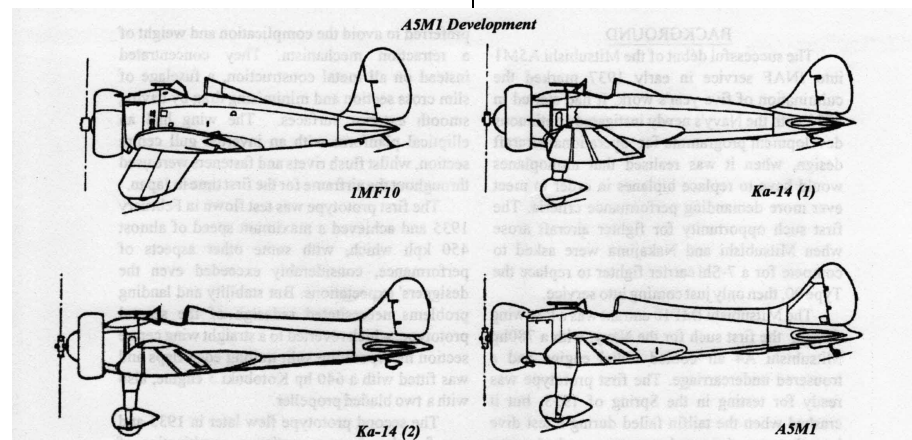
The first prototype was test flown in February 1935 and achieved a maximum speed of almost 450 kph which, with some other aspects of performance, considerably exceeded even the designers' expectations. But stability and landing problems necessitated redesign of the second prototype,

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which reverted to a straight wing centre section incorporating split trailing edge flaps and was fitted with a 640 hp Kotobuki 3 engine, also with a two bladed propeller.

The second prototype flew later in 1935 and was found to have an optimum combination of speed, ma-



neuverability and general performance. It was at this point that it was recognized as superior to the Nakajima PA-Kai competitor (See Jotings 4/4). Not only that, the Ka-14 was also recognized as being capable of holding its own in combat against biplane fighters in general, thus establishing the Navy's future fighter development policy of making maneuverability compatible with speed.

Four more prototypes were then built incorporating various minor modifications and trying different engines. Two were fitted with the 700 hp Nakajima Hikari 1 and two with the 700 hp Mitsubishi Kinsei A-8 and A-9. Increased frontal area of these larger engines reduced performance, in turn compounded with the Hikari by cooling problems. The A-9 on the 6th prototype was replaced with an improved version of the Kotobuki 5 engine fitted to the first prototype, designated Kotobuki 2Kai 1. The Hikari on the fourth prototype was later replaced with an improved version of the Kotobuki 2Kai 1 engine, designated 2Kai 3A (see Model 21 below).

By the time of the Kotobuki

2Kai 1 powered sixth prototype, additional equipment, increased fuel tankage and a slightly heavier engine had taken the gloss of the first prototype's outstanding performance, but conclusion of successful trials showed it still exceeded the specification. Thus, with the proven reliable Kotobuki 2Kai 1 engine, it was finally accepted for production

in late 1936 as Navy Type 96 Carrier Fighter Model 1. (A5 M 1).

### Model 1 (A5M1)

The 580 hp Kotobuki 2Kai 1 engine was housed in a Townend ring cowling much broader than that fitted to the first prototype, but the air-

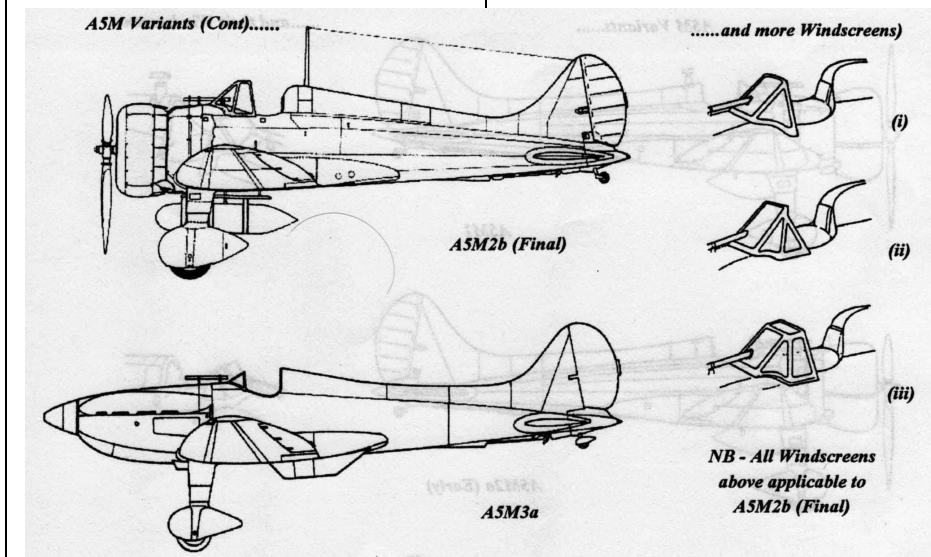
was to remain unchanged in all subsequent Models.

Model 1 itself underwent negligible visible modifications during its short production life. Other than the broad cowling, it was characterized by a two bladed propeller, a three panel windscreen with telescopic gunsight in front of it, an extending turnover protection shoe on the fuselage spine front and no aerial mast. It could also be fitted with a 160L flat sided aerofoil shaped auxiliary ventral tank. One example only, designated A5M1a, was modified for testing installation of Oerliken 20mm cannon.

During early production of the Model 1, the fourth prototype, by then fitted with the 610 hp Kotobuki 2Kai 3A engine, had been successfully tested. Slightly better overall performance led to its acceptance as Model 21, replacing Model 1 on the assembly line after only 26 had been built.

### Model 21 (A5M2a)

A few early examples of Model 21 had an identical airframe to the Model 1, but salient differences were a three bladed propeller,



frame was still very similar to that of the second. Armament now fitted comprised the two specified 7.7 mm machine guns mounted in the front fuselage top, an arrangement which

slightly deeper cowling with two protruding carburetor air intakes at the top rear and a five panel windscreen. Subsequent production air-

(Continued on page 6)